Portfolio Committee No. 5 – Industry and Transport

Augmentation of water supply for rural and regional New South Wales

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Terms of reference

1. That Portfolio Committee No. 5 – Industry and Transport inquire into and report on the performance or effectiveness of the NSW government agencies that are responsible for the augmentation of water supply for rural and regional New South Wales, and in particular:

   a) investigate the requirement for a water equation (demand and supply out to the middle of this century) for rural and regional New South Wales

   b) examine the suitability of existing New South Wales water storages and any future schemes for augmentation of water supply for New South Wales, including the potential for aquifer recharge

   c) review the NSW Government's response to the recommendations of the June 2013 report by the Standing Committee on State Development on the adequacy of water storages in New South Wales

   d) examine the 50 year flood history in New South Wales, particularly in northern coastal New South Wales, including the financial and human cost

   e) examine technologies available to mitigate flood damage, including diversion systems, and the scope of infrastructure needed to support water augmentation, by diversion, for rural and regional New South Wales

   f) examine social, economic and environmental aspects of water management practices in New South Wales and international jurisdictions, including the following case studies:
      i. Broken Hill town water supply/Menindee Lakes system
      ii. South Western NSW water management practices
      iii. North Western NSW water management practices

   g) the efficiency and sustainability of environmental water being managed by different State and Federal Government departments and agencies

   h) the management, appropriateness, efficiency and reporting of:
      i. inter-valley transfers
      ii. conveyance and loss water
      iii. carryover
      iv. the management and reporting of the water market, and

   i) any other related matter.

2. That the committee report by 14 May 2018.[1]

The terms of reference were self-referred by the committee on 22 March 2016.[2] The terms of reference were amended on 31 May 2017 to extend the reporting date until 30 March 2018, and then amended again on 6 March 2018 to extend the reporting date to 14 May 2018.[3]

1 The original reporting date was 27 October 2017 (*Minutes,* Legislative Council, 23 March 2016, p 810). The reporting date was later extended to 30 March 2018 (*Minutes,* Legislative Council, 31 May 2017, p 1683) and then to 14 May 2018 (*Minutes*, Legislative Council, 6 March 2018, p 2308).

2 *Minutes*, NSW Legislative Council, 23 March 2017, pp 810-811.

3 *Minutes*, NSW Legislative Council, 31 May 2017, p 1683, *Minutes*, NSW Legislative Council, 6 March 2018, p 2308.

Committee details

Committee members

The Hon Robert Brown MLC	Shooters, Fishers and Farmers Party	*Chair*
The Hon Mick Veitch MLC	Australian Labor Party	*Deputy Chair*
Mr Jeremy Buckingham MLC*	The Greens	
The Hon Rick Colless MLC	The Nationals	
Mr Scot MacDonald MLC	Liberal Party	
The Hon Matthew Mason-Cox MLC*	Liberal Party	
The Hon Daniel Mookhey MLC*	Australian Labor Party	
The Hon Penny Sharpe MLC*	Australian Labor Party	
The Hon Paul Green MLC*	Christian Democratic Party	

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* Mr Jeremy Buckingham MLC substituted for Dr Mehreen Faruqi for the duration of the inquiry.
* The Hon Matthew Mason-Cox MLC substituted for the Hon Wes Fang MLC for the duration of the inquiry.
* The Hon Paul Green MLC was a participating member for the duration of the inquiry.
* The Hon Penny Sharpe MLC was a participating member from 25 July 2017.
* The Hon Daniel Mookhey MLC replaced the Hon Penny Sharpe MLC as a substantive member from 20 July 2017.

Chair's foreword

> Those who cannot remember the past, are condemned to repeat it.
>
> — George Santayana,
> The Life of Reason: The Phases of Human Progress (1905-1906)

The Commonwealth, and certainly some States are all currently contributing to a 'crisis' in the reliable and affordable supply of energy to Australian energy users.

Will our collective Governments repeat this policy failure with a similar failure on water policy? Are we doomed to repeat the mistakes of short-sighted policy 'inertia'?

Water, and the availability, reliability, and affordability of this critical utility, is the subject of this Inquiry, an Inquiry that has been running since March 2016. This report contains 51 recommendations. The inquiry looks at long term rural and regional water needs out to the middle of this century.

Within this period, out to 2036, the Australian population is forecast to increase by around 28 per cent.[4]

By 2050, the World population is estimated to increase by 29 per cent, to 9.8 billion.[5]

The word 'augmentation' is used in the inquiry title, and is included at the head of the terms of reference.

However, given the time and resource restraints, the inquiry has not been able to quantify the amount of water 'augmentation' needed to sustain farming output matched to these national and global population projections.

Anecdotally however, it seems that in New South Wales, we will need to augment the reliable supply of water for agricultural production, substantially, in order to meet these estimated population requirements.

"Substantially" is not really a satisfactory descriptor. Therefore, one of the first recommendations (Recommendation 5) of the report is that the NSW Government, as a matter of urgency, should commission a long-term water equation for the state. This work would need to include water demand projections based on current estimates for food/fibre demand (domestic and export), at least out to the middle of this century.

The recommendations in this report, reflect twenty-six months of hearings, deliberations, case studies, and the consideration of around 118 submissions from 'stakeholders'.

In my view, all citizens of this state (and indeed the nation), are 'stakeholders' when it comes to water.

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4 Australian Bureau of Statistics, *Persons Projections, Australia, 2011 to 2036*, (2018) http://stat.data.abs.gov.au/.

5 United Nations Department of Economic and Social Affairs, *World Population Prospects: The 2017 Revision*, https://www.un.org/development/desa/publications/world-population-prospects-the-2017-revision.html.

I would like to personally thank all members of the committee for their hard work and perseverance. In particular, I'd like to thank my Deputy Chair, the Hon. Mick Veitch MLC, who chaired the hearings in the Murray Region during my absence.

I'd also like to thank the committee secretariat and Hansard for their enthusiastic and highly professional support during this very lengthy inquiry and the huge effort they have expended in bringing this report to the Parliament.

Hon Robert Brown MLC
Committee Chair

Summary of key issues

Water is an essential resource that is vital to the lives and livelihood of our citizens. This report focuses on a range of issues regarding the augmentation of water supply for rural and regional New South Wales. Primarily the report seeks to ensure that appropriate long-term strategic planning with a 50 plus year outlook, and requisite infrastructure is in place to guarantee that there is an adequate supply of water for current and future generations. The report analyses the Murray-Darling Basin Plan and notes the negative views of stakeholders about the plan. A number of other issues are also addressed including water allocations to irrigators, the water market, New South Wales dams and flood mitigation.

This has been a long-running inquiry. Therefore, a number of recent developments have impacted on the currency of the evidence received. As a consequence the committee's consideration of some of the issues before this inquiry has changed.

Of particular note is the announcement on 15 February 2018 by the Hon Niall Blair MLC, Minister for Regional Water, that he had begun the process to withdraw New South Wales from the Murray-Darling Basin Plan.[6]

In addition, the Independent Commission Against Corruption (ICAC) has commenced an inquiry into allegations regarding non-compliance with New South Wales water laws. These allegations were broadcast on 24 July 2017 in the ABC *Four Corners* program 'Pumped: Who's benefitting from the billions spent on the Murray-Darling?'. The story raised 'serious allegations about the way the [Murray-Darling Basin] plan is working, including accusations of illegal water use, pumping water from fragile rivers and tampering with metres'.[7]

On 19 September 2017, the committee considered whether it should expand its terms of reference to consider these non-compliance allegations. Notwithstanding the power of Legislative Council committees to inquire into matters that are the subject of an ongoing investigation by the ICAC, the committee resolved to write to the ICAC to see if there would be any implications for its investigation if the committee extended its terms of reference.

The Hon Peter Hall QC, Chief Commissioner of the ICAC responded on 3 October 2017. The Commissioner indicated that there may be a potential prejudicial overlap if the committee expanded its terms of reference to consider alleged non-compliance. Following receipt of this correspondence, no amendments to the terms of reference were made.

As this is a large report focusing on many different issues, the key recommendations for the inquiry have been included in this summary section. The evidence supporting these recommendations is detailed in the respective chapters stated under the relevant heading.

6 *Hansard*, NSW Legislative Council, 15 February 2018, p 32 (Niall Blair).

7 *Four Corners*, ABC, 'Pumped: Who's benefitting from the billions spent on the Murray-Darling?', Linton Besser, 24 July 2017.

Broken Hill pipeline (Chapter 7)

The NSW Government announced in June 2016 the construction of a 270 km pipeline, to form part of a $500 million investment intended to secure water supply for Broken Hill.[8] Following the completion of the new pipeline, Broken Hill will no longer need to rely on the Menindee Lakes for its water supply of approximately 10 GL of water per year.[9]

In October 2017, WaterNSW announced it had appointed a consortium of John Holland, MPC Group and TRILITY to design, construct, operate and maintain the pipeline. Construction started in January 2018 and the pipeline is scheduled to be completed and ready for water by December 2018.[10]

The committee notes that a sustainable long-term solution to water management issues is required for Broken Hill. Although there is some opposition to the proposed pipeline from the Murray to Broken Hill, we note that a number of stakeholders, including the peak industry body, the NSW Irrigators Council, support the measure.

However the committee remains concerned that the Broken Hill community may be shouldered with burden of covering the costs for the pipeline, as well as paying for its ongoing maintenance. We note that water bills are already high for local residents, many of whom are pensioners, and will not be able to afford a large increase in costs. We therefore recommend that the NSW Government immediately make a commitment to not increase the water bills for residents of the Broken Hill area in order to pay for the construction and ongoing maintenance of the Broken Hill pipeline. The community needs urgent assurance on this matter.

In addition, we recommend that the Independent Pricing and Regulatory Tribunal take into account its 2017 pricing determination for Peel Valley water users when determining water pricing for Broken Hill residents following the construction of the Broken Hill pipeline. See chapter 4 for a discussion of Independent Pricing and Regulatory Tribunal's decision following giving evidence.

We also understand that the NSW Government does not intend to decommission the Menindee Lakes following the completion of the pipeline as it is an instrumental part of the Murray-Darling Basin water supply system. However, given the concerns in the community, the committee recommends that the NSW Government commit to maintaining the Menindee Lakes following the construction of the Broken Hill pipeline. We therefore recommend that the NSW Government make a commitment to maintaining and improving the operation of the Menindee Lakes following the construction of the Broken Hill pipeline.

8 ABC News, *Broken Hill water crisis: NSW to build Murray River pipeline under $500m supply plan*, 16 June 2016.

9 ABC News, *Broken Hill water crisis: NSW to build Murray River pipeline under $500m supply plan*, 16 June 2016.

10 WaterNSW, *River Murray to Broken Hill Pipeline*, http://www.waternsw.com.au/projects/murray-to-broken-hill-pipeline.

Recommendation 1

That the NSW Government immediately make a commitment to not increase the water bills for residents of the Broken Hill area in order to pay for the construction and ongoing maintenance of the Broken Hill pipeline.

Recommendation 2

That the Independent Pricing and Regulatory Tribunal take into account its 2017 pricing determination for Peel Valley water users when determining water pricing for residents of the Broken Hill area following the construction of the Broken Hill pipeline.

Recommendation 3

That the NSW Government make a commitment to maintaining and improving the operation of the Menindee Lakes following the construction of the Broken Hill pipeline.

A water equation and long-term strategic planning (Chapter 3)

Evidence received during the inquiry focused on the need for greater long-term strategic water planning in New South Wales. This included the urgent need to develop a water equation. The committee also received evidence indicating that there is poor long-term strategic planning regarding the management and supply of water. Much of this evidence contended that there is a will at a local and regional level to invest in planning, but this drive has not been adequately supported by the NSW Government.

The committee also asked a number of irrigators and regional bodies what their production would be if the supply of water was not a concern. Figures provided to the committee indicated that with greater access to water, the potential output of New South Wales irrigators would be much higher than current production levels.

It is critical that a long-term water equation for supply and demand is developed to assist New South Wales in strategically planning for the future. The population of New South Wales and the global population will continue to grow. Consequently, this state must be in a position of certainty in planning for our future water needs. Water is required not just for drinking purposes, but also to ensure that agricultural production is sustainable. Agricultural production feeds our people. It also provides an economic backbone for our rural and regional communities and New South Wales as a whole. Therefore the committee recommends that, as a matter of urgency and in consultation with regional communities, the NSW Government develops a comprehensive water equation for supply and demand in New South Wales by March 2020, for the next 50 years.

While some strategic planning for water is being undertaken by the NSW Government, there is a lack of long-term strategic planning. The committee commends local councils for undertaking some of this work. However, the NSW Government should be leading the way so that a more cohesive strategy is developed for the state. As part of this process it is crucial that state government agencies widely engage with local communities in order to incorporate local insights and expertise. For these reasons we recommend that, following the development of a water equation, the NSW Government uses this calculation to work with regional communities to fund and conduct long-term strategic planning for the security of water in regional areas.

Further, if irrigators were not hamstrung by a range of water plans, far greater agricultural production levels could be achieved. This would increase the economic prosperity of the regions and the state. The committee heard evidence that currently there is an imbalance between economic and environmental outcomes, with irrigators of the view that environmental outcomes have received preferential treatment by government.

There are a range of recommendations throughout this report that seek to address the lack of balance between economic and environmental considerations in the management and supply of water. The implementation of these recommendations will go some way to achieving a better balance. However, to highlight the importance of this matter we recommend specifically that the NSW Government work with regional communities and the federal government to unlock the full production potential of regional New South Wales.

Recommendation 4

That the NSW Government work with regional communities and the federal government to unlock the full agricultural production potential of regional New South Wales.

Recommendation 5

That the NSW Government, as a matter of urgency and in consultation with regional communities, develop a comprehensive water equation for supply and demand in New South Wales by March 2020, for the next 50 years.

Recommendation 6

That the NSW Government work with regional communities to fund and conduct long-term strategic planning for the security of water in rural and regional areas.

Murray-Darling Basin Plan (Chapter 3)

The Murray-Darling Basin Plan was developed as a requirement of the *Water Act 2007* (Cth) and is administered federally by the Murray-Darling Basin Authority. The purpose of the plan is to provide a coordinated approach to water management across the Murray-Darling systems in South Australia, Victoria, New South Wales, Queensland and the Australian Capital Territory.

It is clear that there is anger in New South Wales rural and regional communities regarding the operation of the Murray-Darling Basin Plan. Inquiry participants expressed strong views that the basin plan is a political tool masquerading as an environmental plan that is denying New South Wales an adequate water supply to the benefit of South Australia. The basin plan is having a highly detrimental impact on agricultural production in New South Wales and the socio-economic development of our regional communities.

As noted above, the Minister for Regional Water has indicated that he has begun the process to withdraw New South Wales from the plan.

However, if New South Wales does not withdraw from the Murray-Darling Basin Plan, we recommend that the NSW Government renegotiate the basin plan with the federal Government and other basin

state governments to develop a more equitable agreement for New South Wales that better balances economic, social and environmental outcomes. In addition, we recommend that the NSW Government support a federal Royal Commission into the administration of the Murray-Darling Basin.

The committee is concerned that reports suggest the Murray-Darling Basin Authority will not be conducting a review of the southern basin until 2026. This lengthy delay is unacceptable. The communities of the southern basin require a review similar to the Northern Basin Review which was published in November 2016 by the Murray-Darling Basin Authority. For this reason, the committee recommends that, as a matter of urgency and irrespective of whether New South Wales withdraws from the Murray-Darling Basin Plan, the NSW Government call on the Murray-Darling Basin Authority to conduct a review of the southern basin and publicly release its findings.

Recommendation 7

That, if New South Wales does not withdraw from the Murray-Darling Basin Plan, the NSW Government renegotiate the basin plan with the federal government and other basin state governments to develop a more equitable agreement for New South Wales that better balances economic, social and environmental outcomes.

Recommendation 8

That the NSW Government support a federal Royal Commission into the administration of the Murray-Darling Basin.

Recommendation 9

That, as a matter of urgency and irrespective of whether New South Wales withdraws from the Murray-Darling Basin Plan, the NSW Government call on the Murray-Darling Basin Authority to conduct a socio-economic review of the southern basin and publicly release its findings.

Managed aquifer recharge (Chapter 5)

Managed aquifer recharge is a potential scheme for the augmentation of water. It is the 'intentional recharge of an aquifer under controlled conditions, either by injection or infiltration, in order to store a water source for later abstraction and use (indirect reuse) or for environmental benefit'.[11]

Managed aquifer recharge systems provide storage and treatment for natural water sources including surface water and groundwater; recycled water such as urban stormwater, industrial or urban wastewater; and desalinated seawater.[12]

Evidence to the committee indicates that the current level of knowledge and understanding about aquifer locations and sizes across the state is lacking. This presents a major challenge to those communities who wish to investigate the potential of aquifers for water storages. Therefore the

11 Tabled document, Golder Associates, *Managed Aquifer Recharge: Understanding a sustainable, practical approach to Integrated Water Management*, 22 February 2017, p 2.

12 CSIRO, Managed Aquifer Recharge, https://research.csiro.au/mar/

committee recommends that the NSW Government invest in aquifer mapping across the state to locate potential new water storages.

The committee acknowledges the concerns of stakeholders regarding the NSW Government's consideration of aquifer re-injection by the coal seam gas sector and the possible consequences this poses to water quality. The committee notes that community confidence in the use of aquifers could be increased by upscaling desktop studies of managed aquifer recharge to small pilot studies to test the outcomes of viability. The committee sees great potential in the use of managed aquifer recharge in the future to secure water supply for rural and regional New South Wales. Therefore the committee also recommends that the NSW Government invest in pilot programs to demonstrate the upscale capabilities of projects and new technology such as managed aquifer recharge schemes.

Recommendation 10

That the NSW Government invest in aquifer mapping across the state to locate potential new water storages.

Recommendation 11

That the NSW Government invest in pilot programs to demonstrate the upscale capabilities of projects and new technology such as managed aquifer recharge schemes.

Recommendations

Recommendation 1 **xv**
That the NSW Government immediately make a commitment to not increase the water bills for residents of the Broken Hill area in order to pay for the construction and ongoing maintenance of the Broken Hill pipeline.

Recommendation 2 **xv**
That the Independent Pricing and Regulatory Tribunal take into account its 2017 pricing determination for Peel Valley water users when determining water pricing for residents of the Broken Hill area following the construction of the Broken Hill pipeline.

Recommendation 3 **xv**
That the NSW Government make a commitment to maintaining and improving the operation of the Menindee Lakes following the construction of the Broken Hill pipeline.

Recommendation 4 **xvi**
That the NSW Government work with regional communities and the federal government to unlock the full agricultural production potential of regional New South Wales.

Recommendation 5 **xvi**
That the NSW Government, as a matter of urgency and in consultation with regional communities, develop a comprehensive water equation for supply and demand in New South Wales by March 2020, for the next 50 years.

Recommendation 6 **xvi**
That the NSW Government work with regional communities to fund and conduct long-term strategic planning for the security of water in rural and regional areas.

Recommendation 7 **xvii**
That, if New South Wales does not withdraw from the Murray-Darling Basin Plan, the NSW Government renegotiate the basin plan with the federal government and other basin state governments to develop a more equitable agreement for New South Wales that better balances economic, social and environmental outcomes.

Recommendation 8 **xvii**
That the NSW Government support a federal Royal Commission into the administration of the Murray-Darling Basin.

Recommendation 9 **xvii**
That, as a matter of urgency and irrespective of whether New South Wales withdraws from the Murray-Darling Basin Plan, the NSW Government call on the Murray-Darling Basin Authority to conduct a socio-economic review of the southern basin and publicly release its findings.

Recommendation 10 **xviii**
That the NSW Government invest in aquifer mapping across the state to locate potential new water storages.

Recommendation 11 **xviii**
That the NSW Government invest in pilot programs to demonstrate the upscale capabilities of projects and new technology such as managed aquifer recharge schemes.

Recommendation 12 **19**
That the NSW Government urgently implement the full Water Management Compliance Improvement Package outlined in Mr Ken Matthews' interim report entitled *Independent investigation into NSW water management and compliance*, dated 8 September 2017.

Recommendation 13 **20**
Notwithstanding the above recommendation, that the NSW Government urgently prioritise the introduction of universal monitoring and metering arrangements for water extractions in the Northern Basin.

Recommendation 14 **49**
That the NSW Government conduct Indigenous consultation as an integral part of all strategic planning for the management of water in rural and regional New South Wales, including the examination of cultural flows.

Recommendation 15 **70**
That, if New South Wales does not withdraw from the Murray-Darling Basin Plan, the NSW Government continue to make representations to the federal and South Australian governments to initiate a comprehensive review of the current management of the lower lakes of the Murray-Darling basin in South Australia.

Recommendation 16 **70**
That, if New South Wales does not withdraw from the Murray-Darling Basin Plan, the NSW Government renegotiate the management of water in the Menindee Lakes with the federal government so that the trigger point for the Murray-Darling Basin Authority to control water is increased from 640 GL to 800 GL.

Recommendation 17 **70**
That, if New South Wales does not withdraw from the Murray-Darling Basin Plan, the NSW Government liaise with the Commonwealth Environmental Water Holder and the Murray-Darling Basin Authority to consider developing a formal mechanism to exclude licence holders from pumping water for irrigation purposes for the duration of a planned environmental flow event.

Recommendation 18 **79**
That the NSW Government urgently undertake a review of all water sharing plans in New South Wales, that are yet to be reviewed, before their provisions are incorporated into water resource plans; and that these reviews include thorough public consultation.

Recommendation 19 **80**
That the NSW Government develop and implement public reporting mechanisms on the use of voluntary contributions, known as rules based environmental water, and that access licenses and fixed charges should reflect this permanent reduction in entitlements.

Recommendation 20 **80**
That the NSW Government conduct a review of transparent flows and translucent flows in New South Wales water sharing plans before the provisions are incorporated into water resource plans.

Recommendation 21 **85**
That the NSW Government clearly and publicly exhibit the precise roles of each of its water agencies to enhance public knowledge.

Recommendation 22 **85**
That the NSW Government boost funding and staff numbers for compliance and enforcement.

Recommendation 23 **85**
That the NSW Government ensure that the Department of Industry – Water, WaterNSW and the Office of Environment and Heritage work closely together to deliver a unified and collaborative approach to water management for the benefit of New South Wales, including the delivery of environmental water.

Recommendation 24 **85**
That New South Wales water agencies and departments conduct effective consultation on the development and review of all water plans and strategies, by drawing on the expertise of regional communities.

Recommendation 25 **85**
That WaterNSW commission the production of a mobile application for government water notifications, for example notifying predicted outflow levels.

Recommendation 26 **102**
That the NSW Government reconsider its management of water allocations so that general security irrigators receive a higher allocation at the start of a water year and that allocations should instead be based on a water equation for supply and demand in New South Wales, as recommended at Recommendation 5.

Recommendation 27 **102**
That the NSW Government ensure that carryover is an insurance mechanism for irrigators and other users, rather than as a replacement for higher allocations at the start of a water year.

Recommendation 28 **102**
That the NSW Government consider designating conveyance as an environmental flow.

Recommendation 29 **102**
That the NSW Government review the amount of water that environmental water holders can carryover in New South Wales dams.

Recommendation 30 **113**
That the NSW Government request the Independent Pricing and Regulatory Tribunal to conduct a review of the water market including considering whether it is operating transparently, efficiently, and fairly so as to eliminate market manipulation.

Recommendation 31 **113**
That the NSW Government adopt an automated process for allocation trade approvals, similar to the Victorian Water Register.

Recommendation 32 **113**
That the NSW Government review the 100 GL inter-valley transfer account balance limit in the Murray, with a view to increasing the limit, as it is a factor in the pricing differential between the Murray and Murrumbidgee valleys.

Recommendation 33 **113**
That the NSW Government encourage the Commonwealth Environmental Water Holder, through the Council of Australian Governments, to publicly release up-to-date information about the amounts of water held in its accounts and to generally improve its public reporting.

Recommendation 34 **122**
That the NSW Government work with stakeholders to analyse the electricity cost challenges for irrigators.

Recommendation 35 **139**
That the NSW Government:

(a) conduct a feasibility study into the augmentation of Burrinjuck Dam, and
(b) subject to the findings of the feasibility study, construct a new dam wall or extend the existing dam wall for Burrinjuck Dam.

Recommendation 36 **139**
That the NSW Government, subject to the findings of the WaterNSW feasibility study, construct a dam at Cranky Rock, or other suitable location within the Lachlan River Valley, including the augmentation of existing water storages.

Recommendation 37 **139**
That the NSW Government support the continuation of the Irrigation Farm Modernisation Project and other programs and incentives offered in collaboration with the federal government to increase water efficiency in the agricultural sector.

Recommendation 38 **140**
That the NSW Government conduct a study into the benefits of on-farm water storages and develop best practice guidelines for irrigators, and ensure this advice is in alignment with the Murray-Darling Basin Plan.

Recommendation 39 **168**
That the NSW Government collaborate with local governments in flood prone communities to create and implement education campaigns about floods and ways to mitigate flood damage.

Recommendation 40 **168**
That the NSW Government consider establishing a stormwater and/or flood harvesting pilot program for flood mitigation in the Northern Rivers.

Recommendation 41 **168**
That the NSW Government pursue a review of the National Disaster Relief and Recovery Arrangements through the Council of Australian Governments.

Recommendation 42 **169**
That the NSW Government through the Office of Environment and Heritage increase funding allocations to local government for flood mitigation works and floodplain risk management plans.

Recommendation 43 **172**
That the NSW Government publicly recognise the flooding risks posed by environmental flow targets in the Murray River.

Recommendation 44 **172**
That, if New South Wales does not withdraw from the Murray-Darling Basin Plan, the NSW Government urge the Murray-Darling Basin Authority to factor in the flooding risk caused by the Barmah Choke when setting environmental flow targets.

Recommendation 45 **172**
That the NSW Government re-establish the Yarrawonga to Wakool Junction Constraints Advisory Group to advise and consult on the impacts of high flow targets and strategies to reduce flooding risks.

Recommendation 46 **191**
That the NSW Government finalise its Urban Stormwater Harvesting Policy by 31 December 2018.

Recommendation 47 **207**
That the NSW Government immediately commence a dialogue with Israel to study its innovative water management practices with a view to making recommendations to the Council of Australian Governments regarding the adoption of such practices in New South Wales and Australia.

Recommendation 48 **216**
That the NSW Government:

- as a matter of priority, expedite the repair of the Burrendong Dam temperature control curtain
- then report on the suitability of the Burrendong Dam temperature control curtain in remediating cold water pollution with a view to installing effective solutions to cold water pollution in other severely affected New South Wales dams.

Recommendation 49 **216**
That the NSW Government:

- request funding from the federal government to remediate cold water pollution in New South Wales dams
- work with the Commonwealth Environmental Water Holder to limit the effects of cold water pollution during environmental flows.

Recommendation 50 **219**
That the NSW Government review the impact of ground debris in national parks and state forests on blackwater events that cause fish kills.

Recommendation 51 **219**

That the NSW Government review the effects of regulated flows on riverbank slumping.

Conduct of inquiry

The terms of reference for the inquiry were self-referred by the committee on 22 March 2016.

The committee received 118 submissions[13] and nine supplementary submissions (see Appendix 5 for a list of submission authors).

The committee held 11 public hearings: four at Parliament House in Sydney and one each in Broken Hill, Deniliquin, Griffith, Moree, Tamworth, Orange and Lismore (see Appendix 6 for a list of witnesses who gave evidence at the public hearings).

The committee also conducted site visits while in Broken Hill, Deniliquin, Moree, and Orange.

Inquiry related documents are available on the committee's website, including submissions, hearing transcripts, tabled documents and answers to questions on notice.

[13] The number of submissions received is different to the total number listed in Appendix 5 and on the committee's website, due to a duplication of submissions.

Key definitions[14]

Airspace	A volume in a water storage, which is kept empty for the purpose of mitigating potential floods
Aquifer	An underground layer of rock, rock fractures or unconsolidated materials from which groundwater can be extracted using a well. This water can be used to irrigate crops or for drinking water
Managed Aquifer Recharge (MAR)	The intentional recharge of water to aquifers for subsequent use or environmental benefit
Carryover	Allows water entitlement holders to hold water in storages so that it is available in the next water year
Conveyance	A category of water entitlement that assists the flow of water and ensures water is delivered to downstream licence holders
Desalination	The process of turning seawater into drinking water
Gigalitre (GL)	1 billion litres
Groundwater	Water that sits beneath the earth's surface contained in porous soils and fractured rocks called aquifers (see above)
Inter-valley transfers	The selling of water from one person's account in one valley and purchased for use by another person in another valley
Local Water Utility	Responsible for providing water supply and sewerage services to NSW non-metropolitan urban communities
Loss water	The budgeting/allocation of water to overcome natural river losses, such as evaporation

14 Definitions for the above terms have been sourced from the following: Water Sharing Plan for the New South Wales Murray and Lower Darling Regulated Rivers Water Sources 2016; Department of Primary Industries; Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003; Australian Government Department of the Environment and Energy; Australian Competition and Consumer Commission; CSIRO; Sydney Water; Murray-Darling Basin Authority; Australian Water Association; Standing Committee on State Development (2013) *Adequacy of water storages in New South Wales*; and the NSW Government.

Megalitre (ML)	1 million litres
Potable water	Fit or suitable for drinking
Raw water	Water that is untreated
Salinity	Refers to the concentration of salts in water or soil
Sustainable Diversion Limits (SDL)	Limits set by the Murray-Darling Basin Plan that regulate the amount of water that can be used by communities and industries both within catchment areas and across the entire Basin
Transparent and translucent flows	A transparent flow occurs in a regulated river system when inflows are passed through a regulating structure, such as a dam, to enable a near-natural flow pulse into the river system. A translucent flow is similar, however only a portion of the inflow volume is passed.
Water augmentation	Refers to the action or process of increasing water supply through different hydrological means such as investing in aquifer recharge, increasing or building new water storages
Water equation	An equation that considers the long term requirements for the supply and demand for water. A strategic planning tool to ensure there is an adequate water supply
Water security	The certainty that water needs to ensure economic, social and environmental sustainability. This includes safe and affordable drinking water to create liveable communities; the ability to support industry and agriculture; and the protection of the environment
Water sharing plan	Statutory 10 year plans developed according to the *Water Management Act 2000* (NSW) which indicate when and how water will be available for extraction, the protection of the water source and ensuring the water source is sustainable in the long-term
Water storage	A hydrological feature in which water is stored. Surface water storages include natural and man-made lakes, reservoirs and lagoons and also water held behind weirs and dams. Ground water storage includes aquifers and bores.

Chapter 1 The framework for water management and practice

This chapter discusses the importance of water for rural and regional New South Wales and the implications of regulated and unregulated rivers. It also provides an overview of the framework for water management and practice. It covers state and commonwealth legislation, details a summary of recent water management reform, and identifies the key government agencies responsible for water management and supply in New South Wales. This chapter also outlines the timeline of events concerning water compliance issues in the Barwon-Darling region and recent events concerning the Murray-Darling Basin Plan.

Importance of water

1.1 Australia's water resources are renowned for being highly variable, affected by climatic conditions and a changing environmental, social and economic landscape.[15] As water is a naturally occurring and limited resource, it must be managed to ensure it is available in the longer-term to sustain human life, the economy and the environment.[16]

1.2 With approximately 7.7 million people[17], New South Wales is Australia's most densely populated state. This is projected to increase to between 10.8 million people to 12.6 million people by 2061.[18]

1.3 New South Wales encompasses vast farming regions that require intensive irrigation, placing pressure on water supply. In addition to the increasing demand for water use caused by a growing population and drying climate.[19]

1.4 Water in rural and regional New South Wales has various vital functions, ranging from irrigation, industry, servicing communities and amenities, as well as recreational activities.[20]

1.5 The state's waterways are equally diverse, comprising regulated rivers, dams and groundwater resources, through to pristine rivers and aquifers.[21]

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15 Department of Agriculture and Water resources, *Intergovernmental agreement on a national water initiative*, http://www.agriculture.gov.au/SiteCollectionDocuments/water/Intergovernmental-Agreement-on-a-national-water-initiative.pdf.

16 NSW Department of Primary Industries, Water, *Water management*, http://www.water.nsw.gov.au/water-management.

17 Australian Bureau of Statistics, *3101.0 - Australian Demographic Statistics, September 2017* (22 March 2018) http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0.

18 Bureau of Statistics, *3222.0 - Population Projections, Australia, 2012 (base) to 2101* (28 March 2018) http://www.abs.gov.au/ausstats/abs@.nsf/Latestproducts/3222.0Main%20Features72012%20(base)%20to%202101?opendocument&tabname=Summary&prodno=3222.0&issue=2012%20(base)%20to%202101&num=&view=

19 Submission 48, NSW Government, p 3.

20 Department of Agriculture and Water resources, *Intergovernmental agreement on a national water initiative*, http://www.agriculture.gov.au/SiteCollectionDocuments/water/Intergovernmental-Agreement-on-a-national-water-initiative.pdf; WaterNSW, *Our Dams*, http://www.waternsw.com.au/supply/visit.

1.6 Water is important to Aboriginal people as it plays an integral role in Aboriginal beliefs and culture, and the Dreamtime.[22]

Regulated and unregulated rivers

1.7 Rivers in New South Wales are either regulated or unregulated.

1.8 Regulated rivers are river systems that contain large headwater storages where releases are managed in order to meet the needs of the system downstream.[23]

1.9 The Gwydir, Namoi, Macquarie, Lachlan, Murrumbidgee, and Hunter River valleys, are all regulated river systems with environmental flow rules. These rules provide 'water for the environment across a range of flow events, from floods to very low flows' and are contained in water sharing plans that vary from valley to valley.[24] See figure 1.

1.10 In regulated systems, water availability for users is determined by a range of factors such as: dam storage levels, river flows and catchment conditions. Water allocations increase during a water year as availability improves.[25]

1.11 Unregulated rivers refer to those that are not actively managed with headwater storages and rely on rainfall to provide its river flows.[26]

1.12 Unlike regulated systems, there is 'limited scope' in unregulated rivers to influence flows other than through 'long-term sustainable flow triggers to protect the environment and other water users'. [27]

1.13 Flow triggers are based on 'fixed minimum water levels' which prescribe how much water can be extracted from the river, with allocations dependent on the 'river flow conditions during the year'. When the river falls below a set level, a cease to pump rule is issued to licence holders to ensure the very low flows are protected for the riverine environment.[28]

1.14 The following map in figure 2 outlines the major river systems in New South Wales which include regulated and unregulated rivers.

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21 Department of Agriculture and Water resources, *Intergovernmental agreement on a national water initiative*, http://www.agriculture.gov.au/SiteCollectionDocuments/water/Intergovernmental-Agreement-on-a-national-water-initiative.pdf.

22 Evidence, Mr William 'Badger' Bates, Director, Barkandji Native Title Group Aboriginal Corporation, 26 October 2016, p 2.

23 Submission 48, NSW Government, p 7.

24 NSW Department of Primary Industries – Water, *Regulated Rivers*, http://www.water.nsw.gov.au/water-management/monitoring/regulated-rivers.

25 Submission 48, NSW Government, p 7.

26 Submission 48, NSW Government, p 7.

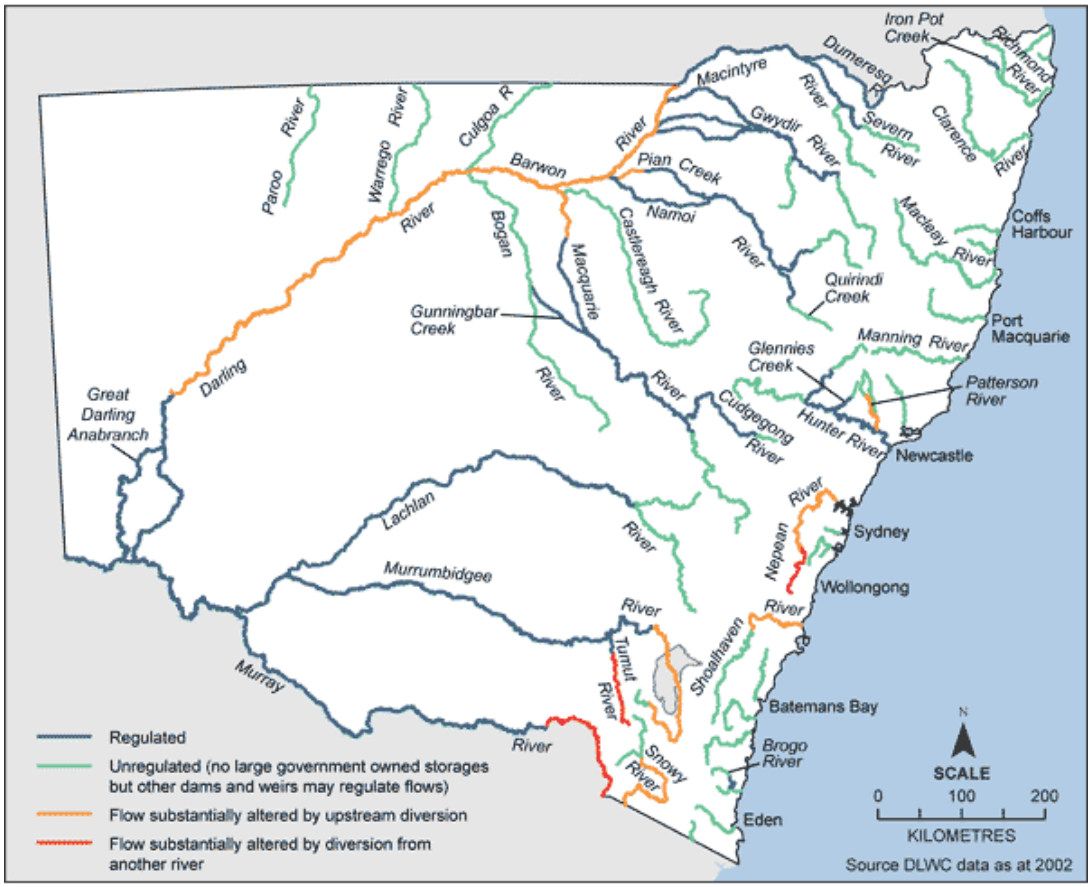
27 Submission 48, NSW Government, p 7.

28 NSW Department of Primary Industries – Water, *Rivers,* http://www.water.nsw.gov.au/water-management/water-sharing/environmental-rules/rivers.

Figure 1 Map of New South Wales valleys[29]

[29] Water NSW, *Valley progress reports* http://www.water.nsw.gov.au/water-management/monitoring/valley-progress-reports.

Figure 2 Major river systems in New South Wales[30]



State management of water

1.15 Over the last 20 years, the NSW Government has implemented major reforms to the way water is managed to support the adequate supply of water to utilities and water use license holders, and to adapt to changes in its economic position and experience of a variable climate.[31]

1.16 These reforms include the introduction of the *Water Management Act 2000* and the gradual phasing out of the *Water Act 1912*.

30 Department of Primary Industries, Water, *Ecology*, http://www.water.nsw.gov.au/water-management/ecology.

31 Submission 48, NSW Government, p 3.

Water Management Act 2000 (NSW)

1.17 The *Water Management Act 2000* was the first comprehensive water legislation to guide the state's water management activities.[32] Prior to this, there were a number of concurrent Acts regarding the management of water which did not provide an integrated framework.[33]

1.18 According to the Department of Primary Industries – Water, the Act ensured a sustainable strategy for water management at a time when available water resources were limited. The health of the state's rivers, groundwater floodplains and estuaries were in decline with evident loss of water quality, species, wetland and natural habitats.[34]

1.19 The objects of the Act are to provide for the sustainable and integrated management of the state's water resources for the benefit of present and future generations.[35] The Act recognises that:

- the fundamental health of our rivers and groundwater systems and associated wetlands, floodplains, estuaries has to be protected
- the management of water must be integrated with other natural resources such as vegetation, soils and land
- to be properly effective, water management must be a shared responsibility between the government and the community
- water management decisions must involve consideration of environmental, social, economic, cultural and heritage aspects
- social and economic benefits to the state will result from the sustainable and efficient use of water.[36]

1.20 The main provision of the Act is the implementation of water sharing plans which 'set out the rules for the sharing of water in a particular water source between water users and the environment and rules for the trading of water'.[37]

1.21 Due to the major changes required by the introduction of the legislation, the Act has been progressively implemented.[38]

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32 NSW Department of Primary Industries Water, *Law and policy*, http://www.water.nsw.gov.au/water-management/law-and-policy.

33 *Hansard,* NSW Legislative Assembly, 22 June 2000, p 7499 (Richard Amery).

34 NSW Department of Primary Industries Water, *Law and policy*, http://www.water.nsw.gov.au/water-management/law-and-policy.

35 *Water Management Act 2000*, s 3.

36 NSW Department of Primary Industries Water, *Law and Policy, Water Management Act 2000*, <http://www.water.nsw.gov.au/water-management/law-and-policy.

37 Under the Murray-Darling Basin Plan 2012, water resource plans are being developed to replace existing water sharing plans in basin states by mid-2019. These water resource plans specify how water will be shared and managed within a specific area. See Murray-Darling Basin Authority, *Water Resource Plans: what they are and how they are developed* (29 August 2017), https://www.mdba.gov.au/publications/policies-guidelines/water-resource-plans-what-they-are-how-they-are-developed; NSW Department of Primary Industries Water*, Law and policy*, http://www.water.nsw.gov.au/water-management/law-and-policy.

38 NSW Department of Primary Industries Water*, Law and policy*, http://www.water.nsw.gov.au/water-management/law-and-policy.

1.22 During the 2013 inquiry into the *Adequacy of water storages in New South Wales*, the Legislative Council's Standing Committee on State Development recommended that water supply to industry and high security needs in regulated rivers under the *Water Management Act 2000* should be given priority above environmental needs.[39]

1.23 In January 2014, the NSW Government advised that it did not support the committee's recommendation as it considered the *Water Management Act 2000* to have enough flexibility for the Minister responsible to suspend the operation of any management plan in time of severe water shortage. It was also of the view that the principles balance correctly between the need for protecting and restoring water resources and maximising social and economic benefits for the community.[40]

1.24 In August 2016, the NSW Government maintained it does not propose to amend the water management principles set out in the *Water Management Act 2000*.[41]

Water Act 1912 (NSW)

1.25 The *Water Act 1912* applies to areas in New South Wales where water sharing plans introduced under the *Water Management Act 2000* have not yet commenced. The *Water Act 1912* is being progressively phased out, and relates to the governance of new water licenses and the trading of licenses and allocations for those areas that have not yet been affected by the *Water Management Act 2000* reform.[42]

Standing Committee on State Development report 2013

1.26 As previously noted, in 2013 the Standing Committee on State Development tabled its report on the adequacy of water storages in New South Wales. The report looked at balancing water needs for agricultural, urban, industrial and environmental purposes, in addition to proposals for the construction and/or augmentation of water storages across the state. The committee made 19 recommendations to the NSW Government.

1.27 As outlined in this inquiry's terms of reference, found on page viii, one task of this committee was to review the NSW Government's response to the recommendations made by the Standing Committee on State Development.

1.28 The recommendations made in the 2013 report as well as the NSW Government's response will be considered throughout this report. For ease of reference, the recommendations and the response can be found at appendices 1 and 2 respectively.

1.29 In brief, the report recommended a number of measures, which encompassed an integrated approach to water management, to secure an adequate and reliable water supply for the State's

39 Standing Committee on State Development, NSW Legislative Council, *Adequacy of water storages in NSW* (2013), p 82.

40 Correspondence from the NSW Government to the Clerk of the Parliaments, 30 January 2014.

41 Submission 48, NSW Government, p 33.

42 NSW Department of Primary Industries -Water, *Water Act 1912*, http://www.water.nsw.gov.au/water-licensing/about-licences/water-act-1912.

current and future needs.[43] This included water conservation measures and efficiency programs as well as reviewing environmental flow allocations for all valleys in New South Wales among others.[44] The status of the certain recommendations and the government's response will be considered throughout the report.

Federal management of water

1.30 At a national level the federal government has implemented reforms over the past ten years which have meant it now takes a more active role in promoting and leading water management and reform for water resources in the Murray-Darling Basin.

1.31 In the past, water management was the exclusive domain of individual basin states.[45] However, as concerns emerged in the 1980s and 1990s about the increasing levels of surface water and ground water being extracted from the basin, the need for water use reform became a national issue.[46]

1.32 A Water Reform Framework was agreed to in 1994 by the Council of Australian Governments in recognition of the fact that the 'management of Australia's water resources … would require cooperation between the Commonwealth and basin states'.[47]

1.33 The 1994 framework set out the 'key strategies to achieve efficient and sustainable urban and rural water use. The principles included pricing for full cost recovery, separation of water access rights from land title, trading of water rights to allow water to move to more efficient uses, and the need for specific provision of water for the environment'.[48]

1.34 The Water Reform Framework was renewed by the Council of Australian Governments in 2004 with the introduction of the National Water Initiative which is a 'shared commitment by governments to increase the efficiency of Australia's water use, leading to greater certainty for investment and productivity, for rural and urban communities and for the environment'.[49]

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43 Media release, Hon Rick Colless MLC, 'Securing a reliable water supply for the future of New South Wales', 26 June 2013.

44 Standing Committee on State Development, NSW Legislative Council, *Adequacy of water storages in New South Wales* (2013).

45 The committee acknowledges the recent announcement of the NSW Minister for Regional Water, The Hon Niall Blair MLC, regarding the decision to withdraw New South Wales from the Murray-Darling Basin Plan and the possibility that water management may revert back to the states as a consequence. The Senate - Select Committee on the Murray-Darling Basin Plan, *Refreshing the plan*, March 2016 p 6.

46 The Senate - Select Committee on the Murray-Darling Basin Plan, *Refreshing the plan*, March 2016 p 6.

47 The Senate - Select Committee on the Murray-Darling Basin Plan, *Refreshing the plan*, March 2016 p 6.

48 The Senate - Select Committee on the Murray-Darling Basin Plan, *Refreshing the plan*, March 2016, p 5.

49 Department of Agriculture and Water Resources, *National Water Initiative* (10 August 2017) http://www.agriculture.gov.au/water/policy/nwi.

1.35 The National Water Initiative sets out the following commitments by Australian governments 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
- better manage urban water demands.[50]

1.36 The initiative also includes provisions for the separation of water access rights from land titles, separating function from regulation of water delivery and making distinct provision for environmental water.[51] It also included a commitment by the federal government to recover 500 GL of water for the environment, which was the first time that water had been allocated solely for environmental purposes.[52]

1.37 In 2007 the Howard Government announced a $10 billion National Plan for Water Security in response to the millennium drought. All basin states – Queensland, New South Wales, Victoria, South Australia as well as the Australian Capital Territory – agreed to refer their powers to the federal government as part of their commitment to this package.[53]

1.38 Following this, the federal government enacted the *Water Act 2007* which established the Murray-Darling Basin Authority and provided the legislative framework for major water management reforms.[54]

Water Act 2007 (Cth)

1.39 The *Water Act 2007* (Cth) made provision for the management of the Murray-Darling Basin's water resources and for other matters in relation to water and water information that are of national interest.

1.40 Under the Act, the Murray-Darling Basin Authority (see 1.66 to 1.70 for further detail) and the Commonwealth Environmental Water Holder (see chapter 4) were established. The Act also provides functions to the Australian Competition and Consumer Commission in relation to water charge and water market rules, and the Bureau of Metrology in relation to water information.[55]

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50 Department of Agriculture and Water Resources, *National Water Initiative* (10 August 2017) http://www.agriculture.gov.au/water/policy/nwi.

51 Department of Agriculture and Water Resources, *Intergovernmental Agreement on a National Water Initiative*, http://www.agriculture.gov.au/SiteCollectionDocuments/water/Intergovernmental-Agreement-on-a-national-water-initiative.pdf.

52 The Senate - Select Committee on the Murray-Darling Basin Plan, '*Refreshing the plan'*, March 2016, p 6.

53 The Senate - Select Committee on the Murray-Darling Basin Plan, *Refreshing the plan*, March 2016 p 7.

54 The Senate - Select Committee on the Murray-Darling Basin Plan, *Refreshing the plan*, March 2016 p 7.

55 Murray Darling Basin Authority, *The Water Act,* https://www.mdba.gov.au/about-us/governance/water-act.

Department of Agriculture and Water Resources

1.41 The Department of Agriculture and Water Resources is responsible for water policy and resources at a national level and has made a commitment to enhancing the sustainability, efficiency and productivity of the management and use of water resources through leadership in water reform.[56]

1.42 The department leads best practice water resource management through the *Water Act 2007* and the National Water Initiative.[57]

Bureau of Meteorology

1.43 Under the *Water Act 2007* the Bureau of Meteorology is required to collect, hold, manage, interpret and disseminate national water information. The Act also obligates certain entities to give information to the bureau to support its functions.[58]

1.44 The bureau's responsibilities include issuing national water information standards, collecting and publishing water information, conducting regular national water resource assessments, providing regular water availability forecasts and enhancing understanding of Australia's water resources.[59]

State agencies responsible for managing water in New South Wales

1.45 A number of key state agencies are responsible for managing water in New South Wales. These agencies and their responsibilities are outlined below.

1.46 It should be noted that during 2016 and 2017 the state agencies responsible for managing water in New South Wales underwent organisational change. This resulted in a number of functions relating to the delivery of water services in New South Wales transferring from the Department of Primary Industries to the Department of Industry – Water and WaterNSW.[60]

Department of Industry – Lands & Water

1.47 The role of the Water branch within the Department of Industry is to develop strategies, programs and policies for the management of water.

1.48 It is responsible for surface and groundwater management including planning to ensure water security for New South Wales. It must ensure the availability of sustainable and equitable

56 Department of Agriculture and Water Resources, *Water policy and resources,* http://www.agriculture.gov.au/water.

57 Department of Agriculture and Water Resources, *Water policy and resources,* http://www.agriculture.gov.au/water/policy.

58 Bureau of Meteorology, *Improving water information*, http://www.bom.gov.au/water/.

59 Bureau of Meteorology, *Improving water information*, http://www.bom.gov.au/water/.

60 NSW Department of Primary Industries Water, http://www.water.nsw.gov.au/.

access to surface and groundwater resources and its use across the state. This is in addition to ensuring water entitlements and allocations are secure and tradeable.[61]

1.49 The Department of Industry Water branch is also responsible for reporting to the NSW Government on water policy and the administration of key water management legislation, including the *Water Management Act 2000* and *Water Act 1912*.[62]

1.50 The Water branch is also leads negotiations with intergovernmental agreements such as the Murray Darling Basin Plan.[63]

WaterNSW

1.51 WaterNSW is a statutory organisation. It is the nation's largest supplier of water and the state's foremost supplier of raw water which is sourced from over forty large dams, pipelines and rivers to towns, irrigators, the Sydney Water utility and other licenced operators, suppliers and councils.[64]

1.52 WaterNSW was recently established under the *Water NSW Act 2014* as the agency responsible for delivering water supply and operating New South Wales's large water storages.[65]

1.53 WaterNSW is also responsible for developing infrastructure solutions to provide a secure water supply for New South Wales, including research on catchment areas and promoting improvements in water quality standards. This involves planning, building, operating and maintaining water infrastructure.[66]

Local government

1.54 Local governments play a key role in water management and in the provision of water services to communities in New South Wales. In regional areas, councils provide water supply and sewerage services.[67]

1.55 There are more than 90 local water utilities in New South Wales which are owned and operated by local councils, providing services to approximately 1.8 million New South Wales residents.[68]

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61 NSW Department of Industry, *Lands & Water,* https://www.industry.nsw.gov.au/about/our-business/department/lands

62 NSW Department of Industry Lands & Water, *Legislation and policies*, https://www.industry.nsw.gov.au/water/what-we-do/legislation-policies

63 NSW Department of Industry, Lands & Water, https://www.industry.nsw.gov.au/about/our-business/department/lands

64 WaterNSW, *What we do*, http://www.waternsw.com.au/about/what-we-do.

65 WaterNSW, *What we do*, http://www.waternsw.com.au/about/what-we-do.

66 WaterNSW, *What we do*, http://www.waternsw.com.au/about/what-we-do.

67 Submission 81, Local Government NSW, p 2.

68 Submission 81, Local Government NSW, p 2.

Office of Environment and Heritage

1.56 The Office of Environment and Heritage is responsible for managing the state's environmental water holdings that have been allocated through water sharing plans or through licensed water that has been recovered.[69]

1.57 It is also responsible for implementing the Flood Prone Lands Policy by providing technical, policy and financial assistance to local councils for the development of their floodplain risk management plans.[70]

Independent Pricing and Regulatory Tribunal (IPART)

1.58 IPART reviews and determines the maximum prices for bulk and retail water that are charged by the major water utilities. This role also extends to making recommendations about public water utilities and monitoring each utility's compliance in relation to their licensing requirements. [71]

1.59 When IPART undertakes a review of water prices it considers a variety of factors including the cost of providing the service consumer protection against the potential for monopoly powers by water utilities, the need to promote competition in the industry and greater efficiency for supply to reduce costs.[72]

1.60 Under the *Water NSW Act 2014*, IPART also has an auditing function in regard to WaterNSW.

1.61 The Act also establishes that IPART will make recommendations to the Minister for Water with respect to the granting, amendment or cancellation of an operating license and conditions of licence sanctions in relation to the operation of licences including remedial action.[73]

1.62 Further, IPART has the function of monitoring and reporting to the Minister on compliance by WaterNSW regarding operating licences reporting any failure by WaterNSW to meet operational standards.[74]

Public Works NSW, Department of Finance, Services and Innovation

1.63 Public Works NSW provides expertise to state and local government agencies in relation to water cycle management, and works with its clients to manage and protect the New South Wales natural water resources.[75]

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69 Submission 48, NSW Government, p 9.

70 Submission 48, NSW Government, p 9.

71 Independent Pricing and Regulatory Tribunal, *Water*, https://www.ipart.nsw.gov.au/Home/Industries/Water.

72 Independent Pricing and Regulatory Tribunal, *Setting water prices*, https://www.ipart.nsw.gov.au/Home/Industries/Water/Setting-water-prices.

73 *Water NSW Act 2014*, s 56.

74 *Water NSW Act 2014*, s 56.

75 NSW Government, *Public Works*, http://www.publicworks.nsw.gov.au/.

1.64 These services include strategic water management, integrated water cycle management, climate change adaptation, wastewater treatment and reuse, and physical and numerical modelling of hydraulic structures. It also provides concept planning, investigation, design, procurement advice and construction managements for delivery of infrastructure projects.[76]

Interjurisdictional agreements

1.65 There are three main interjurisdictional agreements that influence the management of water in New South Wales. These agreements are outlined below.[77]

Murray-Darling Basin Authority

1.66 The Murray-Darling Basin Authority is an independent statutory body established in 2007 to deliver sustainable and integrated management of the water resources of the Murray–Darling Basin.[78]

1.67 The Murray-Darling Basin is a region of national significance in South Eastern Australia for social, cultural, economic and environmental reasons.[79] It contains thousands of interconnected creeks and rivers, most of which eventually connect to the River Murray[80] and spans the states of Queensland, New South Wales, Victoria and South Australia.

1.68 In 2012, the Authority developed the formal Basin Plan to ensure that the basin delivers agreed social, economic and environmental outcomes.[81] The Basin Plan is a strategic document that requires the basin states of Queensland, South Australia, Victoria and New South Wales to reduce their water extractions by 450 GL, by 2019.[82]

1.69 The Authority also has responsibility for operating the River Murray system and overseeing the Dartmouth and Hume Dam, Lake Victoria, Lower Lake barrages, weirs and locks in partnership with their state counterparts (WaterNSW in New South Wales). It also has responsibility for the operation of the Menindee Lakes waters once the water level reaches above 640 GL.[83]

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76 NSW Government, *Public Works*, http://www.publicworks.nsw.gov.au/.

77 It acknowledged that as of 15 February 2018, the NSW Minister for Regional Water, the Hon Niall Blair MLC, has commenced the process of withdrawing New South Wales from the Murray-Darling Basin Plan.

78 Murray-Darling Basin Authority, *Murray-Darling Basin Authority Annual Report 2015-16,* About us, https://www.mdba.gov.au/annual-report-2015-16/about-mdba/about-us.

79 Australian Bureau of Statistics, *Water and the Murray-Darling Basin, A Statistical Profile, 2000-01 to 2005-06*, (15 August 2008) http://www.abs.gov.au/ausstats/abs@.nsf/mf/4610.0.55.007.

80 Murray-Darling Basin Authority, *Did you Know?,* http://www.mdba.gov.au/discover-basin.

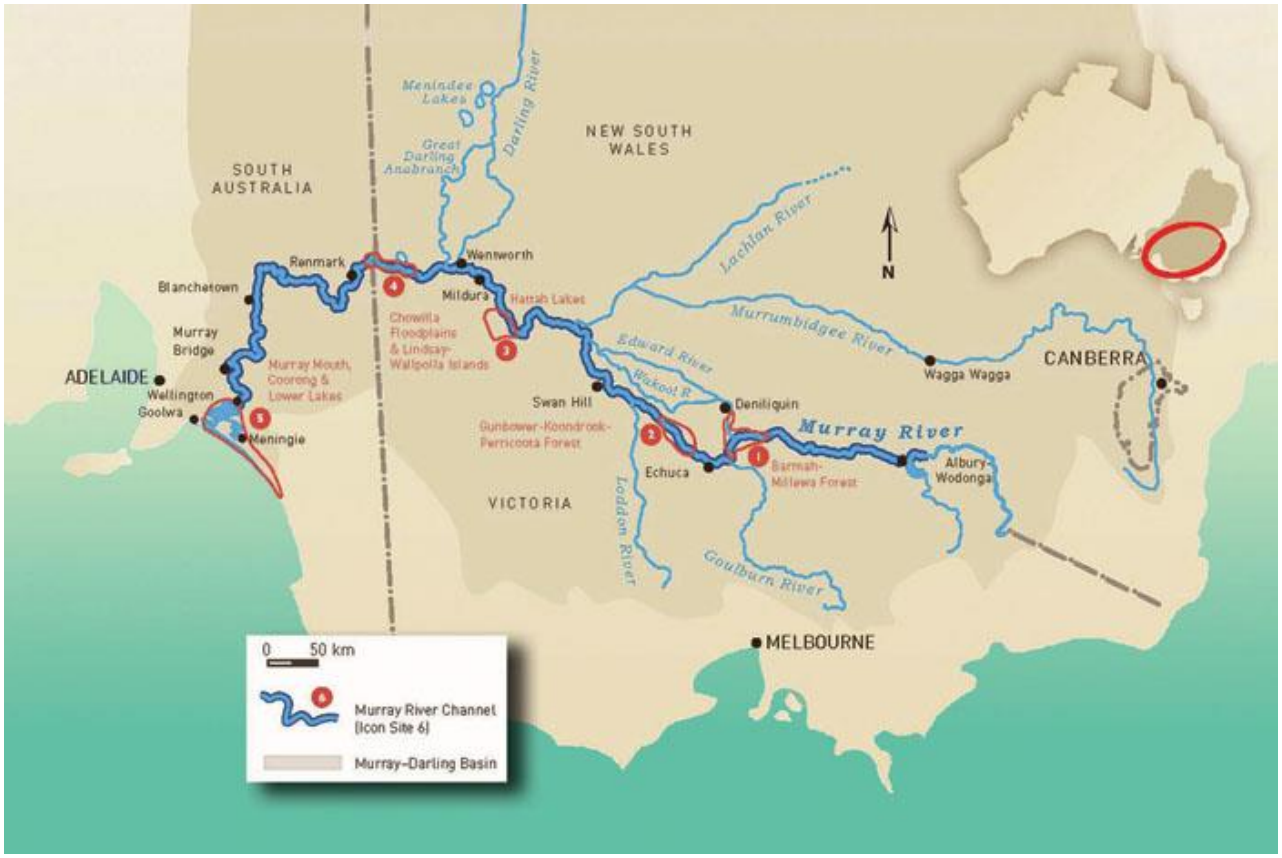
81 The Murray-Darling Basin Authority, *The Water Act*, http://www.mdba.gov.au/about-us/governance/water-act.

82 The committee acknowledges the recent announcement of the NSW Minister for Regional Water, The Hon Niall Blair MLC, regarding the decision to withdraw New South Wales from the Murray-Darling Basin Plan and the possibility that water management may revert back to the states as a consequence. Submission 48, NSW Government, p 9.

83 Submission 48, NSW Government, p 9.

1.70 The challenge for basin communities is to be able to share its waters so that their wellbeing and prosperity is maintained along with respect for traditional cultures and/or the protection or restoration of the natural environment.[84] The Murray-Darling Basin Plan will be considered in more detail in chapter 3.

Figure 3 Murray-Darling Basin and River Murray System[85]



Commonwealth Environmental Water Holder

1.71 The Commonwealth Environmental Water Holder is responsible for administering environmental water that is recovered through the Murray-Darling Basin Plan. In New South Wales the environmental flows are delivered in partnership with the Office for Environment and Heritage.[86]

1.72 Environmental water is used to improve the health of our rivers, floodplains and wetlands and ensures that fresh water ecosystems continue to be resilient during the highly variable conditions experienced by the Basin.[87] The Commonwealth Environmental Water Holder will be discussed in chapter 3 and 4.

84 Murray-Darling Basin Authority, *Did you Know?,* http://www.mdba.gov.au/discover-basin.

85 Murray-Darling Basin Authority, *Annual Report 2011-2012*, http://www.mdba.gov.au/sites/default/files/archived/annualreports/2011-12/chapter_02_2.html.

86 Submission 48, NSW Government, p 9.

87 Department of Environment and Energy, *Commonwealth Environmental Water Office*, https://www.environment.gov.au/water/cewo.

Department of the Environment and Energy

1.73 The federal government's Department of the Environment and Energy oversees Australia's commitment to the United Nations Ramsar Convention, which was signed by Australia in Ramsar, Iran on 2 February 1971. The Ramsar convention is aimed at halting the loss of wetlands across the world and to conserve those that are still in existence.[88]

1.74 The convention encourages member countries to nominate sites that hold rare or unique wetlands that are important to conserve for reasons of biological diversity. Australia has 65 Ramsar sites which cover more than 8.3 million hectares.[89]

1.75 The frameworks, agreements and agencies in relation to water management and practices discussed in this chapter will be explored in the remainder of the report.

Water compliance and important updates

1.76 During the inquiry the issue of water compliance, particularly in the Barwon-Darling region of New South Wales, was raised in the media. This led to multiple investigations by various independent and government bodies as well as the resignation of a senior bureaucrat. A brief timeline of events is outlined below. The committee decided not to address compliance in this inquiry as the Independent Commission Against Corruption is already conducting an investigation into the allegations.

Four Corners program

1.77 On 24 July 2017, the ABC's *Four Corners* ran a story entitled 'Pumped: Who's benefitting from the billions spent on the Murray-Darling?'. The story raised 'serious allegations about the way the [Murray-Darling Basin] plan is working, including accusations of illegal water use, pumping water from fragile rivers and tampering with metres'.[90]

1.78 The story also exposed secret recordings between Mr Gavin Hanlon, Deputy Director General of the Department of Primary Industries and 'powerful irrigators' that discussed the Murray-Darling Basin Plan and a supposed 'Plan B' which would see New South Wales withdraw from the plan altogether.[91]

1.79 As a result of the allegations, Mr Hanlon was stood down while misconduct procedures as set out in the Government Sector Employment legislation were conducted.[92]

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88 Department of Environment and Energy, *Australia's Ramsar Sites,* https://www.environment.gov.au/water/wetlands/publications/factsheet-australias-ramsar-sites.

89 Department of Environment and Energy, *Australia's Ramsar sites,* https://www.environment.gov.au/water/wetlands/publications/factsheet-australias-ramsar-sites.

90 *Four Corners*, ABC, 'Pumped: Who's benefitting from the billions spent on the Murray-Darling?', Linton Besser, 24 July 2017.

91 *Four Corners*, ABC, 'Pumped: Who's benefitting from the billions spent on the Murray-Darling?', Linton Besser, 24 July 2017

92 Media release, Hon Niall Blair MLC, Minister for Regional Water, 'Independent investigation into NSW water management', 11 September 2017.

1.80 On 16 September 2017, it was reported that Mr Hanlon had resigned from his position.[93]

Response to Four Corners program

1.81 On 2 August 2017, in response to the matters raised by *Four Corners*, the Minister for Regional Water, the Hon Niall Blair MLC, commissioned an investigation into New South Wales Water Management and Compliance. The investigation was conducted by Mr Ken Matthews AO, former founding Chair and Chief Executive of the National Water Commission.

1.82 The terms of reference of the investigation sought to achieve the following:

> 1. Determine the facts and circumstances related to the allegations made in the Four Corners Program.
>
> 2. Assess whether the Department of Industry's policies and procedures (including the department's Code of Conduct) were complied with in relation to these allegations.
>
> 3. Assess whether Departmental actions in relation to the allegations were appropriate in the circumstances
>
> 4. Identify whether further action should be undertaken in relation to the allegations, including further investigation or referral to other authorities.
>
> 5. Identify opportunities to improve the Department's water management, compliance and enforcement performance.[94]

1.83 In the following weeks, a number of questions without notice were asked of the Minister for Minister for Primary Industries and Minister for Regional Water, the Hon Niall Blair MLC in the Legislative Council.[95]

1.84 In addition, there were several notices of motion given by non-government members in the Legislative Council for the production of state papers under Standing Order 52 relating to:

- compliance activities in the Murray-Darling Basin under the *Water Act 1912* and the *Water Management Act 2000*
- Water sharing plan for the Barwon-Darling Unregulated and Alluvial Water Sources
- potential withdrawal of the State of New South Wales from the Murray-Darling Plan
- the Strategic Investigation Unit of the Department of Primary Industries
- any meeting held between the Deputy-Director General Gavin Hanlon, Department of Primary Industries – Water and any irrigator.[96]

93 Patrick Begley, 'Top water bureaucrat Gavin Hanlon resigns after corruption allegations', *Sydney Morning Herald*, 16 September 2017.

94 Ken Matthews AO, *Interim report: Independent investigation into NSW water management and compliance*, 8 September 2017, p 13.

95 See for example *Hansard,* NSW Legislative Council, 8 August 2017, pp 20-23, 25, 27-28.

96 *Notice Paper,* NSW Legislative Council, 10 August 2017, pp 9786-9793.

1.85 The issue was also taken up during Budget Estimates in August-September 2017, with the Minister for Regional Water and departmental staff, questioned about the Matthews investigation, and water management and compliance.

The Ken Matthews investigation

1.86 On 8 September 2017, the Ken Matthews interim report, *Independent investigation into NSW water management and compliance,* was released. The report found that 'water-related compliance and enforcement arrangements in [New South Wales] have been ineffectual and require significant and urgent improvement', and in particular, that:

- Arrangements for metering, monitoring and measurement of water extractions, especially in the Barwon–Darling river system, are not at the standard required for sound water management and expected by the community.
- Certain individual cases of alleged non-compliance have remained unresolved for far too long.
- There is little transparency to members of the public of water regulation arrangements in NSW, including the compliance and enforcement arrangements which should underpin public confidence.[97]

1.87 The investigation recommended that a future re-design of the New South Wales compliance and enforcement system should be based on greater transparency, independence and effectiveness:

> 1. Any future system needs to be more **transparent**: Greater public transparency will in itself, contribute to greater compliance.
>
> 2. Any future system needs to be more **independent**: Decisions about compliance and enforcement should be, and be seen to be, sufficiently independent of water policy making, water planning, water regulation-making, and water delivery services to customers.
>
> 3. Any future system needs to be **effective**: The compliance and enforcement effort should be sufficiently resourced, empowered and professional to support public and investor confidence that the quantities, timing and means of water extractions for consumptive use, or water for environmental and other public benefit outcomes, are consistent with entitlements.[98]

1.88 According to the report, such a re-design would require a systemic fix with recommendations that a Water Management Compliance Improvement Package be implemented. This package would consist of 'strategic structural reforms to be considered by ministers; and a complementary package of administrative and operational improvements to be considered by the Secretary of the Department'.[99]

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97 Ken Matthews AO, *Interim report: Independent investigation into NSW water management and compliance*, 8 September 2017, p 4.

98 Ken Matthews AO, *Interim report: Independent investigation into NSW water management and compliance*, 8 September 2017, p 37.

99 Ken Matthews AO, *Interim report: Independent investigation into NSW water management and compliance*, 8 September 2017, p 38.

1.89 The Minister responded to the report on 11 September 2017, stating 'he accept[ed] the principles set out in the Water Management Compliance Improvement Package and [that] actions on the issues identified in the report will start immediately'. This included the 'urgent installation of water meters for all large users in [New South Wales] within 12 months'.[100]

1.90 On 24 November 2017, the final report *Independent investigation into NSW water management and compliance,* conducted by Ken Matthews, was released. This report assessed the department's progress to date in implementing the recommendations within the interim report.[101]

1.91 While Mr Matthews commended the NSW Government for quickly accepting the conclusions in the interim report and adopting the recommendations, he had a number of concerns regarding the future of the implementation process, such as:

- work on other elements of the total reform package could be delayed
- unwarranted 'watering down' of reform measures
- inter-agency boundaries, and organisational restructurings may lead to an unsatisfactory or unworkable operational environment for compliance staff members in the future
- the decision as to whether to proceed to prosecution in the several alleged cases of non-compliant irrigation activities aired in the *Four Corners* program.[102]

1.92 Furthermore, the final report identified other risks that could impact the 'continued momentum' of the implementation process, including:

- the absence of a master plan to oversee the implementation of reforms
- insufficient financial and staff resources
- an inability to 'translate the government's desired high-level reform outcomes into specific and practical measures on the ground'.[103]

1.93 The final report recommended that the Minister and the department provide regular announcements and updates on the reform process as it progresses, and that a 'further external, independent review of implementation progress … be commissioned after … twelve months'.[104]

1.94 In response, the Minister for Regional Water, the Hon Niall Blair MLC, stated the final report would be considered in detail, 'alongside recent findings of the NSW Ombudsman and the

100 Media release, Hon Niall Blair MLC, Minister for Regional Water, 'Independent investigation into NSW water management', 11 September 2017.

101 Ken Matthews AO, *Final report: Independent investigation into NSW water management and compliance*, 24 November 2017, p 1.

102 Ken Matthews AO, *Final report: Independent investigation into NSW water management and compliance*, 24 November 2017, p 2.

103 Ken Matthews AO, *Final report: Independent investigation into NSW water management and compliance*, 24 November 2017, p 2.

104 Ken Matthews AO, *Final report: Independent investigation into NSW water management and compliance*, 24 November 2017, p 3.

Murray-Darling Basin Authority, with a comprehensive response to be presented to the Murray-Darling Basin Ministerial Council and published in December 2017'.[105]

ICAC inquiry

1.95 The Independent Commission Against Corruption (ICAC) has commenced an inquiry into matters that include allegations referred to in the *Four Corners* program and those referred to in the Ken Matthew's interim report.

1.96 On 19 September 2017, the committee considered whether it should expand its terms of reference to consider the allegations. Notwithstanding the power of Legislative Council committees to inquire into matters that are the subject of an ongoing investigation by the ICAC, the committee resolved to write to the ICAC to see if there would be implications on its investigation if the committee extended its terms of reference. The committee's resolution was as follows:

> That the committee write to the Commissioner of the ICAC seeking his opinion whether there would be implications on the ICAC's current investigations if the committee expanded its terms of reference to consider allegations raised in the ABC's Four Corners program on 24 July 2017 and Mr Ken Matthews's Interim Report entitled *Independent investigation into NSW water management and compliance*, dated 8 September 2017 regarding non-compliance with New South Wales water laws.[106]

1.97 The Hon Peter Hall QC, Chief Commissioner of the ICAC responded on 3 October 2017. The Commissioner indicated that there may be a potential prejudicial overlap if the committee expanded its terms of reference to consider alleged non-compliance with New South Wales water laws:

> In circumstances that the terms of reference of the Portfolio Committee No. 5 – Industry and Transport (the Committee) are expanded to include the matters referred to in the Four Corners program on 24 July 2017 and the Ken Matthew's Interim report, there may be a potential prejudicial overlap in our concurrent inquiries which may adversely impact the Commission's functions of investigating corrupt conduct. For that reason, I request that the Committee does not take any further investigative steps with respect to the matters within the scope of the Commission's investigation.[107]

1.98 Following receipt of the correspondence from the Commissioner of the ICAC, no amendments to the terms of reference were made.

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105 Media release, Hon Niall Blair MLC, Minister for Regional Water, 'Ken Matthews' final report into water management and compliance', 30 November 2017.

106 Minutes no. 51, Portfolio Committee No. 5 – Industry and Transport, 19 September 2017, p 2.

107 Correspondence, the Hon Peter Hall QC, Chief Commissioner, ICAC, to Chair, 3 October 2017, p 1.

Other investigations and reviews

1.99 There are a number of other inquiries and reviews that are currently underway and/or have been conducted relating to water management and compliance in New South Wales. These include the:

- Murray-Darling Basin Authority's Basin-wide Water Compliance Review
- Australian National Audit Office extended audit into the performance of NSW under the National Partnership Agreement on Implementing Water Reform in the Murray-Darling Basin relevant to the protection and use of environmental water
- Commonwealth Senate Rural and Regional Affairs and Transport References Committee inquiry
- NSW Ombudsman investigation into allegations of public maladministration.[108]

Committee comment

1.100 The committee acknowledges Ken Matthew's interim finding 'that water-related compliance and enforcement arrangements in NSW have been ineffectual and require significant and urgent improvement'; 'There is little transparency to members of the public of water regulation arrangements in NSW, including the compliance and enforcement arrangements which should underpin public confidence' and that a "systemic fix" is required. The committee supports the full and urgent initiation of the Water Management Compliance Improvement Package Mr Matthews outlines in his interim report.

1.101 The committee further acknowledges and shares the concerns Mr Matthews expresses in his final report that: 'that work on other elements of the total reform package is at risk of delay'; and 'about the risks of unwarranted "watering down" of the reform measures as implementation proceeds.' It is recommended that the NSW Government urgently implement the full Water Management Compliance Improvement Package outlined in Mr Ken Matthews' interim report entitled *Independent investigation into NSW water management and compliance*, dated 8 September 2017.

Recommendation 12

That the NSW Government urgently implement the full Water Management Compliance Improvement Package outlined in Mr Ken Matthews' interim report entitled *Independent investigation into NSW water management and compliance*, dated 8 September 2017.

1.102 The committee acknowledges the immediate response of the Minister for Regional Water regarding the urgent installation of water meters for all large waters users in New South Wales within 12 months. This follows the recommendations of the Ken Matthews interim report on the *Independent investigation into NSW water management and compliance*. The committee views this

[108] Ken Matthews AO, *Interim report: Independent investigation into NSW water management and compliance*, 8 September 2017, pp 13-14.

as an important first step to addressing issues of water compliance as highlighted by the ABC *Four Corners* program and the independent investigations conducted by Mr Ken Matthews. To ensure that these water compliance measures are being implemented within the 12 month timeframe specified, particularly in the Barwon-Darling region, the committee recommends that the NSW Government urgently prioritise the introduction of universal monitoring and metering arrangements for water extractions in the Northern Basin.

Recommendation 13

Notwithstanding the above recommendation, that the NSW Government urgently prioritise the introduction of universal monitoring and metering arrangements for water extractions in the Northern Basin.

South Australia Royal Commission

1.103 On 26 November 2017, South Australian Premier, Jay Weatherill, announced a state royal commission into widespread allegations that upstream irrigators are stealing water from the Murray-Darling River system.[109]

1.104 This announcement was in response to the Murray-Darling Basin Water Compliance Review which revealed 'upstream states and the Federal Government are ignoring widespread allegations of water theft and are failing to enforce the Murray-Darling Basin Plan'.[110]

1.105 According to Premier Weatherill, the Royal Commission will have 'wide-ranging coercive powers to investigate breaches of the Murray-Darling Basin Agreement … [and] examine the adequacy of existing legislation and practices and make recommendations for any necessary changes'.[111]

1.106 It was reported that the Royal Commissioner would be given the power to compel bureaucrats from other states, including New South Wales, to give evidence.[112]

1.107 The Royal Commission is expected to commence in early 2018.[113]

109 Media release, Hon Jay Weatherill MP, Premier, 'South Australia to establish Royal Commission into River Murray water theft', 26 November 2017.

110 Media release, Hon Jay Weatherill MP, Premier, 'South Australia to establish Royal Commission into River Murray water theft', 26 November 2017.

111 Media release, Hon Jay Weatherill MP, Premier, 'South Australia to establish Royal Commission into River Murray water theft', 26 November 2017.

112 'Murray-Darling Basin: SA launches royal commission into alleged water theft', *ABC News online*, (27 November 2017), http://www.abc.net.au/news/2017-11-26/sa-to-launch-royal-commission-into-river-murray-theft/9194368.

113 Matt Smith, 'Jay Weatherill announces Royal Commission into Murray-Darling Plan following claims of upstream rorting', *Sunday Mail (South Australia)*, (26 November 2017), http://www.adelaidenow.com.au/news/south-australia/jay-weatherill-announces-royal-commission-into-murraydarling-plan-following-claims-of-upstream-rorting/news-story/b33276f74924f314ea6fbf956dec21b6.,

NSW Ombudsman Correcting the record: Investigation into water compliance and enforcement 2007-17

1.108 On 8 March 2018 the NSW Ombudsman's report entitled *Correcting the record: Investigation into water compliance and enforcement 2007-17* was tabled in the NSW Parliament.

1.109 The report, released in November 2017, provided an update on the NSW Ombudsman's current investigation into allegations of public maladministration. This was prompted by a number of factors including:

- the NSW Ombudsman's inquiry is one of several currently underway that is looking at similar issues
- the NSW Government is currently taking action to change the administrative structure for water management
- the NSW Ombudsman's inquiry will continue under the new Ombudsman, Mr Michael Barnes, appointed to commence in December 2017.[114]

1.110 The report noted the same concerns contained in its earlier investigations of 2009, 2012 and 2013 – allegations that water management principles and rules were not being properly complied with and enforced – continued to be a 'strong theme' in its current investigation. In particular, 'whether the water compliance and enforcement function has been properly understood, supported and resourced within Government, and whether the function has suffered rather than benefitted from a frequent history of administrative restructuring'.[115]

Committee comment

1.111 The committee is disappointed incorrect data about New South Wales compliance and enforcement was provided to the NSW Ombudsman, and in turn, to the Parliament and public.

Australian Senate vote on *Water Act 2007*—Basin Plan Amendment Instrument 2017

1.112 In 2017, the Murray-Darling Basin Authority recommended amending the *Water Act 2007* which establishes the Murray-Darling Basin Plan, as a result of the extensive and comprehensive Northern Basin Review with environmental, Aboriginal, industry and community stakeholders.[116]

1.113 The proposed amendments to the Plan under the *Water Act 2007* included:

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114 NSW Ombudsman, *Investigation into water compliance and enforcement 2007-17*, p e, available at https://www.ombo.nsw.gov.au/__data/assets/pdf_file/0012/50133/Investigation-into-water-compliance-and-enforcement-2007-17.pdf

115 NSW Ombudsman, *Investigation into water compliance and enforcement 2007-17*, p e, available at https://www.ombo.nsw.gov.au/__data/assets/pdf_file/0012/50133/Investigation-into-water-compliance-and-enforcement-2007-17.pdf

116 Media release, Murray-Darling Basin Authority, 'Basin Plan amendment recommended to Commonwealth Water Minister', 10 November 2017.

- a reduction to the water recovery target in the north of the Basin, from 390 GL to 320 GL
- changes to the allowable level of take in three groundwater areas (Eastern Porous Rock, NSW; Western Porous Rock, NSW; Goulburn–Murray; Victoria)
- minor practical improvements to enable effective and consistent implementation of the Basin Plan.[117]

1.114 On 14 November 2017, the Assistant Minister for Agriculture and Water Resources, Senator the Hon Anne Ruston, tabled the amendments in Parliament.[118]

1.115 According to the Murray-Darling Basin Authority, the proposed amendments to the Act would 'minimise socio-economic impacts in northern Basin communities and deliver almost equivalent environmental outcomes by taking a more targeted approach to water recovery'.[119] In addition, the changes were viewed by the Murray-Darling Basin Authority Chief Executive Mr Phillip Glyde as a 'sensible balance between social, economic and environmental interests' in the region.[120]

1.116 On 14 February 2018, the Australian Senate voted against the amendments to the Murray-Darling Basin Plan.[121] It was reported that the NSW Government, as a result of the vote, intended to withdraw from the Murray-Darling Basin Plan, with speculation as to whether the Victorian Government would also withdraw.[122]

1.117 On 15 February 2018, the Hon Niall Blair MLC, Minister for Primary Industries, Minister for Regional Water and Minister for Trade and Industry, advised the Legislative Council during question time that he had 'begun the process to withdraw New South Wales from the plan'. He also stated that the NSW Government 'will work with the Victorian Labor Government because it shares the exact same concerns … as we do'.[123]

117 Media release, Murray-Darling Basin Authority, 'Basin Plan amendment recommended to Commonwealth Water Minister', 10 November 2017.

118 Media release, Senator, the Hon Anne Ruston, Assistant Minister for Agriculture and Water Resources, 'Murray–Darling Basin Plan legislative amendment tabled', 14 November 2017; *Hansard*, Australian Senate, 14 November 2017, p 8450.

119 Murray-Daring Basin Authority, *Proposed Basin Plan amendments for the Northern Basin*, https://www.mdba.gov.au/basin-plan-roll-out/basin-plan-amendments/basin-plan-amendments-northern-basin.

120 Media release, Murray-Darling Basin Authority, 'Proposed Basin Plan amendments to save jobs and deliver for the environment', 22 November 2016.

121 Brett Worthington and Caitlyn Gribbin, 'Senate rejects Murray-Darling Basin Plan changes as Labor backs Greens, NSW Government prepares to withdraw', *ABC News online,* (14 February 2018), http://www.abc.net.au/news/2018-02-14/senate-rejects-murray-darling-basin-changes/9447876.

122 Brett Worthington and Caitlyn Gribbin, 'Senate rejects Murray-Darling Basin Plan changes as Labor backs Greens, NSW Government prepares to withdraw', *ABC News online*, (14 February 2018), http://www.abc.net.au/news/2018-02-14/senate-rejects-murray-darling-basin-changes/9447876.

123 *Hansard*, NSW Legislative Council, 15 February 2018, p 32 (Niall Blair).

Broken Hill pipeline construction

1.118 Construction of the Wentworth to Broken Hill pipeline has commenced with the design, construction, operation and maintenance of the pipeline to be carried out by a consortium consisting of John Holland, MPC Group and TRILITY (see chapter 7 for further details).[124]

1.119 It is expected that the pipeline will be completed and ready for water by December 2018.[125]

Legal action regarding water use breaches in New South Wales

1.120 WaterNSW has commenced legal action in the NSW Land and Environment Court against prominent cotton growers Peter and Jane Harris, of Brewarrina who were named in the *Four Corners* program about allegations of water theft. Anthony, Frederick and Margaret Barlow, another cotton growing family also face legal action in the NSW Land and Environment Court for 'pumping during an embargo and pumping while metering equipment was not working'.[126]

124 WaterNSW, *Wentworth to Broken Hill pipeline*, https://www.waternsw.com.au/projects/murray-to-broken-hill-pipeline.

125 WaterNSW, *Wentworth to Broken Hill pipeline*, https://www.waternsw.com.au/projects/murray-to-broken-hill-pipeline.

126 Lucy McNally, 'Alleged Barwon-Darling water thieves to be prosecuted after ABC investigation', *ABC News online*, (8 March 2018), http://www.abc.net.au/news/2018-03-08/nsw-water-theft-barwon-darling-government-prosecuting/9527364.

Chapter 2 Regional snapshots

For this inquiry the committee travelled to many regional areas in New South Wales to hear the concerns of communities regarding water security and water management. This chapter provides a brief overview of the key issues for these regional areas. These issues will be discussed in more detail throughout the report. While each region had issues specific to that geographical area, all regions expressed concern for the security of water as well as the tension between social and economic development, and environmental sustainability of water management and practices.

The Murray and Murrumbidgee

2.1 In the far south and south west of New South Wales in the Murray catchment area, the main storage is the Hume Dam on the Murray River. It supplies water across New South Wales, Victoria and South Australia for irrigated agriculture, environmental flows, town supplies, industry, domestic requirements, flood mitigation and recreation. The dam also supplements water supplies to South Australia from Lake Victoria and Menindee Lakes.[127] The area primarily produces wheat, cattle and wool.[128]

2.2 Within the Murray catchment area, Deniliquin sits on the Edward River which provides valuable tourism opportunities such as water-skiing, wakeboarding, fishing, kayaking, as well as accommodation on house boats. However, the committee heard that the operation and flow of the river did not always support the tourism industry in Deniliquin. For example, there have been occasions during peak times such as Easter and Christmas where the river level has dropped to less than a metre, making it unusable and therefore severely impacting tourism.[129]

2.3 In Deniliquin the committee visited a property west of Tocumwal that had been affected by the September-October 2016 floods. The property grows wheat, canola, barley and grazes sheep. The committee heard about access issues, flood damage, the effects of the Murray-Darling Basin Plan and what could be done to augment water, including ways for better management of existing water. Issues relating to flood management, response and mitigation will be discussed in chapter 6.

2.4 The committee also visited Rice Research Australia at Jerilderie to learn of the rice varietal and agronomic research and development currently being conducted in partnership with the NSW Department of Primary Industries and the Rural Industries Research and Development Corporation.

2.5 A public hearing was held in Deniliquin where the committee was informed that the triple bottom line was 'weighted too much towards the environment and not enough towards the

127 WaterNSW, *Hume Dam,* http://www.waternsw.com.au/supply/visit/hume-dam.

128 Department of Agriculture and Water Resources ABARES, *About my region – Murray region New South Wales* (19 October 2017), http://www.agriculture.gov.au/abares/research-topics/aboutmyregion/nsw-murray#agricultural-sector.

129 Evidence, Mr Mark Dalzell, Director, Technical Services, Edward River Council, 28 February 2017, p 17.

social and economic impacts'.[130] This was a major concern for irrigators who feel that the Murray-Darling Basin Plan has adversely impacted the community. This will be discussed further in chapter 3. Also to be discussed in chapter 3 are concerns about gaining timely and adequate information from NSW Government water bodies.

Committee members at Rice Research Australia, Jerilderie

2.6 Burrinjuck Dam, situated in south west New South Wales, is the main water storage for the 660,000 hectare Murrumbidgee Irrigation Scheme. The dam is situated near the headwaters of the Murrumbidgee River in the Great Dividing Range. The dam has a capacity of 1,026 GL.[131] The area is known for its permanent plantings of citrus and wine grapes; its annual crops of rice, wheat and cotton and its wool and cattle enterprises.[132]

2.7 The committee held a public hearing in Griffith and heard of strategies to gain 'new water' – water not currently being used – to secure water supply for irrigation and production purposes. One idea was to divert water from the Clarence River on the east coast to the west, an idea first proposed by Mr David Coffey in 1983.[133] This is further discussed in chapter 6.

130 Evidence, Mr Ray Stubbs, Executive Officer, Riverina and Murray Regional Organisation of Councils, 28 February 2017, p 50.

131 WaterNSW, *Burrinjuck Dam*, http://www.waternsw.com.au/supply/visit/burrinjuck-dam.

132 Ricegrowers' Association of Australia, *Rice Community,* http://www.rga.org.au/the-rice-industry/rice-community.aspx.; Department of Agriculture and Water Resources ABARES, *About my region – Riverina New South Wales* (17 October 2017), http://www.agriculture.gov.au/abares/research-topics/aboutmyregion/nsw-riverina#agricultural-sector.

133 Evidence, Mr Dino Zappacosta, Deputy Mayor, Griffith City Council, 1 March 2017, p 3; Submission 17, Griffith City Council., p 1.

2.8 Another suggestion was to increase Burrinjuck Dam's wall to create greater storage capacity, particularly to hold water for environmental flows, as well as provide airspace for flood mitigation.[134] Augmentation of existing storages will also be discussed in detail in chapter 5.

2.9 The community in Griffith had concerns regarding the management of environmental water (to be considered primarily in chapter 3) and the way general security irrigators are allocated water.[135] Water is often not allocated at the start of the water year, which adversely impacts cropping programs. This means that irrigators must then rely on carryover or enter the water market to purchase water.[136] Concerns regarding allocations, carryover and the water market are addressed in chapter 4.

2.10 In addition, voluntary contributions made by irrigators for the environment during the millennium drought have never reinstated. This has significantly impacted on the economy through productive use.[137] This will be further discussed in chapter 3.

Barwon

2.11 The Barwon catchment area in the central north of the state contains five water storages: Pindari Dam in the Borders Rivers Valley, Spilt Rock Dam and Keepit Dam in the Namoi Valley, Chaffey Dam in the Peel Valley and Copeton Dam in the Gwydir Valley.

2.12 Keepit Dam was the first dam built on the Namoi River followed by Split Rock Dam on the Manilla River. Keepit Dam has a capacity of 425 GL and provides town water for Walgett,[138] while Spilt Rock Dam has a capacity of just over 397 GL and was built to 'supplement supplies from Keepit Dam and meet increased agricultural demand for water in the Namoi Valley'.[139]

2.13 In the Peel Valley, Chaffey Dam on the Peel River, which has a capacity of just over 100 GL, was built to 'provide a regulated water flow for irrigation, stock and domestic use' as well as to provide town water for Tamworth.[140]

2.14 As previously mentioned in chapter 1, the Peel and Namoi rivers are regulated. As a consequence water security has been hampered through high water prices and restricted access to the river for pumping.[141] During the inquiry IPART released a new determination for the

134 Answers to questions on notice, Mr Paul Pierotti, President, Griffith Business Chamber, 28 March 2017, pp 2-3.

135 Supplementary submission 16a, Griffith City Council; Evidence, Ms Helen Dalton, President, NSW Farmers Association, Griffith Branch, 1 March 2017, p 14; Evidence, Mr Paul Pierotti, President. Griffith Business Chamber, 1 March 2017, p 47.

136 Submission 29, NSW Farmers Griffith Branch, pp 17-18.

137 Evidence, Ms Dalton, 1 March 2017, p 14; Evidence, Mr Pierotti, 1 March 2017, p 47; Supplementary submission 16a, Griffith City Council, pp 21-22.

138 WaterNSW, *Keepit Dam,* http://www.waternsw.com.au/supply/visit/keepit-dam.

139 WaterNSW, *Split Rock Dam*, http://www.waternsw.com.au/supply/visit/split-rock-dam.

140 WaterNSW, *Chaffey Dam,* http://www.waternsw.com.au/supply/visit/chaffey-dam.

141 Evidence, Mr Ildu Monticone, Member, Peel Valley Water Users Association, 16 May 2017, p 11; Submission 18, Mr Wayne Chaffey, p 1.

pricing of water for the Peel Valley from 1 July 2018 that would reduce usage costs. The pricing of water and the determinations of IPART in setting prices will be discussed in chapter 4.

2.15 The committee held a public hearing in Tamworth and heard how water sharing plans had resulted in 'the decline of the whole valley … [in terms of] production and income for the producers'.[142] The committee also received evidence about the proposal to implement computer-aided river management and water metering projects in the region.[143] Aspects of computer-aided river management will be discussed in chapter 7.

2.16 Copeton Dam in the Gwydir Valley is one of the biggest inland water storages with a capacity of 1,364 GL. It provides water for irrigated agriculture such as cotton; environmental flows to the Gwydir Wetlands near Moree; town supplies for Inverell as well as industry and domestic requirements; flood mitigation and recreation.[144]

2.17 In Moree and the Gwydir Valley, embargoes and environmental water have impacted negatively on agriculture and the community.[145]

2.18 The Gwydir River water sharing plan was viewed as providing poor management of water due to the significant amounts of high and general security, supplementary and ground water entitlements handed over for environmental use.[146]

2.19 Since the introduction of the water sharing plan in 2004, which was then replaced in 2016, embargoes on water access (discussed further in chapter 4) have continued, 'further limiting already restrictive allocations'.[147]

2.20 Cold water pollution which is 'caused by cold water being released into rivers from large dams during warmer months' was a major concern in the region, particularly in Copeton Dam.[148] Cold water pollution affects the ability of fish to breed and other types of animals who prey on fish.[149] This issue will be discussed in chapter 9.

2.21 While in Moree, the committee held a public hearing and visited a cotton farm that uses an off-grid solar–diesel hybrid power plant to pump high volumes of irrigation bore water while reducing diesel consumption. This innovative technology will be discussed in chapter 7.

142 Evidence, Mr Wayne Chaffey, Irrigation farmer, 16 May 2017, p 2.

143 Evidence, Ms Jon-Maree Baker, Executive Officer, Namoi Water, 16 May 2017, p 27.

144 WaterNSW, *Copeton Dam,* http://www.waternsw.com.au/supply/visit/copeton-dam.

145 See Evidence, Ms Zara Lowien, Executive Officer, Gwydir Valley Irrigators Association, 15 May 2017, p 2; Evidence, Mr Michael Seery, Partner, WJ & Seery Partnerships, 15 May 2017, p 27; Evidence, Mr Mark Winter, Vice-Chair, Gwydir Valley Irrigators Association, 15 May 2017, p 3.

146 Evidence, Ms Lowien, 15 May 2017, p 2; Evidence, Mr Seery, Partner, 15 May 2017, p 27.

147 Evidence, Mr Seery, 15 May 2017, p 27.

148 NSW Department of Primary Industries, *Cold water pollution*, https://www.dpi.nsw.gov.au/fishing/habitat/threats/cold-water-pollution.

149 Evidence, Mr Alec Lucke, Bingara resident, 15 May 2017, p 20.

Committee members looking at an off-grid solar–diesel hybrid power plant on a cotton farm in Moree.

Far West

2.22 The Menindee Lakes system, in the far west of the state, comprises of four main lakes: Cawndilla, Menindee, Pamamaroo and Wetherell, and has a combined capacity of 1,794 GL. The lakes are located on the Darling River about 200 kilometres upstream of its junction with the Murray River at Wentworth. Originally a natural formation, the lakes were altered between 1950 and 1960 with man-made structures to capture and retain floodwaters, and regulate the release of water downstream.[150]

2.23 Broken Hill and surrounding areas produce high quality citrus, stone fruit, wine grapes and table grapes,[151] in addition to cattle, wheat, wool and cotton.[152]

2.24 The committee visited the lakes and held a public hearing in Broken Hill. The committee heard how fraught water security and water management was as a result of policy decisions by several government bodies that had created lasting impacts.[153]

2.25 Menindee Lakes, an internationally recognised destination, is also highly dependent on water for tourism. Water management, particularly the draining of the lakes, has severely affected tourism, and in turn, the economy in Menindee and surrounding regions. According to the Broken Hill Chamber of Commerce: 'People got the perception that the area really was not worth coming to visit and was not safe. The numbers dropped quite significantly'.[154]

150 WaterNSW, *Menindee Lakes,* <http://www.waternsw.com.au/supply/visit/menindee-lakes>.

151 Evidence, Ms Rachel Strachan, Member, Lower Darling Horticultural Group, 26 October 2016, p 10.

152 Department of Agriculture and Water Resources ABARES, *About my region – Far West and Orana New South Wales*, (19 October 2017), http://www.agriculture.gov.au/abares/research-topics/aboutmyregion/far-west-orana#agricultural-sector.

153 See Evidence, Ms Strachan, 26 October 2016, p 10; Evidence, Mr Alan Whyte, Member, Lower Darling Horticultural Group, 26 October 2016, p 11.

154 Evidence, Mr Dennis Roach, Public Officer, Broken Hill Chamber of Commerce, 26 October 2016, p 19.

Committee members at the Lake Menindee inlet regulator

2.26 The management of the lakes by WaterNSW and the Murray-Darling Basin Authority is based on how much water is within them, with responsibility shifting between these two bodies. When the volume of the lakes is above 640 GL, the Murray-Darling Basin Authority assumes management but when the lakes volume reaches below 480 GL, WaterNSW resumes management.[155] This acts as a trigger that forms part of the interstate water sharing agreement for Menindee Lakes as discussed in chapter 3.[156] Concerns were raised about the Murray-Darling Basin Plan being no more than a political ploy to fix South Australia's water management issues (see chapter 3).[157]

2.27 Of major concern to stakeholders was the proposed construction of a pipeline from Wentworth to Broken Hill to secure the long term water supply for Broken Hill. Most stakeholders were against the proposal on the grounds of lack of consultation, inappropriate planning of the pipeline and the lack of information surrounding the estimated costs to build and maintain it.[158] This will be discussed in more detail in chapter 7.

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155 Murray-Darling Basin Authority, Fact Sheet: Menindee Lakes, https://www.mdba.gov.au/sites/default/files/pubs/Menindee%20factsheet%202015.pdf.

156 Evidence, Ms Strachan, 26 October 2016, p 10.

157 See Submission 55, Edward River Council; Evidence, Ms Louise Burge, Vice Chair and Executive Officer, Murray Valley Private Diverters, 28 February 2017, p 29.

158 See Evidence, Ms Strachan, 26 October 2016, p 15; Evidence, Mr Whyte, 26 October 2016, pp 11-12; Evidence, Mr Graeme Pyle, Chairman, Southern Riverina Irrigators, 28 February 2017, p 30; Evidence, Councillor Marion Browne, Broken Hill City Council, 26 October, 2016, p 25; Evidence, Mr Thomas Kennedy, President, Broken Hill and Darling River Action Group and the Broken Hill Menindee Lakes We Want Action Facebook Group, 26 October 2016, p 45; Evidence, Mr Mark

Central West

2.28 In the central west catchment area there are five main water storages: Wyangala Dam, Burredong Dam, Windamere Dam, Oberon Dam and Carcoar Dam.

2.29 Oberon Dam on the Fish River is an important water storage due to its role in the unique Fish River water supply scheme whereby western flowing water is transferred east of the Great Dividing Range. This water goes to Wallerawang and Mount Piper power stations, to Oberon and Lithgow councils for domestic and industry use, and to more than 200 landholders along the length of the river.[159]

2.30 Wyangala Dam on the Lachlan River is the second major irrigation dam in New South Wales with a capacity of 1,217 GL. In 1971 the dam was augmented to increase its storage capacity fourfold.[160] More recently, WaterNSW has considered further augmentation of the dam to increase capacity which will be discussed in chapter 5.

2.31 Windamere Dam on the Cudgegong River, upstream from Mudgee, supplies water for irrigation, stock and domestic needs in the Cudgegong Valley. In addition it supplies water to the Mid-Western Regional Council for town supplies, industry and domestic requirements, as well as providing environmental flows, flood mitigation and recreation. Together, Windamere and Burendong Dams supply water to downstream users in the Macquarie Valley.[161]

2.32 Burrendong Dam on the Macquarie River, is one of the largest inland dams in New South Wales with a capacity of 1,678 GL. The dam supplies water for irrigated agriculture, town, industry and domestic requirements, flood mitigation and recreation. Water is also allocated for 'environmental flows to the Macquarie Marshes, one of the largest remaining inland semi-permanent wetlands in south eastern Australia and a major waterbird breeding area'.[162]

2.33 Carcoar Dam situated about 50km south of Orange, is one of the smaller water storages in New South Wales with a capacity of 35,800 ML. It was built to provide a 'reliable supply of water for irrigation in the Belubula Valley and to meet downstream stock and domestic needs'.[163]

2.34 A proposed new water storage at Cranky Rock, just outside of Canowindra, was a contentious issue for residents in the Central West. On the one hand, it was claimed that the new water storage would guarantee increased water security for the region,[164] while on the other, it was argued that the new storage would have negative environmental impacts, particularly on the

Hutton, Secretary, Broken Hill and Darling River Action Group and the Broken Hill Menindee Lakes We Want Action Facebook Group 26 October 2016, p 46.

159 WaterNSW, *Oberon Dam* http://www.waternsw.com.au/supply/visit/oberon-dam.

160 WaterNSW, *Wyangala Dam* http://www.waternsw.com.au/supply/visit/wyangala-dam.

161 WaterNSW, *Windamere Dam*, http://www.waternsw.com.au/supply/visit/windamere-dam.

162 WaterNSW, *Carcoar Dam*, http://www.waternsw.com.au/supply/visit/burrendong-dam.

163 WaterNSW, *Carcoar Dam*, http://www.waternsw.com.au/supply/visit/carcoar-dam.

164 Evidence, Mr David Somervaille, Board Member, Centroc, and Chair, Central Tablelands Water, 17 May 2017, pp 6 -7.

heritage listed Cliefden Caves.[165] The proposed dam and other potential water security and supply projects will be discussed in chapter 5.

2.35 Orange is a well-known fruit growing district and has recently become known for its cool climate wine varieties. More broadly, the region has a diverse agricultural sector consisting of wheat, cattle and wool.[166]

2.36 During the public hearing held in Orange, the committee heard of the confusion and frustration experienced as a result of structure of the water bureaucracy in New South Wales. Members of Centroc commented on the confusion regarding the roles and responsibilities between the Department of Primary Industries and WaterNSW.[167]

2.37 Centroc also argued that there was no overarching strategy for water compliance. All the different plans were disparate and did not share the same goals:

> There are water resource plans, there are State plans, there are regional plans and there are local plans. The water plan should at least point to, for instance, the Premier's priorities about growth, development and what have you. But the plans at a regional level—including water but also including planning, agriculture and all those—need to be pulled together so that they are all pointing in the same direction. The issue we have at the moment is that none of these plans talk to each other.[168]

2.38 Concerns about the operation of government bodies will be discussed in chapter 3.

2.39 While in Orange, the committee visited Orange City Council's stormwater harvesting scheme to learn about other initiatives to increase water supply. This scheme and other initiatives will be further discussed in chapter 7.

North Coast

2.40 In the North Coast catchment area, there are three main water storages: Toonumbar Dam situated on Iron Pot Creek about 30 kilometres west of Kyogle; Rocky Creek Dam located approximately 20 kilometres north of Lismore; and Clarrie Hall Dam located about 15 kilometres south west of Murwillumbah on the Doon Doon Creek.[169]

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165 See Evidence, Mr Somervaille, 17 May 2017, pp 2, 6 -7; Evidence, Mr Harrison Burkitt, Secretary, Save Cliefden Caves Association, 17 May 2017, pp 15-20; Evidence, Mr Ian Curtis, President, Orange Speleological Society, 17 May 2017, pp 15-20.

166 Department of Agriculture and Water Resources ABARES, *About my region – Central West New South Wales* (16 October 2017), http://www.agriculture.gov.au/abares/research-topics/aboutmyregion/nsw-central#agricultural-sector.

167 Evidence, Mr Somervaille, 17 May 2017, p 5.

168 Evidence, Mr Kent Boyd, Board Member, Centroc, and General Manager, Parkes Shire Council, 17 May 2017, p 5.

169 WaterNSW, *Toonumbar Dam* http://www.waternsw.com.au/supply/visit/toonumbar-dam.; Rous County Council, *Rocky Creek Dam,* https://www.rous.nsw.gov.au/cp_themes/default/page.asp?p=DOC-ICT-21-15-86.;Tweed Shire Council, *Clarrie Hall Dam* (21 October 2017), http://www.tweed.nsw.gov.au/ClarrieHallDam.

2.41 Toonumbar Dam has a capacity of 11 GL and was completed in 1971 to provide water for irrigation, stock and domestic requirements, and provide flood mitigation and environmental flows in the Richmond Valley.[170]

2.42 Rocky Creek Dam has a capacity of 14 GL and supplies drinking water to the Northern Rivers area. It was completed in 1953.[171]

2.43 Clarrie Hall Dam stores drinking water for the Tweed and has a capacity of 15 GL. It was completed in 1983.[172]

2.44 The Northern Rivers and surrounding areas predominantly produce cattle, macadamias, sugar cane and dairy.[173]

2.45 During the public hearing in Lismore, the committee was informed of the lack of understanding amongst the community about the risks of flooding in the Northern Rivers and the impacts of flooding in the region.[174] Flood mitigation tools and technology were also raised, with inquiry participants divided on the issue of dams being used as flood mitigation tools. Flooding and flood mitigation will be discussed in detail in chapter 6.

2.46 Ways to improve flood mitigation, management and response (also discussed in chapter 6) were addressed, with calls for current funding provided by the state government for flood mitigation works and floodplain risk management plans to be reviewed, as it was deemed insufficient by inquiry participants.[175]

Next Steps

2.47 The issues raised in the regions will be discussed in detail in the forthcoming chapters.

2.48 Chapter 3 examines strategic planning for the management of water in rural and regional New South Wales.

2.49 In chapter 4, water allocations, inter valley transfers, conveyance and loss water, carryover, and the water market and water pricing are considered.

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170 WaterNSW, *Toonumbar Dam,* http://www.waternsw.com.au/supply/visit/toonumbar-dam.

171 Rous County Council, *Rocky Creek Dam*, <https://www.rous.nsw.gov.au/cp_themes/default/page.asp?p=DOC-ICT-21-15-86>.

172 Tweed Shire Council, *Clarrie Hall Dam* (21 October 2017), <http://www.tweed.nsw.gov.au/ClarrieHallDam>.

173 Department of Agriculture and Water Resources ABARES, *About my region – Richmond-Tweed New South Wales* (17 October 2017), <http://www.agriculture.gov.au/abares/research-topics/aboutmyregion/nsw-richmond-tweed#agricultural-sector>.

174 See Submission 116, Tweed Shire Council, p 6; Evidence, Mr Rod Haig, Strategic Engineer (Water and Waste Water), Lismore City Council, 1 August 2017; Evidence, Mr Graham Kennett, General Manager, Kyogle Council, 1 August 2017; Evidence, Mr Peter Rees, Manager, Utilities, Byron Shire Council, 1 August 2017; Evidence, Mr Troy Anderson, Manager, Water Cycle, Clarence Valley Council, 1 August 2017.

175 See Evidence, Mr David Oxenham, Director, Engineering, Tweed Shire Council, 1 August 2017, p 12; Evidence, Mr Kennett, 1 August 2017, p 14.

2.50 Chapter 5 provides an overview of the potential augmentation of existing dams and proposals for new water storages.

2.51 In chapter 6, flood risks, flood mitigation, and flood rehabilitation are discussed with reference to the March-April 2017 floods in the Northern Rivers.

2.52 In chapter 7, water security innovations are explored, including the Broken Hill pipeline and references to international case studies.

2.53 Lastly, chapter 8 examines environmental impacts such as cold water pollution, blackwater events and bank slumping.

Chapter 3 Strategic planning

> … centralised rules and regulations for our water resources that are largely based on producing averages and relying on international treaties … ha[ve] failed to recognise the need for flexibility in our highly variable Australian climate which is aptly described in the iconic Australian poem as: 'A land of drought and flooding rains'.[176]

This chapter examines strategic planning for the management of water in rural and regional New South Wales. It then considers the development of a water equation to ensure effective demand and supply is secured to the middle of the 21st century. The Murray-Darling Basin Plan and water sharing plans are then considered, including an examination of the growing role of environmental water. The chapter concludes with a discussion detailing stakeholder views about the management of water by state agencies.

The water equation and long-term strategic planning

3.1 This section focuses on the need for greater long-term strategic water planning in New South Wales, including the urgent need for the development of a water equation. First, the strategic planning approach by the NSW Government will be outlined. Then, support for the establishment of a comprehensive water equation will be discussed, along with the need for long-term strategic planning regarding the management and supply of water. The section concludes with a discussion of the production potential of New South Wales if the water equation is 'solved'.

NSW Government water equation and strategic water planning

3.2 The NSW Government advised that Regional Water Strategies are being prepared for valleys where there is a major demand driver or a major shortfall between supply and demand. The first of these strategies is intended for the Hunter Region where major changes in industry, urban population growth and a shift to high value agri-business are changing the supply and demand balance. Regional Water Strategies also form part of a broader regional development program.

3.3 The strategic regional water planning processes will rely on forecasts of water demand and estimates of the volume of water under various climate conditions. Available water supply is modelled using computer programs that simulate the water supply system that takes into account historical and future climate predictions.[177]

3.4 Further, local water utilities in regional urban areas plan for water supply based on the Department of Primary Industries – Office of Water's *Guidelines on Assuring Future Urban Water Security – Assessment and Adaption Guidelines for NSW Local Water Utilities*. These guidelines include the 5/10/10 design rule to ensure appropriate and cost-effective urban water security in the regions. The NSW Government stated that the 5/10/10 rule is effectively considered a water equation for local water utilities and involves:

176 Submission 37, Murrumbidgee Valley Food and Fibre Association, p 9.

177 Submission 48, NSW Government, p 5.

- duration of drought restrictions to not exceed 5 per cent of the time
- frequency of restrictions to not exceed 10 per cent of years
- severity of restrictions to not exceed 10 per cent – the water supply system must be able to meet 90 per cent of the unrestricted water demand through a full repetition of the worst recorded drought.[178]

3.5 The purpose of the design rule is to enable each system's security of supply to be determined using a consistent methodology, with the flexibility to adapt the rule as appropriate. The NSW Government noted that water infrastructure and supply security planning for growing populations is done in accordance with the 2008 National Urban Water Planning Principles under the National Water Initiative. In regional New South Wales, this planning is undertaken by each local water utility through its Integrated Water Cycle Management Strategy.[179]

Support for a comprehensive water equation

3.6 A large number of inquiry participants supported the development of a water equation for rural and regional New South Wales that takes into account demand and supply out to the middle of the 21st century. For example, Riverina and Murray Regional Organisation of Councils described comprehensive water equation analysis as a top priority 'that will help to identify and prioritise the water infrastructure needs and priority projects for the next fifty years'.[180]

3.7 The Institute of Public Works Engineering Australasia stated that the long-term water balance is vital to ensuring adequate water is available for competing uses, and a water equation must take into account:

- urban water needs
- water quality
- population and demographic changes
- improvements in water use efficiency
- changing water supply reliability caused by climate change
- environmental water needs
- cultural water needs
- agricultural water needs
- industry and mining water needs.[181]

3.8 The institute informed that a planning horizon of at least 50 years should be considered for any water equation assessment. This is due to the fact that it takes a long period of time to

178 Submission 48, NSW Government, p 5.

179 Submission 48, NSW Government, p 5.

180 Submission 25, Riverina and Murray Regional Organisation of Councils, p 4.

181 Submission 62, Institute of Public Works Engineering Australasia, p 8.

deliver water infrastructure as the process includes a feasibility assessment, obtaining the requisite approvals, funding and construction. The institute was also of the view that any such water equation should allow for easy integration into Integrated Water Cycle Management plans, which are required by all Local Water Utilities.[182]

3.9 Griffith City Council asserted that the development of a demand and supply water equation is essential to underpin strategic planning for rural and regional New South Wales as well as for planning future resource requirements for social, economic and environmental needs.[183] Similarly, Lachlan Valley Water Inc indicated that it is important that water policy strives to deliver a genuine triple bottom line, and any water equation must be developed with the view of ensuring an equitable balance between the social, economic and environmental needs of the population.[184]

3.10 The irrigation farmers, WJ & A Seery Partnership, also supported the development of an equation, noting that it must consist of full cost pricing for demand and supply so that economic cost benefit analysis can be undertaken for water users and the communities which rely on primary industries.[185] It indicated that state water policy has so far addressed the 'supply demand nexus very narrowly, focusing almost exclusively on developing and controlling and ultimately restricting the supply for agricultural and natural resource uses due to seemingly invaluable environmental concerns'.[186]

3.11 WJ & A Seery Partnership argued that both supply and demand must be adequately considered, as restricting supply has knock-on effects for regional towns and communities whose industries rely almost exclusively on the prosperity of their primary industry. It concluded that a water equation and any resulting policy must focus on program implementation at the local level, to develop a local consensus and draw on local expertise.[187]

3.12 Leeton Shire Council supported a long-term plan for water sustainability to ensure that rural and regional New South Wales has access to good quality drinking water and continues to access clean water for agricultural use. The council noted it would like to see the politics taken out of the process and for it to be 'driven by key stakeholders'. It called for a transparent process, based on scientific rigour and linked closely with the Australian Agricultural Competitiveness White Paper.[188]

3.13 In calling for the development of a water equation, Local Government NSW stated that this requires close consultation with local council water utilities to take account of:

- water needs identified in urban water supply and demand analysis
- actual and anticipated growth patterns experienced and planned for in communities

182 Submission 62, Institute of Public Works Engineering Australasia, p 8.

183 Supplementary submission 17a, Griffith City Council, p 1.

184 Submission 114, Lachlan Valley Water Inc, p 4.

185 Submission 26, WJ & A Seery Partnership, p 1.

186 Submission 26, WJ & A Seery Partnership, p 4.

187 Submission 26, WJ & A Seery Partnership, p 4.

188 Submission 91, Leeton Shire Council, pp 1-2.

- potential impact of climate change on water availability and quality.[189]

3.14 Gwydir Valley Irrigators Association stated it is unaware of any scenario planning for the future water demands of rural and regional communities and considers such planning to be important as rural and regional towns 'deserve, safe and secure drinking water'.[190]

3.15 The association indicated that the local community in the Gwydir Valley had suffered due to 'the poor planning of successive governments to adequately provide a safe and secure drinking water supply for Broken Hill'. It asserted that the focus should be on local areas where supply is a concern and the equation should centre on how to address these issues.[191]

3.16 Past planning had been ineffective and costly for the region, according to the Gwydir Valley Irrigators Association, which noted that 'there is significant risk to all water users if this performance is not addressed'. It explained that the current system is delicately balanced, and any increase in one area of use will result in a reduction in another.[192]

3.17 The Gwydir Valley Irrigators Association considered that a water equation could be developed based on the water balance reporting provided for regulated systems, as they account for how water is used:

> Planning could include the establishment of a demand equation building upon the current water balance reporting provided for regulated systems, which is used to demonstrate the use of water throughout the water year. If these accounting systems were updated to highlight the different uses of water; environmental, industrial, commercial and agricultural, then the equation could also be used to determine the benefit derived from the use of water by allocating value on a consistent basis.[193]

3.18 Former Director General, NSW Department of Water Resources, Mr Peter Millington contended that it is a major failure of water resource planning and management in New South Wales that 'this water equation work – the medium and long-term water planning scenarios – is not being done'.[194] He stated 'No-one would think of making government investments in transport, health or education without considering future trends and needs over medium to long periods – why should water resources use and development be any different?'.[195]

3.19 Mr Millington noted that water scenario planning work had been done in previous decades. However, just when there are prominent agencies identifying food pressures over coming decades with consequential water demand issues, 'there is no water scenario planning that tests how Australia/New South Wales might need to respond and what this might mean for future water planning'.[196]

189 Submission 81, Local Government NSW, p 5.
190 Submission 109, Gwydir Valley Irrigators Association Inc., p 12.
191 Submission 109, Gwydir Valley Irrigators Association Inc., p 12.
192 Submission 109, Gwydir Valley Irrigators Association Inc., pp 12-13.
193 Submission 109, Gwydir Valley Irrigators Association Inc., p 13.
194 Submission 15, Mr Peter Millington, p 7.
195 Submission 15, Mr Peter Millington, p 2.
196 Submission 15, Mr Peter Millington, pp 7-8.

3.20 Mr Millington explained that water resources planning should first assess 'what we have got now'. It should then continually assess of 'how we are going and are we meeting needs', and should also look at 'what future domestic and international needs and trends are emerging … [and] what are the options that could possibly meet these future water needs over the medium to longer term'. He argued that this planning has not been conducted satisfactorily.[197]

3.21 Namoi Water described the development of a water equation as 'necessary' to determine demand and supply into the future. Greater availability and analysation of data is required to identify the short, medium and long-term water needs of rural and regional communities in New South Wales. However, it argued that the capacity to undertake this assessment is limited at present, due in part to the way water is managed in New South Wales:

> Fundamentally the focus is now either on the Basin Plan or Transformation. The expertise and connectedness of staff with the capacity to undertake this exercise is possibly now spread across two agencies rather than one. NSW agencies have previously reported on this issue separating Urban and Regional Water supplies as part of the planning process.[198]

3.22 Namoi Water contended that Australia currently uses 6 per cent of our available water resources, compared to a world average of 9 per cent. It explained this is reflective of a conservative approach to water management in Australia based on our semi-arid environment and on our reliance on groundwater.[199]

3.23 Namoi Water called for the creation of regional water planning units with strong local knowledge to assist in developing a water equation. It indicated that the NSW Government should also consider a range of factors, including:

- the most appropriate planning period
- the assessment of previous water equations and scenarios against predictions
- population growth estimates
- the calculation of regional urban water use per ML, per capita per day.
- the likely development and decline of industries over the period and trends from regional socio economic studies.[200]

3.24 In considering a water equation, Tweed Shire Council detailed the results of studies it had commissioned to determine future supply and demand of water in the region. One study found that while the present secure yield is approximately 15,000 ML per annum, this will decline to approximately 11,250 ML per annum by 2030 due to climate change. A demand study showed that through demand management measures, council has reduced the demand for water by approximately 20 per cent from forecasts in 2009. The present demand is approximately 10,000 ML per annum and increasing by approximately 2 per cent per year. The studies also show an increasing demand for water, as detailed in the table below.[201]

197 Submission 15, Mr Peter Millington, p 4.

198 Submission 110, Namoi Water, p 5.

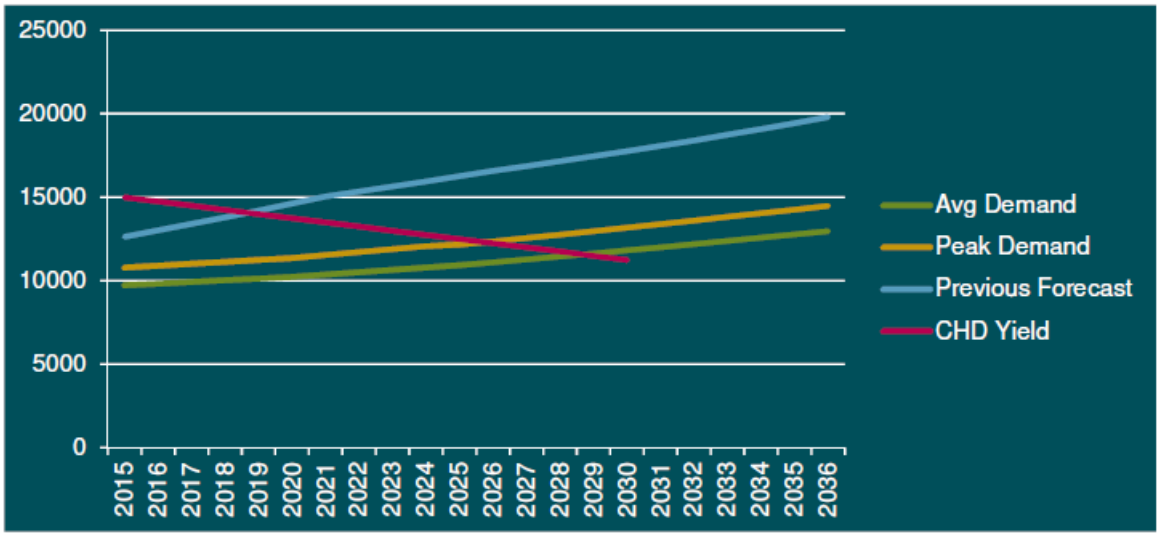
199 Submission 110, Namoi Water, p 4.

200 Submission 110, Namoi Water, p 6.

201 Submission 116, Tweed Shire Council, p 3.

3.25 Tweed Shire Council noted that the table indicates that from 2026, peak demand for water will exceed secure yield from the key water storage, Clarrie Hall Dam (CHD). It therefore argued that an augmentation to the local water supply will be required.[202]

Table 1 Demand and supply forecast for the Tweed[203]



3.26 Dr Rex Stanton indicated that a water equation must take into account an increase in population, as although 'residential water use accounts for less than 5 per cent of all consumption … [t]he state population is projected to grow by approximately 50 per cent by the middle of the century, which will lead to an increase in demand for water'. He argued that a water equation is critical for forward planning and stated that domestic, agricultural, industrial and environmental water requirements should all form part of the equation.[204]

3.27 Murrumbidgee Council argued that the development of a national water equation would be beneficial as the world will need to double its food production by 2050 to meet increasing population growth and global food demand. It noted that the Australian Bureau of Statistics indicated that in New South Wales alone, the population will increase from 7.3 million people in 2012, to 12.6 million people in 2061.[205]

3.28 In order to accommodate that increase, Murrumbidgee Council estimated that at least an extra 38,690 ML per year will be required. The council noted that this figure does not take into account addition urban water requirements including community services such as hospitals, and recreational grounds.[206]

3.29 The Ricegrowers Association of Australia stated the main driver of supply is rainfall and weather. While it is not possible to influence the weather, the development of better long-range weather forecast systems will assist irrigators to adjust their farming practices to accommodate changes to the weather. The association also affirmed that supply to irrigators

202 Submission 116, Tweed Shire Council, p 3.
203 Submission 116, Tweed Shire Council, p 3.
204 Submission 65, Dr Rex Stanton, p 1.
205 Submission 88, Murrumbidgee Council, p 1.
206 Submission 88, Murrumbidgee Council, p 1.

and other extractive water users has been reduced following the introduction of a cap on extractions in 1995. However, the association indicated that total supply could be increased through improvements to the efficiency of water storage.[207]

3.30 Demand for irrigators is influenced by an increasing global demand for Australian produce and an increase in the global population. Ricegrowers Association of Australia also noted that in the future, total demand could be reduced through improvements to the efficiency of water use.[208]

Long-term strategic water planning

3.31 The committee received evidence indicating that there is poor long-term strategic planning regarding the management and supply of water. Much of this evidence contended that there is a will at a local and regional level to invest in planning, but this drive has not been adequately supported by the NSW Government.

3.32 Mr Graham Kennett, General Manager, Kyogle Council explained that local governments in the northern rivers have a long history of regional collaboration. In 2014, the Northern Rivers Regional Organisation of Councils prepared a Regional Water Supply Strategy Study that identified a series of future options for the region in the next 50 years. This comprised a range of scenarios including connection of existing water supplies across local, regional and state boundaries, groundwater investigations, desalination, new dams and raising of existing dams, and direct and indirect use of recycled water.[209]

3.33 Mr Kennett explained that in order for this study to become a long-term regional plan, there is a need for a variety of investigations on specific options and issues. He stated that the 'unfortunate outcome of this process is that there is no political will to invest in these things within the current regulatory environment'.[210] He further noted a lack of collaboration:

> The current regulatory environment also restricts the ability and effectiveness of local water utilities to work collaboratively in regional strategic planning. The lack of regulatory stability and clear objectives means that long-term planning is made all the more difficult, particularly when it comes to partnerships required between State and local governments to deliver effective long-term regional solutions.[211]

3.34 Centroc described the current water resource planning processes in New South Wales as 'confusing' and 'not integrated', and attempted to summarise the framework in the table reproduced below. Centroc advocated for it to work in partnership with the NSW Government to co-design a regional water planning framework that takes into consideration water supply and demand options and aligns local, regional, state and federal planning processes.[212]

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207 Submission 57, Ricegrowers Association of Australia Inc., p 3.

208 Submission 57, Ricegrowers Association of Australia Inc., p 4.

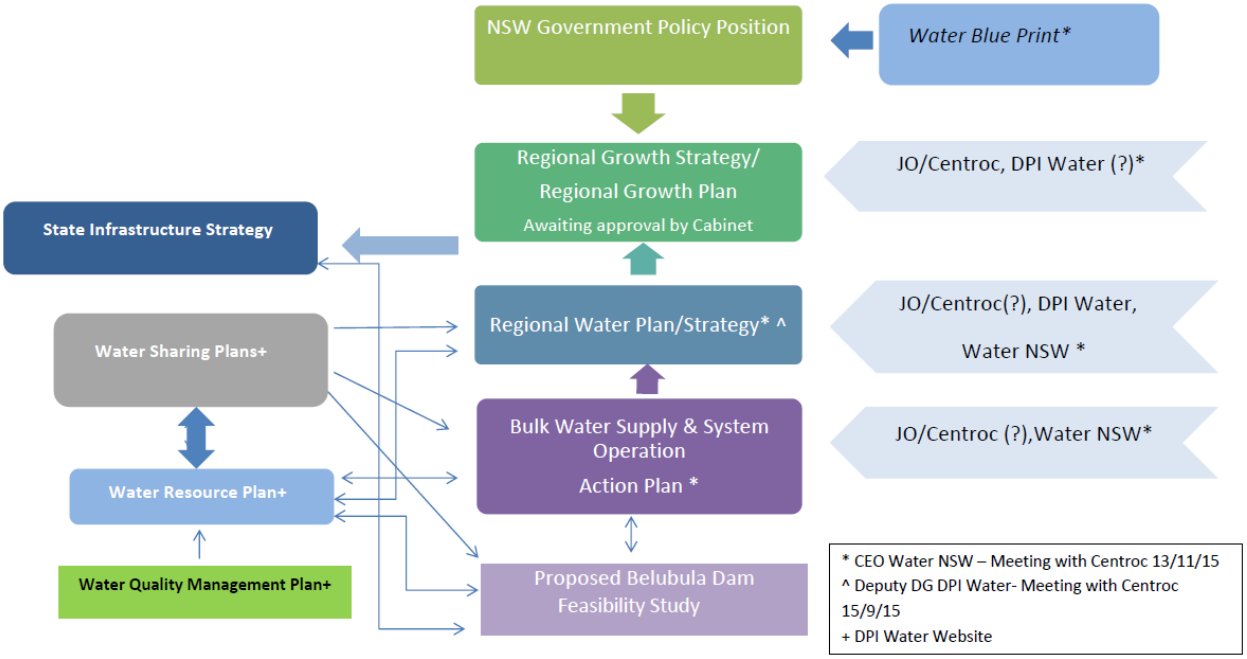
209 Evidence, Mr Graham Kennett, General Manager, Kyogle Council, 1 August 2017, p 14.

210 Evidence, Mr Kennett, 1 August 2017, p 14.

211 Evidence, Mr Kennett, 1 August 2017, p 14.

212 Submission 66, Central NSW Councils, p 7.

Table 2 Strategic framework for water in New South Wales according to Centroc[213]



3.35 In 2008, Centroc finalised a water security study which included modelling to forecast urban demand for the many towns within its remit for a 50-year horizon through to 2059. The study found that the water security of 29 towns was at risk and required substantial improvements (see table 3 below). Following this, Centroc engaged with its 17 local government members and external stakeholders, and agreed upon 'an integrated program of water conservation and demand management measures, coupled with new and upgraded water supply and storage infrastructure'.[214] Centroc advised the committee it had long advocated for the NSW Government to review the 2008 study. This was seen as essential as changes brought on by the impact of climate change could result in significantly less secure water supplies than the 2008 report.[215] Without a holistic, catchment wide review, Centroc argued that it is not currently possible to determine the requirements for a water balance equation for the region.[216]

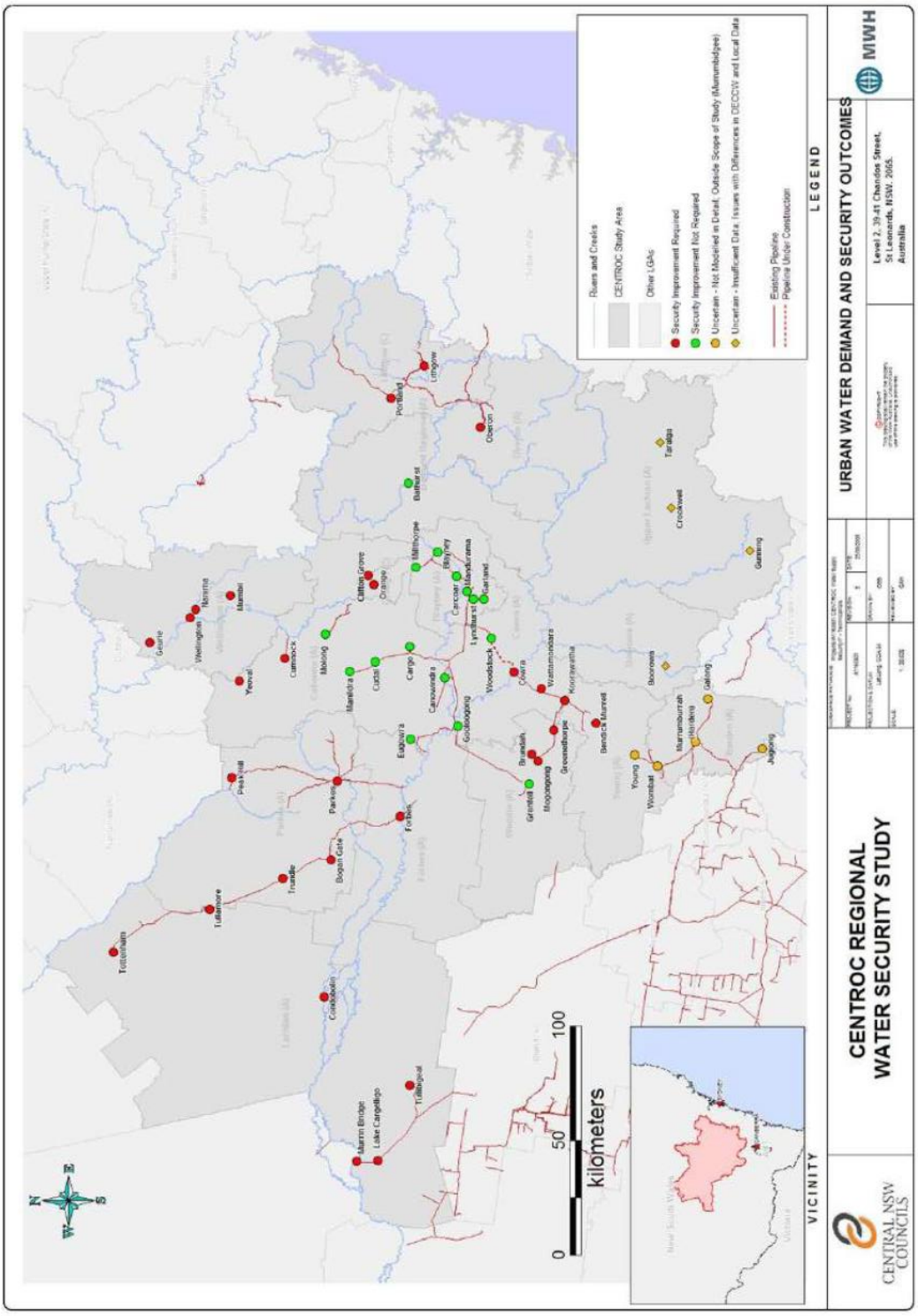
213 Submission 66, Central NSW Councils, p 39.

214 Centroc, *Water Security Study*, http://www.centroc.com.au/centrocs-advocacy-priorities/water-infrastructure/water-security-study/.

215 Submission 66, Central NSW Councils, p 7.

216 Submission 66, Central NSW Councils, p 8.

Table 3 Centroc regional water security study[217]



217 Answers to questions on notice, Centroc, received 21 June 2017, p 9.

3.36 Griffith City Council noted there are many strategy documents in place at a state, regional and local level to grow the regions.[218] However, the council contended that much of NSW Government's comments regarding prioritising growth is merely 'rhetoric', and argued that 'there is no obvious strategic planning' being undertaken.[219]

3.37 To explain this viewpoint, Griffith City Council highlighted the Department of Primary Industries Strategic Plan 2015 – 2019 which includes the key measure: "Increase the value of our primary industries within NSW by 30 per cent".[220] The council noted that according to the Australian Bureau of Statistics' Agricultural Census the value of agriculture in the Murrumbidgee in 2010 was $1,820 million. A 30 per cent increase in this figure equates to an increase of $546 million.[221]

3.38 Griffith City Council questioned how the Murrumbidgee can expect to achieve this increase in value, noting that the equation for value of agricultural production is:

Yield x Area x Price[222]

3.39 It asserted that price is difficult to influence as it is subject to global markets, and area is constrained by existing land use and government legislation. The only way yield can be increased significantly is to increase access to water for productive use. However, the council noted a recent study which suggests there has been a stalling of agricultural productivity growth since 1997.[223]

3.40 In the Murrumbidgee, the two key users of general security water are cotton and rice. If each industry contributed half of the required $546 million, this equates to just over 650,000 tonnes of rice and nearly 575,000 bales of cotton. Collectively both crops would require just over 1,200 GL of additional water to produce these outputs. Therefore to achieve the growth target of 30 per cent, the Murrumbidgee would require a significant amount of additional water for productive use. Griffith City Council argued whether effective strategic planning was in place for the region to reach these figures.[224]

3.41 The NSW Farmers Griffith Branch described the NSW Office of Environment and Heritage as working in 'direct conflict' with the Department of Primary Industries, which has a vision to increase the growth of agricultural production, as noted above. It argued that this growth is difficult to achieve when the NSW Office of Environment and Heritage has 'their foot on producers' necks and are operating in social isolation'.[225]

3.42 The branch contended that little planning has been implemented to meet future water needs for New South Wales and all government planning policies should take this into account:

218 Supplementary submission 17a, Griffith City Council, p 1.
219 Supplementary submission 17a, Griffith City Council, p 4.
220 Supplementary submission 17a, Griffith City Council, p 1.
221 Supplementary submission 17a, Griffith City Council, p 3.
222 Supplementary submission 17a, Griffith City Council, p 3.
223 Supplementary submission 17a, Griffith City Council, p 3.
224 Supplementary submission 17a, Griffith City Council, p 4.
225 Submission 29, NSW Farmers Griffith Branch, p 12.

> Every policy made by state government departments and the federal government should be made carefully to take into account the water needs into the future. Policies should be designed and formulated to support regional rural populations with minimum disruption. Governments have a key role in enabling our region to grow and create wealth by satisfying our water requirements into the future.[226]

3.43 Namoi Water proposed principles that should be considered fundamental to the process of reviewing water management both now and into the future:

- water planning and management must include funding and adequate assessment against proposed targets
- utilise regional data sets rather than desktop or surrogate information
- methodologies must not be one-size-fits-all
- communities and water users need certainty that government intervention during planning periods will be minimal as continued water reform processes impact negatively on regional communities. Government must recognise the fatigue in rural communities resulting from water reform.[227]

3.44 Riverina and Murray Regional Organisation of Councils contended that there is no long-term National Water Plan and no attempt has been made to bring together 'the interrelated issues of water, food and fibre production, food security, sustainable regional and rural communities and a healthy river system and environmental protection'. The organisation called on the NSW Government to foster a stronger working relationship with the federal government to thoroughly investigate water security options.[228]

3.45 The organisation argued that governments have spent too long pandering to environmental groups rather than considering water storage solutions:

> For far too long there has been a total unwillingness to do anything but pander to the interests of extreme environmental groups and to reject potentially worthwhile projects such as additional water storages and/or water diversion schemes.[229]

3.46 Similarly, WJ & A Seery Partnership indicated that state water policy has so far addressed the 'supply demand nexus very narrowly, focusing almost exclusively on developing and controlling and ultimately restricting the supply for agricultural and natural resource uses due to seemingly invaluable environmental concerns'.[230]

Indigenous involvement in water planning

3.47 The Native Title Service Corporation (NTSCORP) informed the committee that the National Water Council's Review of Indigenous involvement in water planning stated in 2014 that Indigenous participation in water planning and management must be improved:

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226 Submission 29, NSW Farmers Griffith Branch, p 6.

227 Submission 110, Namoi Water, p 3.

228 Submission 25, Riverina and Murray Regional Organisation of Councils, p 3.

229 Submission 25, Riverina and Murray Regional Organisation of Councils, p 3.

230 Submission 26, WJ & A Seery Partnership, p 4.

> Indigenous participation in water management decision-making continues to vary regionally. Indigenous needs for water in over-allocated catchments are still not accounted for in water planning, and a gap remains in the actual provision of water to Indigenous people to be managed by them. Further work also needs to be undertaken to better incorporate Indigenous knowledge into water planning.[231]

3.48 It argued that access to water consumption has the potential to help close the gap by empowering Indigenous Australians to generate economic development opportunities. It called for collaborative work to be undertaken to 'improve water sharing and water management, especially in the Murray-Darling Basin, to achieve better social, economic and environmental outcomes for both Traditional Owners and the local community'.[232]

3.49 NTSCORP also recommended that the Murray-Darling Basin Plan be amended to include specific allocations of water for cultural flows and to ensure that water sharing plans accurately depict the state of native title rights within each geographic area.[233]

3.50 Mr William Badger Bates, Director, Barkandji Native Title Group Aboriginal Corporation spoke to the views of the Barkandji people, the traditional custodians of land in the far west of New South Wales and who have native title rights. He stressed the importance of cultural inclusion regarding cultural flows:

> … we would like to have cultural flows down the Darling River. We would like to have our cultural waters. The Barkandji people are not irrigators. We have nowhere to store water. All the people at Wilcannia and up and down the river, we would like our cultural waters. We need them to be stored at Menindee and they should stay there.[234]

3.51 In addition, Mr Bates pointed out the relationship of the waters to living cultural heritage which had particular spiritual significance in Aboriginal dreamtime:

> Our Rainbow Serpent…it lives underground in water. It doesn't live in a pipe. As a Barkandji person we get the pipeline coming from Wentworth to Broken Hill. We need the pipeline from Menindee fixed and our water to stay there. If you put too much pressure on the Murray, it's finished.[235]

3.52 The Barkandji Native Title Group Aboriginal Corporation also emphasised that cultural flow allocations for Barkandji have been largely overlooked in water sharing plans.[236]

Production if the water equation was 'solved'

3.53 The committee asked a number of irrigators and local regional bodies what their production would be if the supply of water was not a concern. The figures provided to the committee

231 Submission 84, NTSCORP, p 5.

232 Submission 84, NTSCORP, p 5.

233 Submission 84, NTSCORP, p 4.

234 Evidence, Mr William 'Badger' Bates, Director, Barkandji Native Title Group Aboriginal Corporation, 26 October 2016, p, 5.

235 Evidence, Mr Bates, 26 October, p, 5.

236 Evidence, Mr Kevin Knight, Director, Barkandji Native Title Group Aboriginal Corporation, 26 October 2016, p 4.

indicate the huge disparity between current production levels and the potential output by irrigators in New South Wales.

3.54 Mr Wayne Chaffey, an irrigator in the Tamworth region noted that based on the current yield of the Cockburn Valley, there is approximately 400 ha of irrigated production area with 5,942 tonnes of lucerne hay produced. This equates to 208,000 small square bales of hay, worth approximately $2.3 million. However, if all available irrigated land was in production, there would be approximately 700 ha in total, producing 10,285 tonnes of lucerne hay, equating to 360,000 small square bales of hay, worth approximately $4 million.

3.55 Based on reduced production, Mr Chaffey contended that there has been a direct loss of $1.7 million per year. He clarified that when amplified into the wider Tamworth region, it can be argued that a loss of over $4.25 million per year has been sustained.[237]

3.56 A farmer, Mr Daniel Kahl indicated that due to water security issues his business was often not able to reach full production. For example, in 2016 he was only able to irrigate 30 per cent of his cotton production and no other rotation crops were irrigated.[238]

3.57 Conversely, Mr Kahl informed that if water was not a concern, and his business could plant a fully irrigated rotation of crops, he estimated his potential economic output to be over $15 million, including $10 million from cotton. Mr Kahl argued that beyond the economic value of production, reaching these high levels would provide income for people in the community through employment and supporting businesses in the town, which would help to stimulate the local economy.[239]

3.58 The Peel Valley Users Association determined that recent annual production in the region equates to $18 million, while the full potential production is closer to $90 million. It explained that foregone production is a direct consequence of excessive water usage charges and the restricted access to less than full entitlement. This $72 million annual differential reflects the fact that irrigators in the Peel are restricted to 20 per cent usage of their full entitlement (6,100 ML out of 31,000 ML). If this full amount was accessed, then the Peel could generate an extra $72 million per annum.[240]

3.59 As will be discussed in chapter 4, the IPART has introduced a new tariff structure for the Peel Valley which will operate from 1 July 2018. This will greatly reduce water costs for users in the Peel Valley[241] and was welcomed by the Peel Valley Water Users Association.[242]

3.60 Mr Joe Curran, an irrigator near Orange, explained that he has approximately 200 ha under centre pivot irrigation. If the water equation was solved, the potential economic output would be approximately 6,000 tonnes of lucerne annually, with a value of approximately $1.8 million. With more water available, he would develop another 100 ha under pivots which could

237 Answers to questions on notice, Mr Wayne Chaffey, Irrigator, p 1.

238 Evidence, Mr Daniel Kahl, Wee Waa farmer, 15 May 2017, p 37.

239 Answers to questions on notice, Mr Daniel Kahl, 14 June 2017, p 1.

240 Answers to questions on notice, Peel Valley Users Association, 14 June 2017, p 2.

241 Answers to supplementary questions, IPART, 4 July 2017, pp 1-3 and 10.

242 Mr Jamieson Murphy, 'Peel Valley irrigators saved by IPART water price decision', *The Northern Daily Leader*, 13 June 2017.

produce an additional 3,000 tonnes of lucerne annually, with a value of approximately $900,000, for a total of $2.7 million.[243]

3.61 If water was not a concern, the Gwydir Valley region has the potential to generate a gross production value of $2,917 per ha from approximately 90,000 ha of developed irrigation fields. This is equivalent to gross production of approximately $263 million , resulting in an extended regional value of $573 million per annum. WJ Seery Partnerships explained that this does not include the development of any additional irrigation land or investments in infrastructure or technology. It also noted that if water was not a concern, large areas of land currently utilised for dryland cultivation could be converted to irrigated cultivation, significantly increasing the overall production of the area.[244]

3.62 Griffith City Council noted that Australian rice growers are world leaders in water use efficiency and use 50 per cent less water to produce 1 kg of rice than the world average. The rice industry is now producing one tonne of rice for each ML of water used, for the price of $415 per tonne. The farm gate value generated by a single ML of water is in excess of $400, with the regional benefit in excess of $900. The council argued that the social and economic benefits of making more water available for productive use can easily be seen.[245]

Committee comment

3.63 Water is an essential resource that is vital to the lives and livelihood of our citizens. It is critical that a long-term water equation for supply and demand is developed to assist New South Wales in strategically planning for the future. The population of New South Wales and the global population will continue to grow. Consequently, this state must be in a position of certainty in planning for our future water needs. Water is required not just for drinking purposes, but also to ensure that agricultural production is sustainable. Agricultural production feeds our people. It also provides an economic backbone for our rural and regional communities and New South Wales as a whole. Further, the committee notes the strong statements from some stakeholders that it is crucial that governments stop pandering to environmental groups and instead provide suitable water storage solutions to secure our water supply for current and future generations.

3.64 Therefore the committee recommended in the summary of key issues at recommendation 5:

- That the NSW Government, as a matter of urgency and in consultation with regional communities, develop a comprehensive water equation for supply and demand in New South Wales by March 2020, for the next 50 years.

3.65 While some strategic planning for water is being undertaken by the NSW Government, there is a lack of long-term strategic planning. The committee commends local councils for undertaking some of this work. However, the NSW Government should be leading the way so that a more cohesive strategy is developed for the state. As part of this process it is crucial that state government agencies widely engage with local communities in order to incorporate local insights and expertise.

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243 Answers to questions on notice, Mr Joe Curran, Irrigator, 6 June 2017, p 1.

244 Answers to questions on notice, WJ Seery Partnerships, 19 June 2017, p 1.

245 Supplementary submission 17a, Griffith City Council, p 14.

3.66 For these reasons the committee recommended in the summary of key issues at recommendation 6:

- That the NSW Government work with regional communities to fund and conduct long-term strategic planning for the security of water in rural and regional areas.

3.67 Further, if irrigators were not hamstrung by a range of water plans, far greater agricultural production levels could be achieved. This would increase the economic prosperity of the regions and the state. The committee heard evidence that currently there is an imbalance between economic and environmental outcomes, with irrigators of the view that environmental outcomes have received preferential treatment by government.

3.68 There are a range of recommendations throughout this report to address this lack of balance between economic and environmental considerations in the management and supply of water that, if implemented, will go some way to alleviating these concerns.

3.69 However, to highlight the importance of this matter the committee recommended in the summary of key issues at recommendation 4:

- That the NSW Government work with regional communities and the federal government to unlock the full agricultural production potential of regional New South Wales.

3.70 The committee notes the evidence of Aboriginal groups that Indigenous Australians have not been adequately involved in the consultation process for the strategic planning of water. Rectifying this would provide Traditional Owners with the opportunity to achieve better social, economic and environmental water outcomes for Indigenous Australians, including a greater recognition of cultural flows. The committee therefore recommends that Indigenous Australians be involved in the consultation process for any strategic planning for the management of water in rural and regional New South Wales and that cultural flows be examined as part of this process.

Recommendation 14

That the NSW Government conduct Indigenous consultation as an integral part of all strategic planning for the management of water in rural and regional New South Wales, including the examination of cultural flows.

Murray-Darling Basin Plan and environmental water management

3.71 As noted in chapter 1, the Murray-Darling Basin Plan was developed as a requirement of the *Water Act 2007* (Cth) and is administered federally by the Murray-Darling Basin Authority. The purpose of the plan is to provide a coordinated approach to water management across the Murray-Darling systems in South Australia, Victoria, New South Wales, Queensland and the Australian Capital Territory.[246] However, as also noted in chapter 1, the NSW Minister for

[246] Murray-Darling Basin Authority, What's in the Basin Plan?, https://www.mdba.gov.au/basin-plan/whats-basin-plan.

Regional Water announced on 15 February 2018 that he had 'begun the process to withdraw New South Wales from the plan'.[247]

3.72 As it currently stands, the basin plan determines the amount of water that can be extracted or taken annually from the basin for consumptive use, while leaving enough water for the environment. This process is called sustainable diversion limits, and these limits can be adjusted. For example, if environmental outcomes can be reached with less water, then more water can remain in the system for other users, including irrigators.[248]

3.73 As a result of the limits on water extraction, any new commercial development must purchase existing surface water licences or allocation water. Further commercial licences that would increase overall extractions cannot be issued. This is to ensure a balance of supply and demand.[249]

3.74 Mr David Dreverman, Executive Director, River Management, Murray-Darling Basin Authority, advised that if a new dam is constructed within the Murray-Darling basin, the new use, including any evaporation created, must be offset by a reduction in use elsewhere in the basin. Water use has to therefore remain within the sustainable diversion limit.[250]

3.75 The basin plan contains specific plans and frameworks to ensure:

- good quality water is delivered to people, businesses and the environment
- environmental water is used effectively
- state governments are committed to the plan
- communities always have access to drinking water
- water trade is efficient and fair
- implementation is monitored and evaluated.[251]

3.76 The plan came into effect in November 2012, and will be reviewed and revised throughout a seven year implementation phase. The overarching aim of the plan is to strike a balance between access to water for basin communities and provision of adequate water for the environment.[252]

3.77 Much of inland New South Wales is part of the Murray-Darling Basin. Although the current basin plan is very recent, joint management of the River Murray dates back over 100 years to

247 *Hansard*, NSW Legislative Council, 15 February 2018, p 32 (Niall Blair).

248 Murray-Darling Basin Authority, Sustainable Diversion Limit Adjustment Mechanism, https://www.mdba.gov.au/basin-plan/whats-basin-plan.

249 Submission 48, NSW Government, p 4.

250 Evidence, Mr David Dreverman, Executive Director, River Management, Murray-Darling Basin Authority, 5 June 2017, p 23.

251 Murray-Darling Basin Authority, What's in the Basin Plan?, https://www.mdba.gov.au/basin-plan/whats-basin-plan.

252 Murray-Darling Basin Authority, A Plan for the Murray-Darling Basin, https://www.mdba.gov.au/basin-plan/plan-murray%E2%80%93darling-basin.

the 1914 agreement between the states and the Australian Government to jointly share the waters and build dams, weirs and locks.[253]

3.78 A cap on water diversions was introduced in the Murray-Darling Basin in 1995. The cap limited the amount of water that could be diverted for consumptive uses to encourage more efficient use of existing diversions. The cap was introduced in recognition that extractions were increasing across the basin, putting the health of the basin at risk.[254]

3.79 The following table outlines the current timeline for the implementation of the Murray-Darling Basin Plan.

Planning under the Murray-Darling Basin Authority

3.80 The Southern Connected Basin Environmental Watering Committee was established in 2014 to facilitate coordination between basin state and commonwealth governments and environmental water holders.[255]

3.81 There are also a range of new planning instruments from the basin plan that will affect water for the environment, including:

- long-term watering plans
- water resource plans (that will replace water sharing plans)
- annual environmental watering priorities
- water quality and salinity management plans
- project to relieve sustainable diversion limit requirements and constraints management.[256]

3.82 Long-term watering plans are intended to provide long-term objectives and strategies for managing environmental water in each of the major regulated valleys. Long-term watering plans must be considered in the development of new water resource plans.[257]

3.83 According to the basin plan, water resource plans, are being developed that will replace existing water sharing plans. All water resource plans must be accredited by mid-2019. These plans will set out arrangements to share water, establish rules to meet environmental and water quality objectives and consider potential and emerging risks to water resources.[258]

253 Murray-Darling Basin Authority, Running the River Murray, https://www.mdba.gov.au/river-information/running-river-murray.

254 Submission 48, NSW Government, p 4.

255 Submission 48, NSW Government, pp 19-20.

256 Submission 48, NSW Government, pp 19-20.

257 Submission 48, NSW Government, p 20.

258 Submission 48, NSW Government, pp 19-20.

Table 4 Murray-Darling Basin Plan timeline[259]

259 Murray-Darling Basin Authority, Basin Plan timeline, https://www.mdba.gov.au/basin-plan/basin-plan-timeline.

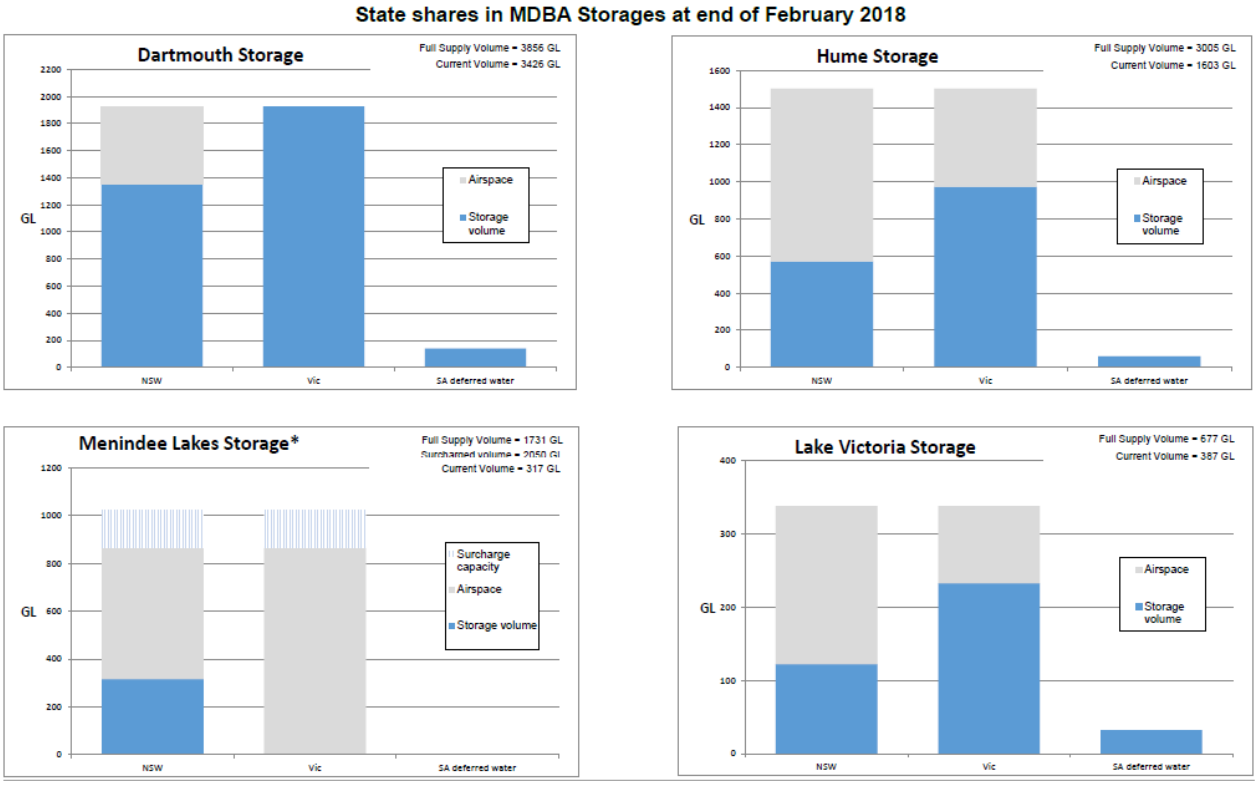
3.84 Water resource plans will outline how a particular area of the Murray-Darling Basin's water resources will be managed in order to be consistent with the basin plan. There are 36 water resource plan areas across the basin, including groundwater and surface water areas.[260]

Water sharing

3.85 The Murray-Darling Basin Authority is responsible for the sharing of water. It tracks the total amount of water in the system, including stored and inflow volumes, and system losses.[261] See Appendix 4 for a map of water sharing in the Murray.

3.86 The calculation of state shares includes the volume that each state holds in major storages at the end of the month. This calculation includes volume stored and the remaining 'airspace' or volume left in storage for each state. The data is updated on the first working day after the 15th of each month. For example, see the table below for information as at the end of February 2018:

Table 5 State shares in Murray-Darling Basin Authority storages at end of February 2018[262]



260 Murray-Darling Basin Authority, *Water resource plans*, https://www.mdba.gov.au/basin-plan-roll-out/water-resource-plans.

261 Murray-Darling Basin Authority, *Water Sharing*, https://www.mdba.gov.au/river-information/water-sharing.

262 Murray-Darling Basin Authority, *Water Sharing*, https://www.mdba.gov.au/sites/default/files/state_shares/State-Shares-at-end-of-February-2018.pdf.

3.87 The general principle of water sharing for the River Murray system is that New South Wales and Victoria each receive 50 per cent of the flow upstream of Albury and 50 per cent of inflows to Menindee Lakes.[263]

3.88 From state shares held in storage and tributary inflows assigned to each state of origin, New South Wales and Victoria provide South Australia with its entitlement, which varies from month to month as stipulated in the agreement. In 2011, approval was given for South Australia to store its share of water resources for the purposes of meeting its water needs.[264]

3.89 When sharing the storages, states must comply with the principal that the volume of water held must not exceed half of the capacity of the reservoir in which it is stored, otherwise it is deemed to have been 'spilt' to the other state (i.e. the water is deducted from the 'spilling' state's account and added to the other state's account).[265]

3.90 Further, the interstate water sharing agreement for the Menindee Lakes included volumetric triggers that when storage volumes are reduced to 480 GL, responsibility for the management of the remaining water reverted to New South Wales to provide drought security. The 480 GL was intended to supply water to New South Wales users for a period equivalent to the longest drought sequence prior to the construction of the Menindee Lakes water storage scheme; effectively two years.[266]

Environmental water

3.91 Environmental water is water used to improve the health of rivers, floodplains and wetlands. Managed environmental water is a practical measure where governments work together to reintroduce some natural variability in river flows to reconnect Murray-Darling Basin rivers, floodplains and wetlands for the benefit of the environment.

3.92 Environmental water is required because the basin's river system is often placed under pressure due to the natural movement, distribution, and the quality of water, as well as river regulation and infrastructure that support communities and agricultural production.[267]

3.93 The Commonwealth Environmental Water Holder manages a large portfolio of environmental water entitlements with annual allocations that are acquired through the Australian Government's investment in water-saving infrastructure and strategic water purchasing throughout the irrigation districts of the basin. The Commonwealth

263 Murray-Darling Basin Authority, *Water Sharing*, https://www.mdba.gov.au/river-information/water-sharing.

264 Murray-Darling Basin Authority, *Water Sharing*, https://www.mdba.gov.au/river-information/water-sharing.

265 Murray-Darling Basin Authority, *Water Sharing*, https://www.mdba.gov.au/river-information/water-sharing.

266 Submission 8, Lower Darling Horticulture Group, p 2.

267 Department of the Environment and Energy, *Commonwealth Environmental Water Office*, http://www.environment.gov.au/water/cewo.

Environmental Water Holder's decisions about the best use of this water are guided by the *Water Act 2007* (Cth) and the Murray-Darling Basin Plan.[268]

3.94 In New South Wales, the Office of Environment and Heritage is responsible for the delivery of all water for the environment including water held by the Commonwealth Environmental Water Holder.[269]

3.95 Environmental water is often used to supplement other water in the system. Depending on river operating rules, flow constraints and climatic conditions, the Commonwealth Environmental Water Holder can agree to:

- use water to meet identified environmental demands
- hold water and carry it over for use in the next water year (known as 'carryover').
- trade water for equal or greater environmental benefit.[270]

3.96 Carryover and the water market will be discussed in detail in the next chapter.

3.97 Environmental flows are an important part of environmental water management and involves the release of water from a dam or weir to maintain downstream river health. Environmental flows can help to:

- protect aquatic ecosystems and reduce aquatic weeds and frequency of algal blooms
- improve river health
- improve conditions for native fish, frogs, water birds and river-dependent plants and animals that rely on different flows to trigger migration and breeding
- protect river condition for recreation such as boating and swimming.[271]

3.98 The majority of environmental water in the basin is not held water entitlements, but rather planned environmental water under water resource plans for each valley. Both sources of environmental water are important, with planned environmental water being a critical component for the basin plan benchmark modelling.[272]

3.99 Commonwealth environmental water deliveries are coordinated with other water in the system, including planned environmental water, to achieve positive environmental outcomes. Planned environmental water is particularly important for river operations, allowing for the management of storage airspace and flood mitigation, and delivering in-stream flows. It also provides more natural flow variability to stimulate primary production.[273]

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268 Department of the Environment and Energy, *Commonwealth Environmental Water Office*, http://www.environment.gov.au/water/cewo.

269 NSW Office of Environment and Heritage, *Current water holdings* (22 November 2017), http://www.environment.nsw.gov.au/environmentalwater/current-water-holdings.htm.

270 Department of the Environment and Energy, *About Commonwealth environmental water*, http://www.environment.gov.au/water/cewo/about-commonwealth-environmental-water.

271 WaterNSW, *Environmental flows*, http://www.waternsw.com.au/supply/Greater-Sydney/environmental-flows.

272 Submission 49, Commonwealth Environmental Water Holder, p 5.

273 Submission 49, Commonwealth Environmental Water Holder, p 5.

3.100 Water shepherding also operates in New South Wales under a 2010 Memorandum of Understanding between the NSW and federal governments. This involves the delivery of a calculated volume of water to a more downstream location where it will be made available for extraction or use for the environment. The purpose of these water shepherding arrangements is to:

- optimise the use of all Commonwealth environmental water for the environment
- provide the capacity to deliver water to high priority environmental assets
- in the case of in-stream environmental watering, provide protection for environmental flows to pass through the system as far as transmission losses allow.[274]

3.101 New South Wales has a water shepherding project for the Barwon-Darling Rivers and intersecting streams. This includes the Warrego River and other streams east of the Barwon. The project follows flood flows in the far west in early 2009 and in 2010. The trial involves the transfer of water through the Menindee Lakes storage into the Lower Darling River and then into the Murray River system.[275]

Concerns with the Murray-Darling Basin Plan and the management of environmental water

3.102 Inquiry participants expressed very strong concerns regarding the operation of the Murray-Darling Basin Plan as they felt it disadvantaged New South Wales irrigators and communities to the benefit of South Australia and that it put too much weight on environmental outcomes rather than supporting a balanced triple bottom line approach.

Views of inequality between New South Wales and South Australia under the plan

3.103 The NSW Farmers Griffith Branch stated that the *Water Act 2007* (Cth) promised a reformation of water management across the Murray-Darling Basin. However, water has instead been managed with little practical understanding, with the bureaucracy focused on environmental water and supporting South Australian users at the expense of New South Wales:

> This has facilitated a continuing nightmare of burgeoning bureaucracy and political rhetoric driven by people with little practical knowledge of regional communities, irrigation or riverine landscapes. Instead of focusing on important concerns like water quality and collaborative environmental outcomes, we are being continuously subjected to an irrational 'flush it and splash it' mindset that is only focused on harnessing volumes of water. To deliver bulk water to the paying customers in the Southern Connected System, there are now over 17 different legislative monopolies involved with around 30 per cent less available productive water.[276]

274 NSW Department of Industry – Water, *Shepherding Environmental Water*, http://www.water.nsw.gov.au/water-management/water-recovery/water-shepherding.

275 NSW Department of Industry – Water, *Shepherding Environmental Water*, http://www.water.nsw.gov.au/water-management/water-recovery/water-shepherding.

276 Submission 29, NSW Farmers Griffith Branch, p 14.

3.104 A member of the public, Mr Michael McKay, expressed strong concerns that South Australia gets a better deal out of the Murray-Darling Basin Plan than New South Wales irrigators. He noted that New South Wales irrigators have restrictions ranging from eight to 20 per cent, while South Australian irrigators have had 100 per cent allocations for the past four years.[277]

3.105 Mr Peter Millington, former Director General of the NSW Department of Water Resources and Commissioner on the Murray-Darling Basin Commission described the Murray-Darling Basin Plan as coming from flawed legislation that did not take into account the science and socio-economic concerns or involve effective consultation:

> To summarise, the Murray-Darling Basin Plan comes from an inappropriate piece of legislation that expressly prevents integrated river basin planning, a planning process that has not opened up the science and hydrology to scrutiny and public discussion and debate, a complete lack of meaningful consultation and participation, a lack of consideration of the long-term socio-economic objectives for the basin and for each State, and a lack of consideration of food security and food and fibre productivity issues over the short, medium and long-term.[278]

3.106 Mr Millington considered the basin plan to be constraining future regional water development in New South Wales as it basically says 'no more water development'. The plan was agreed upon without any of the medium and longer term water scenario assessments for New South Wales and without any idea as to how this might impact on future needs. In addition, he contended that the Murray-Darling Basin Authority has not undertaken meaningful consultation on the main parts of the planning process.[279]

3.107 Ms Perin Davey, Executive Manager Corporate Affairs and Stakeholder Engagement, Murray Irrigation similarly argued that the Murray-Darling Basin Plan has placed a limit on how much water can be taken from the system, regardless of how many dams are built, or how reliable entitlements are made. She stated that under the *Water Act 2007* (Cth) there can be no new water in the Murray-Darling Basin.[280]

3.108 Ms Davey explained that the natural resources levy in South Australia is applied to all taxpayers on the Murray system, for example 'a river pumper in South Australia pays their licence fee but they do not pay ongoing water usage charges, whereas we [irrigators] pay'.[281]

3.109 The Chief Executive Officer of Murray Irrigation, Mr Michael Renehan, was 'uncomfortable' about this arrangement stating that irrigators bear the burden of a disproportionate part of the fees. In the Murray region, users pay $18 per ML and the additional charge on farmers is approximately $5 a ML.[282]

277 Submission 12, Mr Michael McKay, p 1.

278 Submission 15, Mr Peter Millington, p 3.

279 Submission 15, Mr Peter Millington, p 4.

280 Evidence, Ms Perin Davey, Executive Manager Corporate Affairs and Stakeholder Engagement, Murray Irrigation, 28 February 2017, p 21.

281 Evidence, Ms Davey, 28 February 2017, p 23.

282 Evidence, Mr Michael Renehan, Chief Executive Officer, Murray Irrigation, 28 February 2017, p 23.

Calls for improved management of South Australian lakes

3.110 A specific matter of contention among stakeholders is the transfer of water to the South Australian lower lakes, such as Lake Alexandria, and Coorang. Inquiry participants argued that the reason why New South Wales is providing so much water to South Australia through the Murray-Darling system is that there has been historically poor management of water in South Australia.

3.111 Griffith City Council explained that strong scientific evidence demonstrates that increasing freshwater flows from the Murray-Darling Basin system in the South Australian lower lakes will not correct the environmental degradation that has occurred in the lower lakes and Coorong. Instead it considered the environmental degradation to be caused by issues in South Australia.[283]

3.112 The council stated that the current environmental water management regime is based on flawed assumptions, including the need for high volumes of water to sustain the lower lakes in South Australia. Instead the council contended that an artificial environment at the end of the Murray River has been created due to drainage systems built in south east South Australia, the construction of barrages in the lower lakes in the 1940s and then the subsequent operation of the lakes.[284]

3.113 The applied solution to environmental degradation of the lower lakes and Coorong in the past 15 years has been focused on increasing fresh water supply from the Murray-Darling system. Griffith City Council argued that the current supply constraint issues to deliver high volumes of environmental water from New South Wales demonstrates that the Murray-Darling system did not evolve in a manner that would regularly supply the volumes of water being directed towards the lower lakes and Coorong.[285]

3.114 The council asserted that the focus on end-of-system flows and lack of consideration of engineering solutions in the lower lakes in South Australia indicates that politics rather than science dictates environmental water management in the Murray-Darling Basin.[286]

3.115 Edward River Council viewed that the implementation of the basin plan has resulted in substantial losses of water from productive use on a permanent basis. This has been compounded by the impacts of the basin plan and the management of environmental water under the current Lower/Murray-Darling water sharing plan. Council recommended that an investigation into the appropriateness of these plans be urgently undertaken.[287]

3.116 The council called the introduction of the basin plan 'unnecessary' and a political response to the millennium drought. The council considered that part of the outcome of the basin plan was to solve ecological problems in the Coorong and lower lakes in South Australia. However, these problems were created by the implementation of short sighted 'solutions' locally in South Australia. Edward River Council called on the state and federal governments to carefully analyse the 'actual causes and effects of South Australia's decisions regarding the

283 Supplementary submission 17a, Griffith City Council, p 26.

284 Supplementary submission 17a, Griffith City Council, p 22.

285 Supplementary submission 17a, Griffith City Council, p 25.

286 Supplementary submission 17a, Griffith City Council, p 26.

287 Submission 55, Edward River Council, p 1.

Coorong and lower lakes and Murray Mouth and to help implement local solutions that would bring benefit to the entire nation'.[288]

3.117 West Berriquin Irrigators Inc stated that the NSW Government should insist that South Australia provide solutions to its own problems regarding the Coorong, lower lakes and the Murray Mouth as they are no longer the estuarine systems that they once were. They argued that New South Wales should not be expected to fix South Australia's problems.[289]

3.118 A Barham dairy farmer stated that the primary cause of the reduction in New South Wales water security has been the NSW Government conceding far too much water to appease South Australia's demand for ever increasing end of river flows. The farmer contended that most of the problems with the Murray River in South Australia emanate from within that state, for example:

- diversion of local flows through the Coorong now flow directly out to sea
- very little South Australian catchment water flows through the Coorong
- operational management of the barrages restrict flows through the river mouth
- saline water quality.[290]

3.119 A New South Wales winemaker, Mr Darren De Bortoli, described the science underpinning the Murray-Darling Basin Plan as 'flawed'. He commented that 'South Australia blames upstream irrigators for their own stuff ups … the assumption that the [upstream] irrigation destroyed the Coroong was incorrect'. Instead he viewed that much of South Australia's south east wetlands have been destroyed by drains which flush the wetlands straight into the sea.[291]

3.120 Ms Louise Burge, Vice Chair and Executive Officer, Murray Valley Private Diverters, accepted that there is a role to play for the delivery of environmental water, but it should not be at the expense of allowing creeks and rivers to naturally flow. She argued for there to be a greater balance and for the plan to be more environmental than political:

> There are solutions in this political nightmare, but honesty has to be the foundation principle. This was not an environmental plan—it is a political plan—and I am pleading with you to put aside your political differences and find out for yourselves why so much concern is continuing about the Murray-Darling Basin Authority and the Murray-Darling Basin Plan.[292]

3.121 The Murray Valley Private Diverters noted that the majority of water to be recovered for the environment is to meet new 'end of system' flow targets for the Coorong, lower lakes and Murray Mouth. They asserted that these flow targets are very specific in the basin plan and

288 Submission 55, Edward River Council, p 2.

289 Submission 71, West Berriquin Irrigators Inc, p 2.

290 Submission 104, Barham Irrigation Dairy Farmer, p 2.

291 Mr Oliver Jacques, 'Darren De Bortoli speaks out on Don Mackay's death, National Party "footsies" and the "flawed" basin plan', *The Daily Advertiser*, 8 December 2017.

292 Evidence, Ms Louise Burge, Vice Chair and Executive Officer, Murray Valley Private Diverters, 28 February 2017, p 29.

cannot be compromised through other water recovery methods such as Sustainable Diversion Adjustment Mechanism projects.[293]

3.122 The Murray Valley Private Diverters stated that the Murray-Darling Basin Plan set 2,750 GL as the water recovery target and included salinity targets for Lake Alexandrina, as proposed by the South Australian Government. To achieve and maintain these targets, the South Australian Government and the Murray-Darling Basin Authority have ignored other contributing factors to salinity readings in the lake, such as when Goolwa and Tauwitcherie Barrages gates are open, reverse sea flows can re-enter the lakes during southerly swell or though wind conditions.[294]

Recommendations from 2013 inquiry

3.123 Griffith City Council supported recommendation 13 of the Legislative Council Standing Committee on State Development's report into the *Adequacy of water storages in New South Wales*. The report called on the NSW Government to make representations to the Commonwealth and South Australian governments to initiate a review of the management of the lower lakes to improve environmental and productive outcomes for New South Wales. It also recommended that the NSW Government challenge the federal government decision not to implement three out of four recommendations of the March 2012 Senate Legal and Constitutional Affairs References Committee Report, and urgently requested a full review of the *Water Act 2007* (Cth).[295]

3.124 The Standing Committee on State Development's recommendation 13 was based on evidence regarding the high volume of water directed away from productive purposes in New South Wales in order to maintain the lower lakes in South Australia.[296]

3.125 In its response, the NSW Government advised in January 2014 that it supported the committee's recommendation and had raised the issues during the development of the basin plan when there was considerable debate around the management of the lower lakes and the barrages. It advised that it was currently involved in a basin working group that was looking at options for the management of the lower lakes.[297]

3.126 The NSW Government again advised this portfolio committee in August 2016 that it had raised the issues outlined in recommendation 13 during the development of the Murray-Darling Basin Plan, and that there was still considerable debate around the management of the lower lakes and barrages.[298]

3.127 Edward River Council argued that the recommendation 13 has not been effectively actioned by the NSW Government, and called for dialogue to take place.[299] The council concluded that

293 Submission 76, Murray Valley Private Diverters, p 4.

294 Submission 76, Murray Valley Private Diverters, p 5.

295 Supplementary submission 16a, Griffith City Council, p 26.

296 Standing Committee on State Development, *NSW Legislative Council, Adequacy of water storages in NSW* (2013), p 111.

297 Correspondence from the NSW Government to the Clerk of the Parliaments, 30 January 2014.

298 Submission 48, NSW Government, p 35.

299 Submission 55, Edward River Council, p 2.

the implementation of the basin plan has resulted in a 'robbing Peter to pay Paul' outcome; where a reduction in regional productivity and the riparian environment in New South Wales has occurred to create and maintain an artificial environment in South Australia.[300]

3.128 Mr Dreverman from the Murray-Darling Basin Authority noted that over a couple of years the lower lakes in South Australia fell to minus 1.1 metres (about 1.3 metres below sea level). The system became distressed and large areas of the beds of the lower lakes were exposed and turned sulphuric. Mr Dreverman stated that serious consideration was given to opening the barrages to allow seawater into the lower lakes. However the authority, along with the South Australian Government, commissioned modelling that showed that if seawater is let in, the lower lakes become hypersaline within a matter of four or five months.[301]

3.129 Mr Dreverman argued that the barrages have been important to enable upstream diversion to increase and noted that it is 'interesting that the arguments to pull the barrages out or change them normally originate a long way upstream. You do not find too many advocates who live in and around the lower lakes'.[302]

Unintended impacts of the plan

3.130 The Murray Valley Private Diverters stated that to achieve the flow targets down the Murray River, there will be third party impacts on riparian landholders and other businesses. They argued that the Murray-Darling Basin Authority has ignored the natural capacity of the Murray River and natural fault lines that constrain the flow volumes downstream when setting these end of system flow targets.[303]

3.131 For example, below the town of Tocumwal, there are the naturally formed Millewa Choke and Barmah Choke. This section of the Murray River is only 27 metres wide and 2 metres deep.[304] Stakeholders raised concerns that the basin authority's environmental flow targets for the Murray River are causing unseasonal flooding in this section of the river which has the capacity to cause huge economic loss in the region.[305] The Barmah Choke will be examined in more detail in chapter 6.

3.132 Southern Riverina Irrigators stated that the volumes of water being forced through the system in the Murray Valley is resulting in third party impacts, including river bank erosion, bank slumping and trees falling into the river. While the Department of Primary Industries – Office of Water has undertaken consultation processes, Southern Riverina Irrigators argued that this has been a failure. Their view was that 'a predetermined outcome has been set and the consultation process has been a tick the box process wasting the taxpayers' money and the time of those consulted'.[306]

300 Submission 55, Edward River Council, p 3.

301 Evidence, Mr Dreverman, 5 June 2017, p 23.

302 Evidence, Mr Dreverman, 5 June 2017, p 31.

303 Submission 76, Murray Valley Private Diverters, pp 5-6.

304 Submission 76, Murray Valley Private Diverters, p 15.

305 Submission 76, Murray Valley Private Diverters, pp 16-17; Submission 99, Mr Neil Gorey, p 1.

306 Submission 44, Southern Riverina Irrigators, p 6.

3.133 The Murray-Darling Basin Plan is intended to remove some 4,000 GL of water from irrigated food and fibre production and divert it for use as increased environmental watering. Riverina and Murray Regional Organisation of Councils stated that this overemphasis on the environment will be disastrous on Australia's economy and food production, long-term food security, and will decimate many rural towns and communities.[307]

3.134 The Riverina and Murray Regional Organisation of Councils called for innovations in water security and management and for the Murray-Darling Basin Plan to be a key player in effectively managing water storages in Australia:

> The time has come for water solutions to be found – Australia can no longer afford to continue to stagnate – water is the key to our future and the current situation of the Murray-Darling Basin Plan must now be the catalyst for far greater harnessing and storage of our precious water resources, be that by way of new water storages and/or diversion schemes from northern Australia, and/or coastal river systems, and by innovation, technology, research and development and the ongoing development of effective river and irrigation management systems.[308]

3.135 Businesses are also concerned about the impact the Murray-Darling Basin Plan is having on their communities and local economies. 71 per cent of respondents to a NSW Business Chamber survey did not believe the Murray-Darling Basin Plan had equipped their communities to operate with less water. Respondents to the survey reported that the water allocation changes have had significant impacts on their businesses:

- more than half reported a loss of confidence
- nearly half reported that demand for their products and services had reduced
- more than a third reported that the changes had increased costs.
- 62 per cent stated that the Murray-Darling Basin Plan should give more consideration to the economic needs of the community
- 2 per cent stated that environmental considerations needed greater priority.[309]

3.136 Ms Sascha Moege, Senior Policy Officer, Local Government NSW, stressed that an analysis of the socio-economic impacts of the Murray-Darling Basin Plan must be undertaken:

> Our policy position—particularly in relation to the establishment of the Murray-Darling Basin Plan—has always been that the socioeconomic impacts are taken into account and addressed. We do not have the resources to do socioeconomic impact analyses. We hope that government and other players would undertake a proper socioeconomic impact analysis of any water resource management initiatives. For instance, that would apply to the Murray-Darling Basin Plan and any other entitlements buy-backs or changes in the arrangements in individual catchments and water sharing areas. They should ensure they are being done properly so that they are understood and can be addressed.[310]

307 Submission 25, Riverina and Murray Regional Organisation of Councils, p 2.

308 Submission 25, Riverina and Murray Regional Organisation of Councils, p 2.

309 Submission 97, NSW Business Chamber, pp 1-2.

310 Evidence, Ms Sascha Moege, Senior Policy Officer, Local Government NSW, 7 November 2016, p 7.

3.137 Gwydir Valley Irrigators Association stated that although reforms of the basin plan have largely not impacted industry, they have had a great impact on the local community. For this reason the association considered that there has not been appropriate balancing of environmental, social and economic needs and recommended that appropriate measurement, monitoring and reporting of triple bottom line outcomes be conducted prior to considering further changes to the basin plan.[311]

3.138 Further, the association stated that the economic and social impacts of over recovery from the Gwydir Valley under the basin plan have been significant. It recommended that any over recovered water be returned to production in valleys, and that the investment is value-added by coupling it with other stimulus opportunities:

> The return of over recovered water, coupled with smarter investment should aim to offset the economic losses of the past and provide a unique opportunity to strengthen the economic base of the community to build community resilience and reinvigorate the economy of the region. Returning water into production by itself will have benefits by increasing the productive capacity of the irrigated industry, which would have demonstrated benefits for the agricultural and supply sectors, as well as for the non-agricultural sector but will only lead to a partial reversal in the job losses. But if aligned other investment opportunities like new-business stimulus packages, decentralisation initiatives, further investment in transport routes and improved technology access the possibilities to harness this unique opportunity further beyond the farm-gate and for future generations are significant.[312]

3.139 Mr David Harris, Chief Executive Officer, WaterNSW explained the NSW Government's perspective is to ensure compliance with environmental requirements of the basin plan, while at the same time ensuring New South Wales's extractive uses are met:

> The way I would describe it is that the Government collectively some years ago came to policy decisions about the Murray-Darling Basin Plan and in particular the share of sustainable diversion limits and the share between extractive and environmental uses. From WaterNSW's perspective, the issue is: how can we and our customers, either within the rules or through other mechanisms such as complementary measures, seek to achieve the environmental objectives without loss to extractive use—in other words, meet both environmental and extractive uses without the reallocation of water from extractive to environmental use?[313]

Reviews of the plan and water recovery targets

3.140 A review of the northern basin water recovery target has recently been completed by the Murray–Darling Basin Authority. The key recommendation was that the water recovery target should be reduced from 390 GL to 320 GL.[314] In its submission to the review; Gwydir Valley Irrigators Association stated that it rejected the headline recommendation to only reduce the sustainable diversion limit to 320 GL. It recommended that no further recovery is required as

311 Submission 109, Gwydir Valley Irrigators Association, p 18.

312 Submission 109, Gwydir Valley Irrigators Association, p 25.

313 Evidence, Mr David Harris, Chief Executive Officer, WaterNSW, 26 October 2016, p 36.

314 Murray-Darling Basin Authority, *Proposed Basin Plan amendments for the Northern Basin*, https://www.mdba.gov.au/basin-plan-roll-out/basin-plan-amendments/basin-plan-amendments-northern-basin.

there has been an under-estimation of the social and economic impact this has had on the local area. Instead it called for investment in non-flow complementary measures to maximise environmental outcomes.[315]

3.141 Gwydir Valley Irrigators Association questioned the continued role of the Murray-Darling Basin Authority in basin plan implementation and recommended that a review of roles and responsibilities be considered. In addition, both the association and Namoi Water did not believe the Murray-Darling Basin Authority should be involved in basin-wide environmental water planning at five-year or annual periods when the Commonwealth Environmental Water Holder and basin states are responsible for implementation over a 10-year period.[316]

3.142 As part of the Basin Plan Evaluation, the Murray-Darling Basin Authority has analysed water recovery in 41 communities across the southern basin by analysing social and economic outcomes. The analysis found the total water recovery was 1,033.9 GL, as at 31 October 2016.[317]

3.143 Water has been recovered through either water purchase or on and off farm infrastructure efficiency programs. On-farm infrastructure efficiency programs allow a portion of the water saved to remain with the irrigator, and the remainder is transferred to the Commonwealth and counts toward the basin plan's water recovery target. The evaluation confirmed that water recovered through on and off farm infrastructure programs, rather than purchase, has less impact at the community level. The evaluation assumes that irrigators participating in infrastructure programs retained 30 per cent of the water savings generated.[318]

3.144 The Murray-Darling Basin Authority noted that once the water savings from infrastructure efficiency programs were accounted for, the net reduction to water available for consumptive use was substantially less, at 810 GL.[319]

3.145 However, an ABC media article from January 2017 noted that the Murray-Darling Basin Authority will wait until 2026 before reviewing the basin plan's impact on southern communities. The article stated that although the northern review found the basin plan had a detrimental impact on rural communities, Mr Phillip Glyde, the Chief Executive of the authority, indicated there would not be a similar study in the south until the 10-year anniversary of the plan's implementation.[320]

3.146 Australian Water Exploration Co. submitted that the legitimacy of the current 'enormous' environmental demands must be reviewed. The Commonwealth Environmental Water Holder currently holds 750 GL in New South Wales dams, a further storage capacity is being

315 Gwydir Valley Irrigators Association, Submission to the Murray-Darling Basin Authority, pp 3-4.

316 Submission 109, Gwydir Valley Irrigators Association, p 21; Submission 110, Namoi Water, p 12.

317 Murray-Darling Basin Authority, *Water recovery in the southern basin*, https://www.mdba.gov.au/basin-plan-roll-out/monitoring-evaluation/water-recovery-southern-basin.

318 Murray-Darling Basin Authority, *Water recovery in the southern basin*, https://www.mdba.gov.au/basin-plan-roll-out/monitoring-evaluation/water-recovery-southern-basin.

319 Murray-Darling Basin Authority, *Water recovery in the southern basin*, https://www.mdba.gov.au/basin-plan-roll-out/monitoring-evaluation/water-recovery-southern-basin.

320 Ms Cara Jeffery, 'Murray-Darling Basin Plan southern review not until 2026,' *ABC News* (25 January 2017), http://www.abc.net.au/news/2017-01-25/10-year-wait-for-murray-darling-basin-plan-southern-review/8211332.

demanded to allow 'air space' in these dams, and in addition, 2750 GL is being demanded for the environment. These amounts dramatically reduce the volume of water available for irrigation.[321]

3.147 Centroc stated that based on feedback, the region's agricultural sector wants a review of the Murray-Darling Basin Plan. Centroc wanted to be engaged in this proposed review, as the plan impacts on the social, economic and environmental imperatives of the Lachlan and Macquarie catchments. In the past there has been limited engagement with local government regarding the plan and the impact of sustainable diversion limits.[322]

Menindee Lakes

3.148 As noted earlier, the Menindee Lakes water supply scheme is owned by New South Wales and managed under the Murray-Darling Basin Agreement. Under the agreement, when the volume stored in the lakes is greater than 640 GL the water is managed by the Murray-Darling Basin Authority to supply New South Wales, Victoria and South Australia. When volumes fall below 480 GL, all water remaining is managed by the state to meet the needs of far west New South Wales, including Broken Hill's water supply and the irrigation needs in the Lower Darling River Valley. This is known as the 640/480 rule and provides an additional 160 GL for drought security.[323]

3.149 Mr Thomas Kennedy, President of the Broken Hill and Darling River Action Group and the Broken Hill Menindee Lakes We Want Action Facebook Group, argued there has been a continued mismanagement of the Menindee Lakes. He argued that decisions by the Murray-Darling Basin Authority and Department of Primary Industries – Office of Water in the last five years to release water from the Menindee Lakes system at a rapid rate has left the city in a situation that resulted in water restrictions, dying gardens and non-existent tourism.[324]

3.150 Mr Kennedy was of the view that water should be kept in the lakes instead of being drained so it goes out to sea at the Coorong or to the lower lakes in South Australia. Mr Kennedy stated that if water was in the Menindee Lakes, small and medium flows would not be required. He concluded that people should think about the environments of the Menindee Lakes and the Darling River and not worry so much about evaporation:

> So it is quite easy: manage the water so that the lakes are used for what they have been used for a long time. And stop talking about evaporation. Evaporation is part of the environment. The Menindee Lakes is part of the environment. We have more bird and fish species than the Coorong. They rave on about the Murray River and what is needed there for the environment. Well, the Menindee Lakes is an environment in

321 Submission 60, Australian Water Exploration Co., p 2.

322 Submission 66, Central NSW Councils, p 32.

323 Evidence, Mr Harris, 26 October 2016, p 30; NSW Office of Water, 'An overview of water saving investigations at the Menindee Lakes – the proposed changes under the Memorandum of Understanding between the Commonwealth and NSW to the lakes and water supply to Broken Hill', 2010, pp 1-2, see: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/549197/menindee_mgt_broken_hill_water_supply_under_commonwealth_mou.pdf.

324 Evidence, Mr Thomas Kennedy, President of the Broken Hill and Darling River Action Group and the Broken Hill Menindee Lakes We Want Action Facebook Group, 26 October 2016, p 45.

> itself and so is the Darling River and they need to start considering the Menindee Lakes and the Darling River as an environment as well.[325]

3.151 Broken Hill Darling River Action Group and Broken Hill Menindee Lakes We Want Action Facebook Group called for greater accountability of the people responsible for draining the Menindee Lakes in 2004. The groups considered that if those responsible had been held accountable, 'it is possible that the environmental disaster in the Lower Darling and Menindee Lakes would not be happening now'.[326]

3.152 The groups argued that the draining of the Menindee Lakes by the Department of Primary Industries – Office of Water in 2003/04 and 2012/13 and by the Murray-Darling Basin Authority in 2012/13 had been done 'without any thought to the environmental and social disaster that it would cause'. The over extraction of water has 'left this once pristine waterway nothing more than a polluted sewer' and 'its fish and wildlife are being destroyed so swiftly and to such an extent that we may not be able to save them for future generations'.[327]

3.153 Mr Robert Gillespie called for the Murray-Darling Basin Plan to be 'scrapped' and for governments to start again with a proper investigation that consults affected people. He considered that the trigger points for control of water stored in the Menindee Lakes should be adjusted. Mr Gillespie called for water sharing rules in New South Wales and Queensland to be enforced to ensure that small and medium flows have the opportunity to flow the length of the Darling River and that rapid drawdown of the Menindee Lakes, as occurred in 2013-2014, does not happen again, as this was an act of 'environmental vandalism'.[328]

3.154 Griffith City Council condemned the management of the Menindee Lakes system. It considered the breakdown of the Broken Hill town water supply, environmental damage and the drainage of the Menindee Lakes to be prime examples of the failure of water management practices in the region.[329]

3.155 Broken Hill City Council requested a thorough review of the current 'trigger point' for NSW Government control of the Menindee Lakes system. It asserted that the trigger point should be set at a minimum of 640 GL for New South Wales control and above 800 GL before the Murray-Darling Basin Authority can access the water to release it.[330]

3.156 The Lower Darling Horticulture Group considered the 480 GL trigger under the interstate water sharing agreement to be insufficient. It was intended to provide drought reserve for far-west New South Wales water users for a two year period. However, in recent dry inflow sequences when the water is spread across the four lakes within the water storage scheme, this provides only 12 to 15 months of supply to users. A significant proportion has been held in the two larger downstream lakes, Lake Menindee and Lake Cawndilla, most of which is unable to be diverted to the Lower Darling River. The NSW Government constructed large block

325 Evidence, Mr Kennedy, 26 October 2016, p 51.

326 Submission 3, Broken Hill Darling River Action Group / Broken Hill Menindee Lakes We Want Action Facebook Group, p 3.

327 Submission 3, Broken Hill Darling River Action Group / Broken Hill Menindee Lakes We Want Action Facebook Group, p 3.

328 Submission 11, Mr Robert Gillespie, p 3.

329 Supplementary submission 17a, Griffith City Council, p 16.

330 Submission 61, Broken Hill City Council, p 2.

banks in 2007 and 2015 to mitigate this. While this work was appreciated by locals it is an expensive temporary measure that has significant environmental impacts.[331]

3.157 Therefore, Ms Rachael Strachan, Member, Lower Darling Horticultural Group called on the NSW Government to seek changes to the Murray-Darling Basin Plan to ensure that when the volumes in the Menindee Lakes scheme fall, management control for drought reserve reverts to New South Wales when there is 400 GL remaining in the top two lakes and not spread across the two bigger lakes of Menindee and Cawndilla.[332]

3.158 Ms Strachan also wanted the Murray-Darling Basin Authority to raise the full supply level of Menindee and Cawndilla lakes by up to a metre to provide more water and prolong the time the lakes are out of drought reserve. She stated that this could be done by foreshore and Aboriginal burial protection works similar to those undertaken at Lake Victoria. Ms Strachan further viewed that the NSW Government should undertake structural works, including for a regulated bank separating Menindee and Cawndilla lakes and enlarging the outlet capacity of Lake Menindee.[333] The group considered these proposals would have the potential to make significant water savings that may contribute to sustainable diversion limit offsets.[334]

3.159 In terms of the sustainable diversion limit, NSW Farmers Griffith Branch was of the view that there is too much focus on savings numbers, rather than a vision for the management of water. It asserted that federal and state authorities 'demonise' evaporation and governments' methods appear 'more like a cost shifting exercise rather than sensible, achievable water management'. The branch asserted that if there is a continuing pattern of draining and drying down areas to achieve 'evaporative savings' there will continue to be a negative impact on rural communities. They argued that this process regarding evaporative losses has adversely affected Menindee and the Lower Darling and essentially, these losses have been shifted elsewhere to places like Lake Victoria, the Lower Murray and the lower lakes.[335]

3.160 NSW Farmers Griffith Branch questioned why the Lower Darling is the only place where there is no water for the river environment and communities. Sustainable diversion limit figures are not achievable in this area without risking the wellbeing of rural communities. It stressed that we 'need to get some common sense operating in water management and stop arguing about unworkable numbers. We should be focusing on our economic, social and environmental goals - not cost shifting'.[336]

3.161 Murrumbidgee Valley Food and Fibre Association viewed the overriding mindset of the departments is to put as much stored water as possible on top of 'freshies' or wet sequences. This is in direct contradiction to the original purposes of storages and regulatory systems. The association stated it has a growing list of examples where water has been wasted and environmental damage has been caused, such as in the Menindee Lakes:

331 Submission 8, Lower Darling Horticulture Group, p 3.

332 Evidence, Ms Strachan, 26 October 2016, p 10.

333 Evidence, Ms Strachan, 26 October 2016, p 11.

334 Submission 8, Lower Darling Horticulture Group, p 5.

335 Submission 29, NSW Farmers Griffith Branch, p 16.

336 Submission 29, NSW Farmers Griffith Branch, p 16.

> Menindee Lakes and the Lower Darling are a stark and obvious example but far from the only example of the outcomes from this overriding mindset. The management of Menindee and the Lower Darling in 2013/14 created a triple bottom line disaster. In our valley, precious water resources are wasted for no measureable environmental benefits as water is just let through our storages based on out of date rules and regulations that do not take into account dam levels or downstream conditions. Water is also put in places that are not connected to the rivers or the riverine landscapes at all.[337]

3.162 Mr David Harris, Chief Executive Officer, WaterNSW indicated that WaterNSW would consider all requests for orders from the Murray-Darling Basin Authority or environmental water customers, but will reject or re-negotiate orders that potentially compromise critical water needs, which relate to ensuring two year's water supply to Broken Hill and high-security entitlement holders in the Lower Darling. Mr Harris clarified that, as the system operator, WaterNSW would do what is right; it 'will calculate the impacts of orders, rather than just blindly accepting them'.[338]

3.163 A former Department of Primary Industries – Office of Water representative noted that New South Wales has a range of projects it is submitting to the Murray-Darling Basin Authority for sustainable diversion offset modelling, including a proposal for infrastructure at Menindee Lakes to give more flexibility to its operation. The proposal is to keep water in the upper storages for as long as possible and for regulators to get more operational flexibility.[339]

3.164 Following this stage, the department will need to negotiate a new funding agreement with the Commonwealth to build the infrastructure, and then renegotiate the operating rules with other basin states and interested parties. The former representative also noted that some non-negotiables will be built into the project that relate to impacts on reliability on the other southern systems.[340]

Compliance with environmental flow events

3.165 In March 2017 the Commonwealth Environmental Water Holder trialed a connection flow between the Macquarie River and the Barwon River to benefit native fish. 27.5 GL from commonwealth water accounts was drawn and it was expected that much of this flow would be retained in the Macquarie Marshes. The Office of Environmental and Heritage contacted landholders and requested that they do not pump during the event, despite them being entitled to do so under New South Wales regulations. This was agreed to voluntarily.[341]

3.166 On two occasions, during this environmental watering action, irrigators pumped some of this water. The Office of Environmental and Heritage called the landlords on both occasions and asked them to stop. The water holder estimated that 3.2 GL flowed through to the Barwon

337 Submission 37, Murrumbidgee Valley Food and Fibre Association, p 8.

338 Evidence, Mr Harris, 26 October 2016, p 31.

339 Evidence, Mr Gavin Hanlon, Former Deputy Director General, NSW Department of Primary Industries, 5 June 2017, p 48.

340 Evidence, Mr Hanlon, 5 June 2017, p 48.

341 Answers to questions on notice, Commonwealth Environmental Water Holder, received 24 October 2017, pp 1-2; see also Evidence, Mr Mark Taylor, Assistant Secretary, Commonwealth Environmental Water Office, 19 September 2017, p 7.

River, and about 0.9 GL was pumped out by licence holders. The pumped volume was approximately 3 per cent of the total release, with a market value of between $100,000 and $120,000.[342]

3.167 While the Commonwealth Environmental Water Holder noted that on this occasion the objectives of the environmental watering event were largely met, it suggested that New South Wales could consider developing 'a mechanism in water regulations or water resource plans to exclude licence holders from pumping for the duration of a flow event that was created exclusively or mainly using environmental water'.[343]

Committee comment

3.168 It is clear that there is anger in New South Wales rural and regional communities regarding the operation of the Murray-Darling Basin Plan. Inquiry participants expressed strong views that the basin plan is a political tool masquerading as an environmental plan that is denying New South Wales an adequate water supply to the benefit of South Australia. The basin plan is having a highly detrimental impact on agricultural production in New South Wales and the socio-economic development of our regional communities. We note that the Minister for Regional Water has indicated that he has begun the process to withdraw New South Wales from the plan.

3.169 The committee therefore recommended in the summary of key issues at recommendation 7:

- That, if New South Wales does not withdraw from the Murray-Darling Basin Plan, the NSW Government renegotiate the Murray-Darling Basin Plan with the federal government and other basin state governments to develop a more equitable agreement for New South Wales that better balances economic, social and environmental outcomes.

3.170 The committee is concerned that reports suggest the Murray-Darling Basin Authority will not be conducting a socio-economic review of the southern basin until 2026. This lengthy delay is unacceptable. The communities of the southern basin require a review similar to the Northern Basin Review which was published in November 2016 by the Murray-Darling Basin Authority.

3.171 For this reason, the committee recommended in the summary of key issues at recommendation 9:

- That, as a matter of urgency and irrespective of whether New South Wales withdraws from the Murray-Darling Basin Plan, the NSW Government call on the Murray-Darling Basin Authority to conduct a socio-economic review of the southern basin and publicly release its findings.

3.172 We note that the NSW Government demonstrated that dialogue did occur between federal and South Australian governments following the recommendation by the Legislative Council's

342 Answers to questions on notice, Commonwealth Environmental Water Holder, received 24 October 2017, p 2.; see also Evidence, Mr Mark Taylor, Assistant Secretary, Commonwealth Environmental Water Office, 19 September 2017, p 7.

343 Answers to questions on notice, Commonwealth Environmental Water Holder, p 2.; see also Evidence, Mr Taylor, 19 September 2017, p 7.

Standing Committee on State Development for there to be a comprehensive review of the current management of the lower lakes of the Murray-Darling basin in South Australia. However, it does not appear that any tangible progress has been made to addressing the management of the lower lakes. Therefore, the committee recommends that, if New South Wales does not withdraw from the Murray-Darling Basin Plan, the NSW Government continue to make representations to the federal and South Australian governments to initiate a comprehensive review of the current management of the lower lakes of the Murray-Darling basin in South Australia.

3.173 The committee acknowledges the concerns of inquiry participants regarding environmental mismanagement of water in the Menindee Lakes caused by the Murray-Darling Basin Plan, and in particular the 640/480 GL rule. For this reason we recommend that the NSW Government renegotiate the rule with the federal government so that the trigger point for the Murray-Darling Basin Authority to control water in the Menindee Lakes is increased to 800 GL.

3.174 We note the March 2017 incident described by the Commonwealth Environmental Water Holder where irrigators did not comply with a request by the Office of Environment and Heritage to not pump water during an environmental flow event. The committee notes concerns that compliance with these requests is voluntary. Therefore we recommend that the NSW Government liaise with the Commonwealth Environmental Water Holder and the Murray-Darling Basin Authority to consider developing a formal mechanism to exclude licence holders from pumping water for irrigation purposes for the duration of a planned environmental flow event.

Recommendation 15

That, if New South Wales does not withdraw from the Murray-Darling Basin Plan, the NSW Government continue to make representations to the federal and South Australian governments to initiate a comprehensive review of the current management of the lower lakes of the Murray-Darling basin in South Australia.

Recommendation 16

That, if New South Wales does not withdraw from the Murray-Darling Basin Plan, the NSW Government renegotiate the management of water in the Menindee Lakes with the federal government so that the trigger point for the Murray-Darling Basin Authority to control water is increased from 640 GL to 800 GL.

Recommendation 17

That, if New South Wales does not withdraw from the Murray-Darling Basin Plan, the NSW Government liaise with the Commonwealth Environmental Water Holder and the Murray-Darling Basin Authority to consider developing a formal mechanism to exclude licence holders from pumping water for irrigation purposes for the duration of a planned environmental flow event.

Water sharing plans

3.175 The *Water Management Act 2000* (NSW) provides for the establishment of water sharing plans, which are statutory ten year plans for the management of New South Wales's water resources. The purpose of a water sharing plan is to:

- provide all water users with a clear picture of when and how water will be available for extraction
- ensure the water source is sustainable in the long-term
- protect the fundamental environmental health of the water source.[344]

3.176 Under a water sharing plan, water licences are generally perpetual and separate from land. Water sharing plans set out the rules for accessing different types of water use such as town supply, rural domestic supply, stock watering, and industry. They also ensure a proportion of water is set aside for the health of the water source and water dependent ecosystems. They protect water users' rights and access to water and establish water trading rules.[345]

3.177 As at October 2017 there are 57 water sharing plans in place across New South Wales with only two coastal plans yet to commence. Once the remaining plans commence this will result in water sharing plans being in place across the whole state.[346] However, as noted earlier in the chapter, according to the basin plan, water resource plans will replace water sharing plans by mid-2019.

3.178 Water sharing plans set long-term and annual limits on water extractions to ensure that water extractions do not increase and erode the security of supply to all water users.[347]

3.179 Rules for transparent and translucent flows exist in several water sharing plans in New South Wales and these flows generally operate differently to the active management of licenced environmental water. A transparent flow occurs in a regulated river system when inflows are passed through a regulating structure, such as a dam, to enable a near-natural flow pulse into the river system. A translucent flow is similar, however only a portion of the inflow volume is passed.[348]

3.180 The intent of these flows is to restore natural flow variability and contribute towards achieving specific environmental outcomes, such as connecting different parts of the river and the floodplain or maintaining habitat and breeding conditions for native fish and waterbirds.[349]

3.181 The next section details some of the key issues with water sharing plans. This includes that many plans have not been effectively reviewed and concerns regarding environmental water, such as voluntary contributions and transparent, translucent and dilution flows. A detailed

344 Submission 48, NSW Government, p 4.

345 Submission 48, NSW Government, p 4.

346 Submission 48, NSW Government, p 4.

347 Submission 48, NSW Government, p 4.

348 NSW Department of Industry – Water, *Rivers*, http://www.water.nsw.gov.au/water-management/water-sharing/environmental-rules/rivers.

349 NSW Department of Industry – Water, *Rivers*, http://www.water.nsw.gov.au/water-management/water-sharing/environmental-rules/rivers.

discussion of water allocation under water sharing plans will be undertaken in the next chapter. Further concerns regarding the impacts of environmental flows on rivers and aquatic life will be addressed in chapter 9.

Review of water sharing plans

3.182 Mr Derek Schoen, President, NSW Farmers contended that it is a 'serious omission' that reviews were not conducted for many of the water sharing plans and argued that it was 'not good enough simply to roll them over'. He noted that there are people in the community 'who are hurting and who are awaiting a review that could be another two years coming'.[350]

3.183 NSW Farmers Griffith Branch was very concerned that water sharing plans may be rolled into federal water resource plans without a proper review. Current water sharing plans 'divvy up or prioritise water access and they have scrambled and confused the whole process'.[351] Irrigators must pay fixed fees and charges on undelivered water and the wider community is seeing a negative impact on production, jobs, businesses, population numbers and the ongoing reduction of essential government services.[352]

3.184 The branch also claimed that irrigators were 'coerced' into providing 'voluntary contributions' in 2002 and complained that these contributions were rolled into water sharing plans without a review. They argued that the NSW Office of Environment and Heritage manages this acquired water with little transparency or accountability and there has been no socio-economic monitoring or research to quantify its impact on communities.[353]

3.185 NSW Farmers Griffith Branch explained that water sharing plans appear to be designed 'so they can be altered for the benefit of bureaucracy at the expense of the paying customers, rural communities and their environments'.[354] The branch noted that water sharing rules associated with transparent flows, translucent flows and dilution flows appear to let water straight through storages regardless of downstream conditions. In some valleys water sharing rules appear designed to remove the purpose of storages altogether.[355]

3.186 Ms Debbie Buller, President, Murrumbidgee Valley Food and Fibre Association stated that water sharing plans have been tweaked and fiddled with because the NSW Government realised they were not working. She considered that most of the tweaks 'were a classic example of the management managing the system for the benefit of the management' regarding issues such as carryover rules, environmental accounts and inter-valley transfers' and not to serve the public or enhance the prosperity of the state.[356]

350 Evidence, Mr Derek Schoen, President, NSW Farmers, 7 November 2016, p 29.

351 Submission 29, NSW Farmers Griffith Branch, p 15.

352 Submission 29, NSW Farmers Griffith Branch, p 15.

353 Submission 29, NSW Farmers Griffith Branch, p 12.

354 Submission 29, NSW Farmers Griffith Branch, p 12.

355 Submission 29, NSW Farmers Griffith Branch, p 12.

356 Evidence, Ms Debbie Buller, President, Murrumbidgee Valley Food and Fibre Association, 1 March 2017, pp 21-22.; Submission 37, Murrumbidgee Valley Food and Fibre Association, pp 7-8.

3.187 The Murrumbidgee Valley Food and Fibre Association were very disappointed that the NSW Government chose to roll over the operation of water sharing plans in June 2016. According to the association, for many years the success of water sharing plans has been hard to judge, as they have spent much of their life suspended. It has only really been since 2013 that they have operated during 'average' seasons. The association, like many inquiry participants, stated that these plans are not delivering on stated outcomes across the triple bottom line and are hindering the progress of communities. Some of the major problems have been exacerbated by alterations to plans in 2008, which it viewed to be a kneejerk reaction to the drought and the introduction of the *Water Act 2007* (Cth).[357]

3.188 Griffith City Council noted that the 2004 water sharing plans were to be reviewed after 10 years, yet this has not occurred. Environmental water management in water sharing plans, such as translucent and transparent flows, have frequently been questioned by rural and regional communities, particularly in light of the Murray-Darling Basin Plan, yet no noticeable action has been taken.[358]

3.189 The council highlighted further ongoing issues with water sharing plans that the NSW Government does not acknowledge or address. For example, voluntary contributions were made by irrigators in the late 1990s and 2000s towards the environment. These voluntary contributions known as 'rules based environmental water' were meant to be reviewed after one and five years. These reviews did not occur; instead the voluntary contributions were enshrined in water sharing plans, which are also yet to be reviewed.[359]

Environmental requirements in water sharing plans

3.190 Griffith City Council asserted that water management practices are constraining rural and regional New South Wales. There is a lack of objective data addressing the social, economic and environmental impacts of environmental water management and the Murray-Darling Basin Plan. This is evidenced by the recommendations of the Standing Committee on State Development's 2013 *Adequacy of water storages in New South Wales* report which called for a review of environmental flow allocations for all valleys in New South Wales and for this to be integrated into the Murray-Darling Basin Plan (recommendation 7). It also recommended for the principles of the *Water Management Act 2000* to be amended to ensure that commercial water supply for towns and utilities and high security needs are prioritised above environmental needs (recommendation 8).[360] Griffith City Council highlighted that these recommendations recognised issues in 2013 with environmental management in New South Wales, yet there has been no tangible action by the government since then.[361]

3.191 According to the council, in south-western New South Wales translucent and transparent flows are examples of failed water management practices. The purpose of these flows is to mimic natural flow variability. However, they are based on 'assumptions of pre-European

357 Submission 37, Murrumbidgee Valley Food and Fibre Association, pp 7-8.

358 Supplementary submission 17a, Griffith City Council, p 13.

359 Supplementary submission 17a, Griffith City Council, pp 21-22.

360 Supplementary submission 17a, Griffith City Council, p 12.

361 Supplementary submission 17a, Griffith City Council, p 13.

natural flows, the premise of which is technically flawed'.[362] Griffith City Council argued that the problems relating to environmental water management are well known at both the state and federal level and denounced the 'blame shifting between levels of government, lack of accountability and lack of progress in resolving the issues'. The council stated that leaving these matters unresolved is constraining rural communities and making life difficult and uncertain for irrigators.[363]

3.192 Lachlan Valley Water Inc argued that there has been no effective opportunity to review environmental requirements in water sharing plans. Instead there appears to be an ongoing cycle of reforms. The organisation considered that a review of environmental flow allocations as recommended by the Standing Committee on State Development would help address the gaps in the science and the overlaps between state and federal policy.[364]

3.193 In addition to a review of water sharing plans, the Southern Riverina Irrigators recommended that the Department of Primary Industries – Office of Water develop more inclusive consultation methods to draw on local expertise:

> NSW Department of Primary Industries – Water has continued on the failings of the Murray-Darling Basin Authority to provide meaningful consultation by handpicking consultants they want to work with. Southern Riverina Irrigators strongly recommends that NSW Government processes involving consultation on water policy be reviewed. They cannot be made in isolation in city offices. They need to involve representative from grassroots organisations who are in touch with the day to day management of water resources. Through genuine consultation NSW Department of Primary Industries – Water would have the ability to take proactive steps in ensure that the demands on our precious resource well into the future can be met. This would require actively listening and working with those at the coalface; those with the local knowledge.[365]

3.194 The NSW Irrigators Council did not believe that any further review of water management practices in Western New South Wales is warranted beyond the amendment of the current water sharing plans. The NSW Irrigators Council welcomed the announcement of the Minister for Regional Water, the Hon Niall Blair MLC, that the NSW Government will undertake a review of the management of translucent flows for the environment in the Murrumbidgee. However, the council urged the NSW Government to extend this review to both translucent and transparent flows for the environment in the Lachlan and Murrumbidgee, and dilution flows in the Murray.[366]

3.195 While the NSW Irrigators Council did not seek to reduce the volumes of water released to the environment under existing water sharing plan rules per se, the recent release of a translucent flow in the Murrumbidgee, and a similar event in the Lachlan, requires review of the flow trigger levels and their resetting at higher thresholds.[367]

362 Supplementary submission 17a, Griffith City Council, p 13.

363 Supplementary submission 17a, Griffith City Council, p 14.

364 Submission 114, Lachlan Valley Water Inc, p 6.

365 Submission 44, Southern Riverina Irrigators, p 6.

366 Submission 85, NSW Irrigators Council, pp 5-6.

367 Submission 85, NSW Irrigators Council, pp 5-6.

3.196 Ms Stefanie Schulte, Policy Manager, NSW Irrigators Council, stated that their stakeholders had raised concerns that planned environmental water such as transparent and translucent flows are not currently paid for by environmental water holders and these costs are carried by irrigators. She also called for more clarity regarding how the Commonwealth Environmental Water Holder manages water and the volumes controlled.[368]

3.197 NSW Farmers were concerned that 'outdated and unbalanced' water sharing plans fail to reflect increased knowledge about both environmental requirements and how and when translucent flows occur. They called for changes to be made to environmental flow rules to restore the balance between environmental and productive shares. They also submitted that existing water sharing plans be urgently reviewed to avoid situations, like in the Lachlan River in 2015, where water is released for the environment in times when the environment already has plentiful water.[369]

3.198 Murrumbidgee Council agreed that transparent and translucent flows need re-visiting and questioned the release of water from Burrinjuck Dam for environmental purposes during an extremely wet period.[370]

3.199 Mr Paul Maytom, Mayor, Leeton Shire Council, informed the committee that many within the community thought translucent flows were a 'waste of water going through the system'. While he acknowledged translucent flows were introduced to 'mimic a natural event', Mr Maytom argued there needed to be greater clarity about their purpose, benefits and negative impacts if they were to cease.[371]

3.200 Tweed Shire Council stated that it would be beneficial if a specific set of guidelines were developed for the assessment of environmental flows.[372] While Edward River Council noted that it appears the operation of commonwealth environmental water remains unchanged, even when the environmental targets and objectives for the region have been met by unregulated flows through the system.[373]

3.201 Mr Jim Muirhead, Management Committee Member, South West Anglers Association, expressed the view that environmental flows should not occur just because a document says it should:

> If you go and put more water in the system just because it says 'We need an environmental flow today' because it is there on the document and you push the release button, it may not need it … So you have got water for a later date in the storage, possibly when you do need it.[374]

368 Evidence, Ms Stefanie Schulte, Policy Manager, NSW Irrigators Council, 17 May 2017, p 21.

369 Submission 52, NSW Farmers' Association, p 11.

370 Submission 88, Murrumbidgee Council, p 4.

371 Evidence, Mr Paul Maytom, Mayor, Leeton Shire Council, 1 March 2017, p 10.

372 Submission 116, Tweed Shire Council, p 5.

373 Submission 55, Edward River Council, p 1.

374 Evidence, Mr Jim Muirhead, Management Committee Member, South West Anglers Association, 1 March 2017, p 33.

Issues with water sharing plans

3.202 South West Anglers Association Inc argued that the timing and duration of the flows is more dependent on the need to meet targets and deliver quantities of water to certain destinations than it is to match the natural rises and falls of an unregulated river. While the association appreciated that it is difficult to deliver to both the irrigation industry and the needs of native fish, it did not consider past efforts to be satisfactory.[375]

3.203 Mr Wayne Chaffey contended that the Cockburn Valley Water Sharing Plan and associated licence changes have been a complete failure regarding social and economic land use for the valley. According to Mr Chaffey, surface water has been cut by 66 per cent, from 1,600 ML per year, to less than 500 ML per year. The Cockburn Valley has experienced a catastrophic loss in hay production, totalling over $1 million. Mr Chaffey explained that he relies on his farm as his sole source of income. This has dropped dramatically as a result of not being allowed to irrigate lucerne and other crops during critical times of moisture deficiency.[376]

3.204 Mr Chaffey noted that the NSW Office of Water stated in the Cockburn Valley Water Sharing Plan socioeconomic report, that the changes to his water licence conditions would make him more profitable. However he advised that this has not occurred, and in 2007, following a change to his licence conditions, he suffered a 40 per cent cut in his water access.[377]

3.205 The Peel Valley Users Association was of the view that the Peel Water Sharing Plan was rushed through in order to meet an arbitrary completion deadline. According to the association, it contains a number of 'glaring errors', for example an environmental contingency allowance now provides 5,000 ML of water from the Chaffey Dam to the environment annually. However, the water is only treated as environmental water while it is in the Peel River. Once it joins the Namoi River it is no longer environmental water and is available for pumping by Namoi Valley irrigators. The association described this as an anomaly, as there is no justification for such a large allowance, given that the Peel Valley already provides 95 per cent of the long-term annual average end of stream flow to the environment and downstream irrigators to the Namoi Valley. They argued that it is unfair that water users in the Peel must pay the full charges on the allowance when they cannot access the water and it is gifted to the Namoi.[378]

3.206 The association also advised that Peel irrigators are restricted by the water sharing plan to a long-term average annual extraction limit of only 6,100ML per year, compared to the total entitlement of all licences held of 31,000 ML, even though irrigators pay entitlement fees on the full total of 31,000 ML.[379]

3.207 The Pastoralists Association of West Darling Inc stated that the 2012 Barwon-Darling Water Sharing Plan has failed to meet its own objectives in terms of equitable resource sharing between all stakeholders. However, instead of being weighted too heavily in favour of environmental water, the association argued that a number of operating rules were introduced,

375 Submission 82, South West Anglers Association Inc., p 2.

376 Submission 18, Mr Wayne Chaffey, p 1.

377 Submission 18, Mr Wayne Chaffey, p 2.

378 Submission 21, Peel Valley Users Association, p 5.

379 Submission 21, Peel Valley Users Association, p 5.

without consultation, which have resulted in a significant windfall for irrigators to the disadvantage of other stakeholders and the environment. The operating rules were regarding the removal of pump size limits, approval to extract 300 per cent of an entitlement per annum and failure to implement daily extraction limits. The association recommended that these provisions be removed from the water sharing plan. It argued that 'under no circumstances should an irrigator be allowed to pump and store more than their annual entitlement in any one year in such a high evaporation environment'.[380]

3.208 Also on a different note, Ricegrowers' Association of Australia were generally supportive of the water sharing plan framework for the Murray and Murrumbidgee valleys as they underpin the security and reliability of water. As such, any substantial changes to these plans could significantly impact upon the value of ricegrowers' water entitlement assets. It noted that the NSW Irrigators' Council has been assured that water resource plans in 2019 will retain the current water sharing plan framework.[381]

3.209 The Ricegrowers' Association of Australia also supported the timeframe for ten year statutory reviews of water sharing plans as this provides a level of stability. However, it noted that it is critical for the NSW Government to dedicate adequate time and resources to undertaking these reviews. Ricegrowers' Association of Australia contended that this unfortunately has not been the case for the first statutory review, and 'the clear lack of respect displayed for the importance of these documents to the water users and their communities was disappointing'.[382]

NSW Government response

3.210 Some inquiry participants during the 2013 inquiry into the *Adequacy of water storages in New South Wales* were concerned with the government's approach to its management of environmental flows, including during certain times such as flood events. As noted earlier in this section, the committee recommended that the NSW Government review the environmental flow allocations for all valleys in New South Wales and make representations to the Commonwealth Government for it to review the environmental flow allocations for New South Wales valleys in relation to the Murray-Darling Basin Plan.[383]

3.211 The NSW Government's response noted the committee's recommendation, advising that the water sharing plan processes has already defined an appropriate method of determining environmental water allocations for valleys, and the current environmental flow provisions in New South Wales valleys are well supported by the community.[384] In August 2016 the NSW Government advised this committee that the environmental provisions in water sharing plans are being reviewed as part of the development of water resource plans. The government also advised that it will undertake a review of translucent flow rules to determine whether the intended environmental outcomes can be achieved with a more flexible approach.[385]

380 Submission 118, Pastoralists Association of West Darling Inc, p 2.

381 Submission 57, Ricegrowers' Association of Australia, p 6.

382 Submission 57, Ricegrowers' Association of Australia, p 6.

383 Standing Committee on State Development, NSW Legislative Council, *Adequacy of water storages in NSW* (2013), p 77.

384 Correspondence from the NSW Government to the Clerk of the Parliaments, 30 January 2014.

385 Submission 48, NSW Government, pp 32 - 33.

3.212 The NSW Government indicated it has developed strategies for improving the efficiency and effectiveness of licensed environmental water delivery whilst not compromising the security of water supply to consumptive users.[386]

Commonwealth Environmental Water Holder response

3.213 In response to current stakeholder concerns, Mr Mark Taylor, Assistant Secretary, Commonwealth Environmental Water Office, explained how his office works with state departments to deliver environmental water:

> As the Commonwealth Environmental Water Holder we work with our State colleagues, both in terms of the delivery of water and in terms of its management. We do not actually own or manage or deliver any of the infrastructure that supports the use of water in rivers through the State systems themselves. We have to depend upon, … and work with WaterNSW in relation to monitoring and metering. We work with the Office of Environment and Heritage in terms of delivery. We need to have a works licence to be able to deliver water to any particular part of the river, particularly if we are ordering from storages as well. In that sense we rely on the State and the State systems, including WaterNSW, to tell us about water releases.[387]

3.214 Mr Taylor stated that while the Commonwealth Environmental Water Office publishes a great deal of information about its work, it could be more effective at communicating with the general community about the benefits of environmental water.[388] Environmental watering is relatively new, and operational practices are more established for the extraction of water for consumptive use, rather than retaining water in stream.[389]

3.215 The water holder advised that accounting for environmental water poses challenges, but is extremely important. It noted that there is a clear need to establish new methods for accounting for environmental water that are creditable, reliable and practical, and the office is open to working with state governments to develop such methods.[390]

3.216 Mr Taylor indicated that his office has a high confidence in environmental water accounting across the southern-connected basin because the rivers and the systems are highly managed. However, is a different story across the north of the state:

> There are gages and systems but it has proven to be more complex for us to get good readings on that. I think the State agency itself has faced some difficulties in maintaining systems. I will not comment too much on that, but we have lower confidence in our accounting there, particular in relation to the use of water that is unregulated, for example the water in streams. We are seeking connectivity of flows. We think we know what has happened, but we do not quite know what has happened.[391]

386 Submission 48, NSW Government, p 33.

387 Evidence, Mr Taylor, 19 September 2017, p 6.

388 Evidence, Mr Taylor, 19 September 2017, p 10.

389 Answers to supplementary questions, Commonwealth Environmental Water Holder, p 3.

390 Answers to supplementary questions, Commonwealth Environmental Water Holder, p 3.

391 Evidence, Mr Taylor, 19 September 2017, p 12.

3.217 Mr Taylor explained that more could be done to change this, for example through the use of satellites, remote telemetry, and improved gauge points. The office is discussing this issue with WaterNSW and the Murray-Darling Basin Authority.[392]

3.218 The Commonwealth Environmental Water Holder also indicated that it is important that any new water resource plans maintain the same volumes of planned environmental water, and do not change the timing of planned environmental water in ways that would reduce the environmental outcomes achievable. Water resource plan requirements under the basin plan stipulate that plans must be consistent with the environmental watering plan and the basin-wide environmental watering strategy.[393]

Committee comment

3.219 The committee notes that regional communities have expressed concern that the NSW Government has shown them a lack of respect by not conducting reviews of many water sharing plans. While amendments have been made to these plans over the years, inquiry participants have generally not been impressed by this tinkering. Reviewing these plans is now critical, as provisions in water sharing plans are likely to be incorporated into water resource plans, which are being developed in accordance with the Murray-Darling Basin Plan and are to be accredited by mid-2019. We therefore recommend that the NSW Government urgently complete its reviews of water sharing plans in New South Wales before their provisions are incorporated into water resource plans; and that these reviews include thorough public consultation.

3.220 The committee notes that in the 1990s and 2000s voluntary contributions were made by irrigators towards the environment and that these contributions were rolled into water sharing plans without a review. We are concerned that the NSW Office of Environment and Heritage continues to manage these contributions with little transparency or accountability and recommend that the NSW Government develop and implement public reporting mechanisms on the use of voluntary contributions, for example on the WaterNSW website, and that access licenses and fixed charges should reflect this permanent reduction in entitlements.

3.221 In addition, the committee acknowledges that there are many concerns regarding environmental flows, and in particular transparent flows and translucent flows. The committee recommends that the NSW Government conduct a review of transparent flows and translucent flows in New South Wales water sharing plans before the provisions are incorporated into water resource plans.

Recommendation 18

That the NSW Government urgently undertake a review of all water sharing plans in New South Wales, that are yet to be reviewed, before their provisions are incorporated into water resource plans; and that these reviews include thorough public consultation.

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392 Evidence, Mr Taylor, 19 September 2017, p 12.

393 Submission 49, Commonwealth Environmental Water Holder, p 5.

Recommendation 19

That the NSW Government develop and implement public reporting mechanisms on the use of voluntary contributions, known as rules based environmental water, and that access licenses and fixed charges should reflect this permanent reduction in entitlements.

Recommendation 20

That the NSW Government conduct a review of transparent flows and translucent flows in New South Wales water sharing plans before the provisions are incorporated into water resource plans.

Operation of government bodies

3.222 Several inquiry participants informed the committee of the difficulty gaining timely and adequate information from NSW Government water bodies and that these government bodies tend to work in silos.

3.223 In recent years there has been a significant restructure of the management of water in New South Wales. The *Water NSW Act 2014* established the agency WaterNSW, which was formed on 1 January 2015 by merging the Sydney Catchment Authority with the State Water Corporation.[394] The Department of Primary Industries – Office of Water website also indicates that during 2016 and 2017 further changes have taken place and 'a number of functions relating to the delivery of water services' in New South Wales are now held by the Department of Industry – Water and WaterNSW.[395]

3.224 Mr Kevin Mack, Chair, Riverina and Murray Regional Organisation of Councils, was of the view that greater and more efficient access to information was paramount for farmers.[396] According to Mr Mack, the biggest issue was the lack of notification from agencies such as the Murray-Darling Basin Authority, WaterNSW, Department of Primary Industries and the Commonwealth Environmental Water Holder. He suggested that there could be a simple phone application that could notify people of the predicted outflows.[397]

3.225 This view was supported by Ms Louise Burge, Vice Chair and Executive Officer, Murray Valley Private Diverters who expressed the view that 'there are people making decisions remotely [about water] and they have no idea of the consequences'.[398] While Mr Austin Evans, Administrator, Murrumbidgee Council, thought better transparency and better communication was required from everyone.[399]

394 WaterNSW, *Annual report 2014-2015*, p 3.

395 NSW Department of Primary Industries – Water, *Homepage*, https://www.water.nsw.gov.au/.

396 Evidence, Mr Kevin Mack, Chair, Riverina and Murray Regional Organisation of Councils, 28 February 2017, p 47.

397 Evidence, Mr Mack, 28 February 2017, p 47.

398 Evidence, Ms Burge, 28 February 2017, p 32.

399 Evidence, Mr Austin Evans, Administrator, Murrumbidgee Council, 28 February 2017, p 15.

3.226 Murrumbidgee Valley Food and Fibre Association expressed concern that with the current system it is difficult to gain access to information or hold a particular agency to account:

> As well as being the largest water holder in New South Wales, the NSW Government is in charge of all the rules and regulations, implements all the water trade rules, inter-valley transfer rules and infrastructure rules and it holds a legislative monopoly over the delivery systems and the water infrastructure. There is a serious governance issue developing that would not be allowed to occur in the private sector. Because there has been a progressive separation of powers along with the implementation of further rules and regulations it is almost impossible to hold any department to account for poor decisions or to consult for sensible, practical updates and changes. The amount of 'buck passing' that occurs in land and water management in New South Wales is becoming ridiculous. We are always, always told that whatever the issue is, it's some other department's responsibility.[400]

3.227 The association also commented that for many years there has been a disconnect between natural resource management and agriculture in New South Wales at the regulatory level. It argued that this is counterproductive, as ideally these areas should be working together instead of being 'in direct competition with each other and competing for funding and community attention'. Murrumbidgee Valley Food and Fibre Association indicated that the agricultural sector could provide valuable input into natural resource management as it is populated by people who have generational knowledge of best practice land and water management.[401]

3.228 Ms Perin Davey, Executive Manager, Corporate Affairs and Stakeholder Engagement, Murray Irrigators, described how difficult it was to obtain clear information about what water belonged to New South Wales. Ms Davey argued that the inability to gain information from either the Murray-Darling Basin Authority or Department of Primary Industries websites meant that informed business decisions were hard to make.[402]

3.229 Likewise, Mr Michael Renehan, Chief Executive Officer, Murray Irrigation advised that the most common challenge faced by irrigators was decision making and information on water allocations for crop planting.[403]

3.230 A member of the West Berriquin Irrigators, Ms Shelly Scoullar, informed the committee of her unsuccessful attempts to get a Department of Primary Industries representative to come to Deniliquin to explain changes about water plans, water allocations and carryover:

> We made a number of phone calls and emails to DPI. We kept getting sent to different departments and we could not get anyone down here. That would have made a really big difference. I think it is important for anyone who is making decisions on behalf of people who will be impacted by that decision that they come, they engage with them and understand and get to know the people who will be impacted.[404]

400 Submission 37, Murrumbidgee Valley Food and Fibre Association, p 8.

401 Submission 37, Murrumbidgee Valley Food and Fibre Association, p 4.

402 Evidence, Ms Davey, 28 February 2017, p 22.

403 Evidence, Mr Renehan, 28 February 2017, p 22.

404 Evidence, Ms Shelly Scoullar, member, West Berriquin Irrigators, 28 February 2017, p 31.

3.231 Ms Helen Dalton, President, NSW Farmers Association, Griffith Branch, told the committee that it was very frustrating when government departments worked in silos.[405] While Ms Debbie Buller, President, Murrumbidgee Valley Food and Fibre Association, suggested all the departments streamline their practices, especially as 'quite often the messages that they give us are completely contradictory'.[406]

3.232 Ms Dalton and Ms Buller were of the view that there was little communication between irrigators and the Office of Environment and Heritage.[407] Ms Dalton stated that she had spoken to the office which has conceded that it must communicate more; however, it still does not answer her questions.[408]

3.233 Mr John Dal Broi, Mayor, Griffith City Council, was of the view that 'there are too many people … involved in the delivery of water'.[409] Ms Rachel Kelly, Policy Manager, Ricegrowers' Association of Australia suggested it would be far more helpful and efficient if all federal and state managing agencies of water could determine which agency was responsible for what task.[410]

3.234 Griffith City Council identified a large disconnect between the water bureaucrats and rural communities, arguing that this contributes to numerous inadequacies in the way environmental water is managed and contended that there is 'nearly as many bureaucrats involved in water management in New South Wales as there are irrigators'.[411]

3.235 Meanwhile, Mr Wayne Chaffey, irrigation farmer, noted that inconsistencies in staffing within the departments has led to considerable delays towards the development of water sharing plans and other improvement processes.[412]

3.236 According to Ms Jon-maree Baker, Executive Officer, Namoi Water, the recent restructure and transformation of Department of Primary Industries – Office of Water has meant a loss in technical capacity and resources 'at a critical juncture in our negotiations with the MDBA on the basin plan'.[413] She was of the view that the restructure had made it 'extremely challenging' for the department to function.[414]

3.237 Namoi Water expanded on this view in its submission, expressing strong concerns regarding the recent restructure of NSW Government water bodies during a critical period of the Murray-Darling Basin Plan negotiations:

405 Evidence, Ms Helen Dalton, President, NSW Farmers Association, Griffith Branch, 1 March 2017, p 17.

406 Evidence, Ms Buller, 1 March 2017, p 17.

407 Evidence, Ms Buller, 1 March 2017, p 24; Evidence, Ms Dalton, 1 March 2017, p 17.

408 Evidence, Ms Dalton, 1 March 2017, p 17.

409 Evidence, Mr John Dal Broi, Mayor, Griffith City Council, 1 March 2017, p 12.

410 Evidence, Ms Rachel Kelly, Policy Manager, Ricegrowers' Association of Australia, 28 February 2017, p 5.

411 Supplementary submission 17a, Griffith City Council, p 20.

412 Evidence, Mr Wayne Chaffey, Irrigation Farmer, 16 May 2017, p 10.

413 Evidence, Ms Jon-maree Baker, Executive Officer, Namoi Water, 16 May 2017, p 28.

414 Evidence, Ms Baker, 16 May 2017, p 33.

> The current restructure of the Department of Primary Industries – Water has seen significant shift in technical capacity and policy and planning expertise, this has come at the critical juncture of the Murray-Darling Basin Plan negotiations. The current staff are under resourced and faced with a plethora of challenges as the impacts and complexity of the basin plan implementation is now realised. This issue of resourcing and retaining expertise must be addressed before New South Wales can successfully move forward with reviews of current 10 year water sharing plans, and prior to the development of new Water Resource Plans under the Basin Plan. … [F]undamentally the timing and extent of the reform is affecting the ability of the agency to address issues associated with water planning and management. … Finalising the transformation process in transferring services from Department of Primary Industries – Water to WaterNSW has also impeded the focus and time available to staff to review these types of issues.[415]

3.238 Mr Steven Carolan, Vice Chairman, Namoi Water similarly stated department personnel structural changes meant the process of reaching understanding and knowledge was 'a somewhat unforgiving and disheartening process'.[416]

3.239 Central West Environment Council were also particularly concerned that continuous water agency restructures and budget cuts has caused a critical loss of corporate knowledge and expertise regarding water management in the state.[417]

3.240 Mr Mark Winter, Vice Chair, Gwydir Valley Irrigators Association, spoke of the apparent 'limbo' created by the transition of the compliance section from Department of Primary Industries – Office of Water to WaterNSW, as illustrated by a flood event in September 2016:

> There was some country down on the eastern end of the watercourse that had floodwater over it in areas that had never been flooded before, and it was not a big flood. … there were a lot of questions raised over whether some of the banks that were in the area were legal or not … They do not know which section of the compliances are going to do it, or who is going to do it.[418]

3.241 Mr Greg Mashiah, Manager, Water Cycle, Clarence Valley Council, said there was a lot of 'confusion between the different agencies as to their exact role' with water management.[419]

3.242 A former Department of Primary Industries official noted that one challenge for the department is ensuring good systems and procedures are in place to allow the organisation to retain knowledge, while at the same time allow staff to move on and take career opportunities.[420]

3.243 The former official stated that there are a number of long-term officials that are starting to retire, which is leaving a knowledge gap. These people have built up strong relationships with rural and regional communities over time. He indicated that the department must ensure that it can quickly point the community to a new contact and rebuild these relationships quickly.

415 Submission 110, Namoi Water, p 6.

416 Evidence, Mr Steven Carolan, Vice Chairman, Namoi Water, 16 May 2017, p 36.

417 Submission 53, Central West Environment Council, p 3.

418 Evidence, Mr Mark Winter, Vice Chair, Gwydir Valley Irrigators Association, 15 May 2017, p 8.

419 Evidence, Mr Greg Mashiah, Manager, Water Cycle, Clarence Valley Council, 1 August 2017, p 28.

420 Evidence, Mr Hanlon, 5 June 2017, p 34.

Particularly during these periods of water reform, it is vital that knowledge is captured by the department, and community relationships maintained.[421]

3.244 Mr Harris noted that WaterNSW completed its stage one restructure in 2015 and has acquired an additional 200 staff from the Department of Primary Industries. A three-year strategic plan has been developed for the organisation, so that stakeholders can see there is constancy of purpose in the organisation over the medium term. He stated that WaterNSW is an organisation that is developing its people. It is doing everything it can 'by way of skills, leadership and so on to retain and grow our talent and to fill our many vacancies by attracting high-calibre people. … In short, we are an organisation that is looking to grow and develop people, attract good people and hold onto good people'.[422]

3.245 Mr Harris stated that WaterNSW has been increasing its local community engagement, particularly through its work on pricing determinations:

> On the customer front, we really over the last year and largely in the context of the rural pricing determination have taken an enormous step up in our efforts to engage locally with our customers through our, currently, customer service committees and soon to be customer advisory groups. We do four roadshows a year with those customer service committees. I also get out to see people in my organisation right around the State.[423]

Committee comment

3.246 The committee notes the views of many inquiry participants that NSW Government water agencies tend to work in silos and it is difficult for the community to get timely and adequate information. There is also a fatigue in the community from the upheaval caused by restructures and the delineation of responsibilities between agencies. To address the confusion in the community caused by restructures, the committee recommends that the NSW Government clearly and publicly announces and exhibits the precise roles of each of its water agencies in order to enhance public knowledge. Further we recommend that the NSW Government boost funding and staff numbers for compliance and enforcement.

3.247 As water is such a vital resource, and there is already conflict regarding the management of water between states, NSW Government agencies need to make sure they work together for the benefit of New South Wales and not work in silos. As such we recommend that the Department of Industry – Water, WaterNSW and the Office of Environment and Heritage work closely together to deliver a unified and collaborative approach to water management in New South Wales, including the delivery of environmental water.

3.248 In addition, throughout this chapter there have been examples of NSW Government water agencies not adequately consulting with local communities and drawing from local expertise when developing and reviewing plans and strategies. To highlight the importance of consultation, the committee recommends that New South Wales water agencies conduct effective consultation on the development and review of all water plans and strategies.

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421 Evidence, Mr Hanlon, 5 June 2017, p 34.

422 Evidence, Mr Harris, 5 June 2017, pp 34-35.

423 Evidence, Mr Harris, 5 June 2017, p 35.

3.249 Further the committee supports the proposal by Mr Kevin Mack from the Riverina and Murray Regional Organisation of Councils for the development of a mobile app that acts as a water notification service from government agencies to irrigators and recommends that WaterNSW commission the production of such a service.

Recommendation 21

That the NSW Government clearly and publicly exhibit the precise roles of each of its water agencies to enhance public knowledge.

Recommendation 22

That the NSW Government boost funding and staff numbers for compliance and enforcement.

Recommendation 23

That the NSW Government ensure that the Department of Industry – Water, WaterNSW and the Office of Environment and Heritage work closely together to deliver a unified and collaborative approach to water management for the benefit of New South Wales, including the delivery of environmental water.

Recommendation 24

That New South Wales water agencies and departments conduct effective consultation on the development and review of all water plans and strategies, by drawing on the expertise of regional communities.

Recommendation 25

That WaterNSW commission the production of a mobile application for government water notifications, for example notifying predicted outflow levels.

Chapter 4 Water allocations, the water market and water pricing

This chapter examines water allocations and the movement of water by considering inter valley transfers, conveyance and loss water and carryover. The chapter will also examine the water market and water pricing.

Water licences

4.1 The NSW Office of Water is responsible for managing access to water and ensuring it is shared between the environment, towns and cities, farmers and industry and for Aboriginal cultural activities.[424] Under the *Water Management Act 2000*, water licences are separated from the land title when a water sharing plan commences.[425] The NSW Government explained that this creates opportunities and flexibility for businesses wishing to trade water.[426]

4.2 Water access licence categories include:

- regulated river (high, conveyance or general security) access licences
- unregulated river access licences
- aquifer (groundwater) access licences
- estuarine water access licences
- coastal water access licences
- supplementary water access licences
- major utility access licences
- local water utility access licences
- domestic and stock access licences.[427]

4.3 This chapter will examine how water is allocated to these licences and how it can be traded. In doing so, the committee will consider problems associated with these processes identified by inquiry participants.

424 NSW Department of Industry – Water, *Water licensing*, http://www.water.nsw.gov.au/water-licensing.

425 NSW Department of Industry – Water, *About licenses*, http://www.water.nsw.gov.au/water-licensing/about-licences.

426 Submission 48, NSW Government, p 4.

427 NSW Department of Industry – Water, *Water access licences*, http://www.water.nsw.gov.au/water-licensing/about-licences/new-access-licences.

Water allocations

4.4 The volume of water that licensed users can access, known as an allocation or 'Available Water Determination' (sometimes referred to as an AWD), varies based on water availability within the water source and the size of a user's entitlement. The entitlement for licence categories is fixed to ensure that long-term sustainable extraction limits are met, and to provide equitable sharing between consumptive and environmental uses. As discussed in chapter 3, water sharing plans developed by the Department of Primary Industries – Office of Water determine how much water can be extracted over the long-term and how much must be set aside for the environment.[428]

4.5 Available Water Determinations credit water to a user's water account proportionate to water availability conditions at the time. Seasonally available water is shared across prioritised purposes, and as water availability decreases, for example during drought, allocations are reduced accordingly. This way, water is only made available for critical purposes. For instance, in dry times, general security entitlement holders will not be allocated available water, while towns, domestic and stock users might be allocated some available water.[429]

4.6 The new water year starts on 1 July. At this time, licensed water users are provided with an opening allocation between zero and 100 per cent of their entitlement.[430]

4.7 For most licence categories, if 100 per cent of an entitlement is allocated, there is no further increase in that licence category for the remainder of the water year. As such, water users are in most cases limited to using 100 per cent of their entitlement each year. The highest priority categories of licence typically receive 100 per cent of their allocation. However, if a licence holder receives less than this, an increase can occur later in the year if sufficient water becomes available, for example through rainfall and river flows.[431]

4.8 The following are the main licence categories, listed in order of priority:

- **Domestic & Stock; Town Water Supply**: Opening allocations are generally 100 per cent unless conditions are very dry with low water in storage.
- **High Security**: Full or near full allocations are made at the start of all but the very dry years.
- **Conveyance**: Allocations are made commensurate with other allocations.
- **General Security**: Are most susceptible to seasonal climatic variations. Last to receive allocations and are the least secure licence category. Licence holders can start the year with low or zero allocation and typically receive incremental improvements during the year.[432]

428 Submission 48, NSW Government, pp 7-8.

429 Submission 48, NSW Government, pp 7-8.

430 Submission 48, NSW Government, p 8.

431 Submission 48, NSW Government, pp 7-8.

432 NSW Department of Industry – Water, *How water is allocated*, http://www.water.nsw.gov.au/water-management/water-availability/how-water-is-allocated.

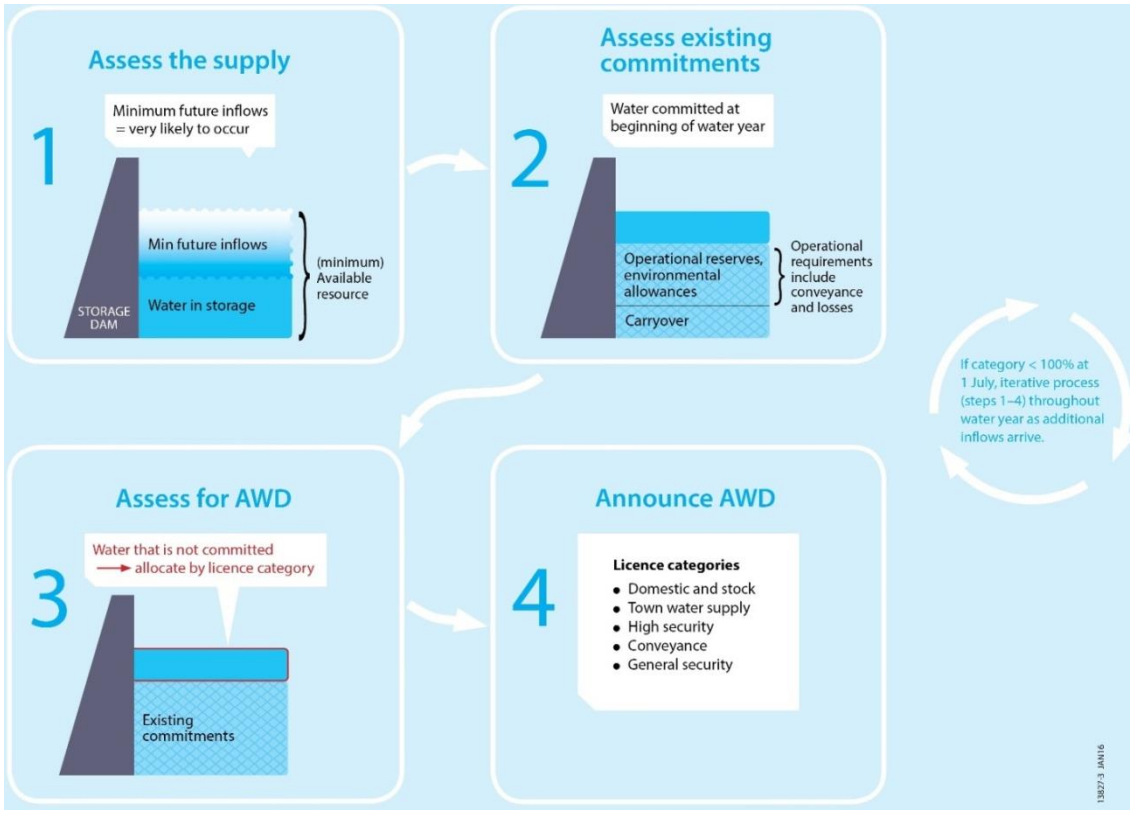
4.9 High security and general security are the two major categories used for irrigation purposes. While high security is higher priority and therefore more reliable than general security, there are frequently more general security licences on issue in most systems.[433]

4.10 A water resource assessment is made to determine allocations. This determination takes into account the following:

- how much water is in storage and how much of that is carried over as unused water from the previous year
- how much water is expected to flow into storages from natural inflows
- the volume required to run the river, including end of system flows, transmission losses and evaporation losses
- credits to environmental water allowances.[434]

4.11 Figure 4 provides an overview of how water is allocated in valleys.[435]

Figure 4 How water is allocated[436]



433 Aither, *Water markets in New South Wales: Final report* (March 2017), p 21.

434 NSW Department of Industry – Water, *How water is allocated*, http://www.water.nsw.gov.au/water-management/water-availability/how-water-is-allocated.

435 NSW Department of Industry – Water, *How water is allocated*, http://www.water.nsw.gov.au/water-management/water-availability/how-water-is-allocated.

436 NSW Department of Industry – Water, *How water is allocated*, http://www.water.nsw.gov.au/water-management/water-availability/how-water-is-allocated.

4.12 The committee heard evidence that the current allocation system is not working effectively as irrigators are not allocated enough water at the start of each season. This makes it hard for them to plan their cropping and forces them to purchase expensive water through water trading. The allocation of general security water is very conservative, based on a 'worst case scenario' drought. The next section provides an overview of these concerns, which will be examined further throughout the chapter.

Concerns with water allocations

4.13 Griffith City Council expressed strong concerns with the current system for allocating water, as general security irrigators are 'provided the scraps' and often experience major shortfalls as they cannot rely on planned allocations.[437] The council argued that the reliability of general security irrigation allocations has been significantly eroded over the past 30 years, while at the same time there has been no change to water storage capacity. It considered that this situation has arisen from the reallocation of water 'for non-productive purposes', such as the environment.[438]

4.14 As environmental water can be carried over (see 4.34 for a discussion of carryover) and excess water can be sold to cover costs, Griffith City Council argued that the NSW Government was prioritising these categories over general security entitlements and favouring trade over allocation for productive use to irrigators.[439]

4.15 Griffith City Council advised that the current process for allocating general security water makes it very difficult for farmers to plan in advance. Table 6 provides an example of how 100 per cent allocations tend only to be announced in December for general security licence holders on the Murrumbidgee. This is unhelpful because in southern New South Wales two of the largest general security irrigation water users are the cotton and rice industries. These crops are planted in September/October and are planned months in advance. December allocations are therefore too late to facilitate increased production as they are announced well after the summer crop planting window closes.[440] The council also noted that this conservative approach to water allocations was implemented after the millennium drought, with allocations now being managed by a 'worst case scenario' approach.[441]

Table 6 Murrumbidgee general security allocations[442]

Year	1 July	15 September	1 December	15 December
2010/11	0	45%	59%	100%
2011/12	44%	59%	100%	100%
2012/13	64%	69%	100%	100%

437 Supplementary submission 17a, Griffith City Council, p 18.
438 Supplementary submission 17a, Griffith City Council, p 18.
439 Supplementary submission 17a, Griffith City Council, p 18.
440 Supplementary submission 17a, Griffith City Council, pp 18-19.
441 Supplementary submission 17a, Griffith City Council, p 18.
442 Supplementary submission 17a, Griffith City Council, p 19.

4.16 Griffith City Council highlighted the disconnect between large amounts of water in storages and low allocations to general security licence holders claiming that this is not conducive to best-practice irrigation:

> On 1 July, 2016 the general security irrigation allocation in the Murrumbidgee was 20 per cent. This was very low despite June 2016 being the third wettest month on record in New South Wales. As at August 16 general security allocations are only 44 per cent and yet Blowering Dam is 73 per cent full and Burrinjuck Dam is 81 per cent full. These two dams have only 640 GL of available capacity until full and yet general security irrigators are still less than 50 per cent. Current and recent general security allocations highlight the disconnect between water management authorities and best-practice irrigation.[443]

4.17 NSW Farmers Griffith Branch agreed that recent general security allocations underline the disconnect between water allocation by the authorities and best-practice irrigation[444] and recommended that a review be conducted around initial allocations at the start of the water year to enable irrigators to seasonally plan for their cropping program.[445]

4.18 Ms Debbie Buller, President, Murrumbidgee Valley Food and Fibre Association, opposed the approach of basing annual water allocations on the worst case scenario which she stated is now based on the 1902 'Federation drought':

> The timing of the allocation announcements are more about just being absolutely sure that they have got the water to deliver and basing it on the worst-case scenario. To start off they were basing it on 2006; that has now been changed to 1902, before there were even any dams built. They are basing it as if tomorrow that set of circumstances may suddenly appear again … like that is going to happen; it only happened twice. To manage all the resources on that idea is so against how business works and using productive water. None of us would even bother if we had to manage our businesses based on the worst-case scenario. You need to remember that we are the paying customers and those plans are not performing for us.[446]

4.19 Mr Paul Pierotti, President, Griffith Business Chamber described basing water allocation on the worst case scenario as 'berserk'. He claimed that '[e]very year since the water sharing plan has been in place, which is only six years, they have got it wrong every year without a doubt. That is a 100 per cent failure rate. Prior to that they had 98 per cent success rate'.[447]

4.20 Griffith City Council called the system 'flawed', as rivers are being managed on the 'worst case scenario' even during very wet seasons:

> Given [2016 saw] the third wettest June on record in New South Wales and southern New South Wales recording the wettest July in over 20 years the assumption of dry conditions is flawed. The Murrumbidgee and Murray Rivers are being run at very high levels as at early August 2016. Despite how wet the catchment and river systems are,

443 Supplementary submission 17a, Griffith City Council, p 19.

444 Submission 29, NSW Farmers Griffith Branch, p 15.

445 Submission 29, NSW Farmers Griffith Branch, p 2.

446 Evidence, Ms Debbie Buller, President, Murrumbidgee Valley Food and Fibre Association, 1 March 2017, p 22.

447 Evidence, Mr Paul Pierotti, President, Griffith Business Chamber, 1 March 2017, p 52.

> the worst case scenario loss allowances are being held in storages rather than being allocated for productive use.[448]

4.21 Ricegrowers' Association of Australia also contended that that the current system does not make sense, as even when flooding occurred in the Riverina in September 2016 the river operators still based their allocations on the 'worst case scenario':

> September was considered one of the wettest springs on record, so we all knew there was going to be a flood. …What could the Murray-Darling Basin Authority have done? They could have recognised the flood risks, they could have listened to the Bureau of Meteorology weather forecasts, they could have released a bit more water to take off the peak at the severity of the thing. In the Hume Dam operating protocols they aim for the dam to be 99 per cent for demand exceeding inflows. … It is based on allocations determined on a policy position called 'serially correlated index'. What that does is take the worst-case scenarios of inflows over, say, 100 years. So in a dry year you take the worst case, in a medium year you take the worst case, a wet year you take the worst case.[449]

4.22 Ms Louise Burge, Vice Chair and Executive Officer, Murray Valley Private Diverters was similarly perplexed, arguing that the system distorts decision making and means irrigators cannot effectively plan their irrigation programs:

> If you have got conditions of saturation—the wettest spring on record—why are we taking in determining allocations and decisions on the worst-case scenario of a wet year when you know all the points are actually saying it is going to be the worst case? In dry years and medium and wet years you are still taking the driest-case scenario in all those points. So it is distorting the decision making. The general security irrigators in the Murray Valley were on 53 per cent when we were having this flooding. So they could not plan their irrigation programs, the SunRice productivity with rice was down; all these people were having 53 per cent of their allocations. I think that is a really important thing to say because in the Murray Valley and in the southern systems we are the most regulated and controlled irrigation usage area in the entire basin …[450]

4.23 Mr Austin Evans, Administrator, Murrumbidgee Council provided a counterbalance to these arguments and explained that there are valid reasons why the allocation system is conservative, as it can be even more disastrous for farmers to be allocated water that subsequently cannot be delivered:

> I was here in Coleambally in 2006 when we actually had our allocations reduced. We were issued an allocation and then in November they could not deliver it. They did not have it in the dams and they reduced us from 15 per cent back to 10 per cent. … The angst and the difficulty that caused amongst irrigators was huge, so I don't ever want to go back there again. I understand to a degree with the management of the dams and the allocation system, they do not ever want to get themselves into that space again either.
>
> …

448 Supplementary submission 17a, Griffith City Council, p 27.

449 Evidence, Ms Louise Burge, Vice Chair and Executive Officer, Murray Valley Private Diverters, 28 February 2017, p 40.

450 Evidence, Ms Burge, 28 February 2017, p 40.

> They are playing conservative. We could have the system work to provide allocations earlier and I understand people would then use that, particularly around planning timing to get their decisions earlier. We could make the system be more adventurous and you would have that water but you have that risk in occasional years of it being clawed back or you go down the other path, which is what they do now where they are more conservative. So irrigation corporations have to probably understand that that is how it is and factor that in with their decisions. A 30 per cent allocation under this regime is probably equivalent to a 50 per cent allocation under a less conservative scheme. So as long as you are aware of that you can factor it in but you cannot ever change that security early in the season if the water is just not there.[451]

Conveyance and loss water

4.24 Conveyance refers to water that is required primarily to operate regulated rivers and utility supply networks to enable the delivery of water.[452] It is a category of water entitlement that was originally issued to irrigation corporations and reflects the volume of water needed to operate channel systems to deliver water orders for the different categories of water licence. Water sharing plans prescribe how available water accrues to this entitlement. It generally has similar reliability as high security.[453]

4.25 The NSW Government advised that with investment in water savings and improved water use efficiencies, some conveyance water has been sold and is now held by other users, including the environmental water holder.[454]

4.26 Licenced conveyance information is available publicly on the NSW Water Register and to licence holders. Allocation volumes are also included in regular water allocation statements, typically once or twice per month. Conveyance information is reported on an annual basis to the Australian Bureau of Meteorology, Murray-Darling Basin Authority, Australian Bureau of Statistics and is part of the General Purpose Water Accounts of the Department of Primary Industries – Office of Water (now Department of Industry – Water).[455]

4.27 Loss water refers to water that must be set aside in order to operate regulated river systems to overcome natural river losses, typically, evaporation, evapo-transpiration and soakage into the riverbeds and banks. Once these 'operating' losses are set aside water can then be allocated to other priority needs through the Available Water Determination process.[456]

4.28 The NSW Government indicated that at the start of the water year a conservative estimate of river losses is made based on historic observations. The 'water budget' is re-assessed at least monthly, and water savings that accrue from losses that are less than anticipated, is allocated to water users. Therefore, in some months, even when there has been no rainfall or increased

451 Evidence, Mr Austin Evans, Administrator, Murrumbidgee Council, 28 February 2017, pp 13-14.

452 Australian Bureau of Metrology, *Australian Water Information Dictionary*, http://www.bom.gov.au/water/awid/id-128.shtml.

453 Submission 48, NSW Government, p 28.

454 Submission 48, NSW Government, p 28.

455 Submission 48, NSW Government, p 28.

456 Submission 48, NSW Government, pp 28-29.

inflows, there can still be a small allocation improvement from a reduction in the total losses for the water year.[457]

Issues with conveyance and loss water

4.29 Mr David May, Chair, Wakool Landholders Association called for conveyance to be considered as environmental water as it is essentially an environmental flow (see chapter 3 for a discussion of environmental flows), not just associated with irrigation:

> To get water from one end to the other there is a component of water that is called conveyance water or run-of-the-river water. That is about a million megalitres. Our association is of the view that that should be regarded as environmental water; it is not just all about productivity, it is environmental flows. If you have not got regulation upstream, the river dries up, and without regulation it would. So to run that river in years where it would normally dry up, is that not an environmental flow?[458]

4.30 This view was supported by Mr Michael Renehan, Chief Executive Officer, Murray Irrigation who argued that the current system for conveyance promoted a lack of accountability for environmental water:

> This is where the accounting becomes quite interesting because a gigalitre delivered in South Australia is a gigalitre technically up in the dams, but there is clearly conveyancing losses. It is those losses that we are not recognising completely across the system. That is where we are quite concerned because we look very much at the losses in our system. We lose about 10 to 11 per cent in conveyance loss to deliver water through to farmers. That accountability does not sit with the environment today. It is almost factored in as that is just how it is. … If they were compelled to deliver that water efficiently to environmental outcomes you would probably get people working together and saying, 'What's the best way we can do this?'[459]

4.31 In calling for more accountability for environmental water, Mr Renehan, Chief Executive Officer for Murray Irrigation considered that if this type of water had a market price people would be more inclined to conserve it:

> The water we deliver to farmers has a value. They have an allocation, there is a market price for it. People are compelled to use that water efficiently and in the best way possible. At this point in time environmental water does not have a cost or even a price. What happens is you can transport that water down the river system with 25 per cent losses and no-one really cares. If it was worth something then people would start saying, 'Hang on, I've got to conserve it and use it for the best possible outcome.'[460]

4.32 Griffith City Council stated that the measurement of loss water lacks transparency and accountability.[461] For example the council noted that although 2016 saw the wettest July in

457 Submission 48, NSW Government, pp 28-29.

458 Evidence, Mr David May, Chair, Wakool Landholders Association, 28 February 2017, p 58.

459 Evidence, Mr Michael Renehan, Chief Executive Officer, Murray Irrigation, 28 February 2017, p 25.

460 Evidence, Mr Renehan, 28 February 2017, pp 24-25.

461 Supplementary submission 17a, Griffith City Council, p 18.

over 20 years, approximately 30 per cent of the 3,027 GL available in the Murrumbidgee Valley on 1 August 2016 was set aside for conveyance (317 GL) and losses (589 GL).[462]

4.33 The council contended that loss water was effectively being used as an environmental flow:

> Loss water is being used by government agencies to prop-up environmental flows. In some instances when environmental water is being delivered part thereof is accounted as loss water which means environmental accounts are not being fully and reasonably debited. Preferential 'loss allowances' for environmental flows are not made for irrigators and this is allowing government agencies to unfairly maintain water in storage which could otherwise be available for production.[463]

Carryover

4.34 Carryover refers to the water remaining in accounts at the end of the water year (30 June) that is credited to that account on 1 July for use in the following water year. The rule is prescribed in water sharing plans and varies between water sources and licence entitlements.[464]

4.35 Carryover rules are set by states and vary for different entitlements and in different water plan areas across the basin. As a result of the rules, no water holder can fill up dams to the exclusion of other water users.[465]

4.36 Typically, high priority licences, namely towns, domestic, stock and high security entitlements are not permitted to carryover water. Water remaining in these accounts is forfeited at the end of the year. Apart from very dry years, these accounts normally receive a full allocation on 1 July, therefore carryover is not needed.[466]

4.37 General security entitlement holders are the main beneficiaries of carryover. The NSW Government considered that this method was becoming more popular among this category of water users:

> Although water users place varying degrees of importance on carryover – some avoiding it, others maximising the opportunity, it is becoming more popular as water users become more sophisticated. It provides a degree of insurance and assurance should water allocation in the new year commence at low levels as they often do for general security entitlement holders. … Carryover is a popular option used by many water users to ensure that a minimum volume of water is available early in the following water year regardless of allocation announcements.[467]

4.38 In the Murray valley, general security entitlement holders can carryover up to 50 per cent of their entitlement. Therefore, an account corresponding to an entitlement of 100 shares, can

462 Supplementary submission 17a, Griffith City Council, p 27.

463 Supplementary submission 17a, Griffith City Council, p 27.

464 Submission 48, NSW Government, p 29.

465 Department of the Environment and Energy, *Carryover*, http://www.environment.gov.au/water/cewo/about/carryover.

466 Submission 48, NSW Government, p 29.

467 Submission 48, NSW Government, p 29.

carryover up to a maximum of 50 ML. The carryover limit in the Murrumbidgee valley is 30 per cent of the entitlement for general security and conveyance entitlements.

4.39 The Commonwealth Environmental Water Holder also uses carryover rules to manage its water holdings. Carryover provides flexibility in the timing of water delivery across years, which can be important when meeting environmental needs, such as requirements to water wetlands or floodplains.[468]

4.40 The Commonwealth holds a number of entitlements in some water sources, and carryover is an important consideration when deciding which accounts to leave water in, or draw water from. Considerations include:

- to minimise the risk of water being reallocated under state rules by carrying over water in accounts with better carryover provisions
- to have sufficient water in accounts for environmental watering actions that occur early in a water year
- the cost-effectiveness with regard to the cost of water delivery and transfer fees against the potential market cost of water being reallocated under State rules
- the risk of carryover of water in accounts which may be subject to trade restrictions through the following water year.[469]

Issues with carryover

4.41 The Commonwealth Environmental Water Holder characterised carryover provisions as an essential management and planning tool as it can be used to reserve water in good years to mitigate the risk of environmental damage during drier periods. Carryover is also critical for watering in winter and early spring, which often occur prior to increases to seasonal allocations.[470] Mr Mark Taylor, Assistant Secretary, Commonwealth Environmental Water Office referred to carryover as 'putting money in the bank', enabling the Office to plan for the future.[471]

4.42 Some inquiry participants contended that the biggest problems with carryover are that there is too much carryover water in dams, which impacts on the amount of water that can be allocated to irrigators in the new water year, and that carryover has now become intrinsically linked with trading on the water market.

4.43 Derek Schoen, President, NSW Farmers considered that carryover water has a skewing effect on allocation and would instead prefer irrigators receiving a greater allocation at the start of the water year:

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468 Department of the Environment and Energy, *Carryover*, http://www.environment.gov.au/water/cewo/about/carryover.

469 Department of the Environment and Energy, *Carryover*, http://www.environment.gov.au/water/cewo/about/carryover.

470 Submission 49, Commonwealth Environmental Water Holder, p 2.

471 Evidence, Mr Mark Taylor, Assistant Secretary, Commonwealth Environmental Water Office, 19 September 2017, p 6.

> Carryover water does have the skewing effect. If we were guaranteed we would have our allocation a lot earlier and that it would be a larger percentage, then I think you would find there would be a hell of a lot less carryover water in the reservoirs.[472]

4.44 Mr Graeme Pyle, Chairman, Southern Riverina Irrigators, described carryover as a 'dark science' noting that some more than others know how this works. He stated that it 'defied logic' that even when a dam such as Menindee is empty, carryover is still in effect:[473]

> When you hear that carryover is carried over in Menindee Lakes when it is empty, that should have raised a few eyebrows. But that was put in the 2004 water sharing plan. I struggle with that concept.[474]

4.45 Mr Pyle explained the connection between carryover and the water market, remarking that some people carry over water with the view of selling it at a high price in the new water year:

> Last year there were a lot of people … that carried over water at $250 into this year when water is currently $30, $40 or $25 in the Murrumbidgee. This is the first time they have really got a whack from speculating. Prior to that, they had not got a resounding whack for carrying water over. That is quite a problem in the water market and that precludes younger people entering agriculture. They are low on assets, do not have a water allocation and are reliant on the temporary water market to get their start to make things work. Speculators—some are past irrigators—are sitting back waiting for the water to be worth $250. At $250 there are still a few people buying it and if they do not make that they will carry it over. That seems to be the method or sort of a layman's terms explanation of how that works.[475]

4.46 Mr Alan Mathers, Member, Local Representation Committee, Murray River Council and Chair, Eagle Creek Pumping Syndicate Incorporated, stated that carryover was one of his main drivers when operating on the water market. However, Mr Mathers agreed with other stakeholders that there is too much carryover water and this creates a knock-on effect of low allocations in future water years, even in wetter years:

> There is a whole lot of carryover water in the air and the dam is spilling and I have got initially 20 per cent or something ridiculous. It has been discussed through the day the way that calculation is done of the driest set of years and the wettest set of years and so on. … We are not against [carryover] but there is a point when carryover water gets tipped out the top first. We should have been accumulating allocation and we were not because we are holding water in there that is carryover, which was last year's water. An entitlement is about each year's water.[476]

4.47 Mr Mathers stated he found it 'appalling' that the Hume weir is spilling at the start of a water year and 'we are sitting there spinning our wheels with bugger-all of the allocation yet South Australia has full allocation'.[477]

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472 Evidence, Mr Derek Schoen, President, NSW Farmers, 7 November 2016, p 35.

473 Evidence, Mr Graeme Pyle, Chairman, Southern Riverina Irrigators, 28 February 2017, p 42.

474 Evidence, Mr Pyle, 28 February 2017, p 43.

475 Evidence, Mr Pyle, 28 February 2017, p 42.

476 Evidence, Mr Alan Mathers, Member, Local Representation Committee, Murray River Council; and Chair, Eagle Creek Pumping Syndicate Incorporated, 28 February 2017, p 63.

477 Evidence, Mr Mathers, 28 February 2017, p 63.

4.48 Edward River Council explained that since 2004, carryover water is no longer 'spilt' when the Hume Dam spills. The council argued that the Commonwealth Environmental Water Holder and speculators manage water to ensure the carryover of substantial volumes. This takes up dam space and makes volume allocations unavailable in the new water year.[478]

4.49 Similarly, a Barham dairy farmer argued that the current carryover rules are in need of an overhaul, as 'it's totally unacceptable to have Hume weir spilling and yet no carryover water is lost (both private and environmental)'. The farmer considered that carryover water should be the first water spilled as the dam rises. Instead it is taking up the space of a permanent annul entitlement.[479]

4.50 Mr David May, Chair, Wakool Landholders Association, contended that if the Hume Dam is spilling, and irrigators' crops are being watered, this should come out of the carryover allocation.[480] Mr May also argued that the Commonwealth Environmental Water Holder has all the benefits and called on the state to fight for the rights of New South Wales:

> But the Commonwealth Environmental Water Holder is getting his crop watered. All that water is coming out of the dam, and he is not losing any carryover. Let us get serious about it. We need to make sure we have State politicians batting for us, so we feel that there is a future because we are getting really tired.[481]

4.51 He asserted that there needs to be some 'real consultation' regarding carryover. However, the rules should not be changed 'just to counter the Commonwealth Environmental Water Holder' as that might also disadvantage other users.[482]

4.52 Clr John Dal Broi, Mayor, Griffith City Council explained that while carryover is a tool that can be utilised as an insurance to top up an account before the end of the water year, it is also abused.[483] He worried about smaller irrigators that cannot generate large amounts of money to top up their accounts before the start of the new water year:

> This year a lot of farmers paid out a lot of money to top up their accounts, but once the allocation reached 100 per cent bang, they did it. I am talking about the average irrigator, not the huge corporate companies that have the funds to be able to top up their accounts and spend many, many thousands of dollars to do that. I worry about the …. rice grower who grows a couple of rice crops. He cannot afford to go out and spend $50,000 or $60,000 to top up his account so that he has water to start next year.[484]

4.53 Clr Dal Broi reasoned that with the Commonwealth Environmental Water Holder holding 2.5 million ML of water and entitled to carry over 30 per cent, it is little wonder that at the start of

478 Submission 55, Edward River Council, p 1.

479 Submission 104, Barham dairy farmer, p 2.

480 Evidence, Mr David May, Chair, Wakool Landholders Association, 28 February 2017, p 63.

481 Evidence, Mr May, Chair, 28 February 2017, p 54.

482 Evidence, Mr May, 28 February 2017, p 54.

483 Evidence, Clr John Dal Broi, Mayor, Griffith City Council, 1 March 2017, p 4.

484 Evidence, Clr Dal Broi, 1 March 2017, p 4.

an irrigation season, 'with all that committed carryover, farmers start maybe with five or 10 per cent in July and they hope that will increase to grow crops'.[485]

4.54 NSW Farmers Griffith Branch considered that carryover was originally a tool offered to general security irrigators to transfer a percentage of unused water from one season to the next. The organisation believed that carryover is good in theory as a risk management tool, but the reality is different, as general security producers rarely have unused general security allocation in their accounts.[486]

4.55 NSW Farmers Griffith Branch explained that at the end of each season, general security irrigators are now in the water market buying very expensive water that is not general security in order to secure a good start for the next season.[487]

4.56 It saw the root of this problem to be the changes to carryover rules and limits during the 2008 drought, where carryover levels were doubled from 15 per cent to 30 per cent in the Murrumbidgee Valley and raised to 50 per cent in the Murray Valley, and some water holdings were permitted to be carried over and remain in dams indefinitely. This has led to storages that are now too full of 'other water' and the department cannot announce timely allocations to general security irrigators.[488]

4.57 NSW Farmers Griffith Branch called for a streamlining of carryover rules, as different rules across the southern states adds further complications and leaves the water market open to manipulation by 'punters'. It asserted that this practice further obstructs timely general security allocations.[489] Murrumbidgee Valley Food and Fibre Association similarly argued that carryover rules, inter valley transfer rules and water market rules are all creating complications and unnecessary roadblocks.[490]

Carryover as a risk management tool

4.58 Leeton Shire Council supported the continuation of carryover water as a significant risk management tool for irrigators, to overcome between-season allocation variability and to maximise production. The council stated that carryover must remain a characteristic of general security water entitlements to ensure the integrity of water access licences as a property right, and maximise the use of available water each year.[491]

4.59 Mr Austin Evans, Administrator, Murrumbidgee Council, also noted that carryover 'is a great insurance tool for irrigators and irrigators by and large would rather it be there than not'. He discussed what the situation was like before carryover was introduced and stated that most irrigators support at least some level of carryover:

> What used to happen without carryover is that people would rush onto the market, sell it because they are trying to get any income they can out of it rather than lose it—

485 Evidence, Clr Dal Broi, 1 March 2017, p 4.

486 Submission 29, NSW Farmers Griffith Branch, pp 17-18.

487 Submission 29, NSW Farmers Griffith Branch, p 17.

488 Submission 29, NSW Farmers Griffith Branch, pp 17-18.

489 Submission 29, NSW Farmers Griffith Branch, p 18.

490 Submission 37, Murrumbidgee Valley Food and Fibre Association, p 8.

491 Evidence, Mr Maytom, 1 March 2017, p 3.

> $1 or $2 a megalitre—and it would all end up in the big storages further down the river where people have large storages and they could afford to buy that water. They would pump it in there and hold it through to the next year. Probably there is a debate to be had around the level of carryover but I think most irrigators would support some carryover.[492]

4.60 The NSW Irrigators Council strongly favoured the continuation of the carryover system as a management tool for irrigators to mitigate the impact of drought and low allocation seasons, and to allow greater certainty of the volume of water available for productive use in each water year. The council noted it is aware of calls for harmonising carryover caps between the Murray and Murrumbidgee, but supports caps that reflect the size of each resource rather than an arbitrary cap across all.[493]

4.61 Mr Mark McKenzie, Executive Officer, NSW Irrigators Council also advised that the peak body was in favour of carryover as an important planning tool and also supported carryover for environmental use, as he explained there is currently a limited understanding of environmental water:

> There is certainly concern among some of our member constituents. I think that is particularly so in the Murray and Murrumbidgee systems. We continue to be supportive of carryover and given that there is a 50 per cent cap of carryover against licensed volumes in the Murray and 30 per cent in the Murrumbidgee, we are reasonably satisfied that that is okay. The area of concern would not be around Commonwealth held water, because that water has actually been bought back from the markets, so in the context of carryover, it is not adding, in our view, the extra pressure that some of our constituents believe it does in respect of limiting the amount of water that may be available to them that underpins their annual allocations. Where environmental and heritage held water has been previously sold back or purchased, or clawed back within government regulations and programs, I think there is probably a fairly limited understanding of what that means, because it is either held water or planned water—the planned water being the translucent or transparent flows. We acknowledge there are concerns. We believe, in general terms, as a risk mitigator, that the carryover system is a very important part of people's ability to plan forward, particularly when we are entering into a dry sequence.[494]

Commonwealth Environmental Water Holder view

4.62 Mr Mark Taylor, Assistant Secretary, Commonwealth Environmental Water Office stated that there is a misconception regarding how much environmental water is held in storage, noting that it is only 3.4 per cent of the total capacity across the basin:

> I know this point is put out a fair bit, and there is a little misunderstanding. The water that the Commonwealth holds takes up only 3.4 per cent of total storage capacity across the basin at the moment. In storages like that at Copeton, for example, we have only 6.6 per cent of the total storage capacity. We really take up a very small proportion. Currently, in the very big storages we could have something like 40 per

[492] Evidence, Mr Evans, 28 February 2017, p 14.

[493] Submission 85, NSW Irrigators Council, p 7.

[494] Evidence, Mr Mark McKenzie, Executive Officer, NSW Irrigators Council, 17 May 2017, p 21.

> cent, 50 per cent or 60 per cent of our capacity, but we are carrying only 20 per cent. We are a very small user in the system carryover-wise.[495]

4.63 Further, the Commonwealth Environmental Water Holder contended that any changes to remove its right to carryover water would be 'unacceptable' as it would 'potentially create a situation where the Commonwealth was discriminated against, as it would be treated differently from other water holders in a similar entitlement class'.[496] He warned that any change 'could severely limit the ability to efficiently and effectively achieve the environmental outcomes sought with the Basin Plan'.[497]

4.64 Mr Taylor also noted that all water held by the Commonwealth Environmental Water Holder was previously owned by productive users in the system. This water was sold by these users to the water holder. As such, Mr Taylor explained that there is still the same amount of water in the system and environmental water 'fill[s] up the space in dams as much as anyone else's do[es]'.[498]

4.65 Mr Taylor clarified that the Commonwealth Environmental Water Holder uses carryover in a different way to other entitlement holders as the need for environmental water comes at different times of the year. For example, environmental water is used in winter and early spring, meaning this lessens pressures on the system in early summer when irrigators want to take up those channel capacities and use their storage.[499]

4.66 Although noting that there are often good reasons for differences between catchments, the Commonwealth Environmental Water Holder considered that more consistency in carryover rules would support efficient environmental water management across the basin. In particular, catchments placing tight limits on the capacity to carryover water could be reconsidered.[500]

Committee comment

4.67 While the committee understands there are good reasons to be cautious in the management and allocation of water in New South Wales, the current 'worst case scenario' approach is debilitating for irrigators, as it makes it extremely difficult to effectively plan cropping for the year. Irrigators cannot rely on the initial allocation at the start of the water year and must therefore make contingency plans, such as ensuring they have enough carryover water available. This is creating other problems, as irrigators are no longer using carryover just as an insurance mechanism and are extensively relying on it. In some cases irrigators are purchasing expensive water that is not general security before the end of the water year in order to carry it over into the new water year in lieu of a larger initial allocation.

4.68 The committee concludes that the management of water allocations needs to be improved and recommends that the NSW Government reconsider its current approach so that general security irrigators receive a higher allocation at the start of a water year and that allocations are

495 Evidence, Mr Taylor, 19 September 2017, p 9.

496 Submission 49, Commonwealth Environmental Water Holder, p 3.

497 Submission 49, Commonwealth Environmental Water Holder, p 3.

498 Evidence, Mr Taylor, 19 September 2017, p 9.

499 Evidence, Mr Taylor, 19 September 2017, p 9.

500 Submission 49, Commonwealth Environmental Water Holder, p 2.

no longer based on a 'worst case scenario'. This decision should take into account the water equation for supply and demand in New South Wales as recommended at Recommendation 5.

4.69 In addition, we recommend that the NSW Government ensure that carryover is an insurance option for irrigators and other users, rather than as a replacement for higher allocations at the start of a water year.

4.70 Further, the committee notes the views of some inquiry participants that there is a lack of accountability regarding conveyance and that this mechanism appears to be treated as an environmental flow. We therefore recommend that the NSW Government consider designating conveyance as an environmental flow.

4.71 The committee also recognises stakeholder concerns that dams appear to be full of carryover water at the start of a water year, which cannot be allocated to irrigators and other users. In particular, many stakeholders noted concerns that environmental water holders are carrying over large amounts of water. To counter this we recommend that NSW Government review the amount of water that environmental water holders can carryover in New South Wales dams.

Recommendation 26

That the NSW Government reconsider its management of water allocations so that general security irrigators receive a higher allocation at the start of a water year and that allocations should instead be based on a water equation for supply and demand in New South Wales, as recommended at Recommendation 5.

Recommendation 27

That the NSW Government ensure that carryover is an insurance mechanism for irrigators and other users, rather than as a replacement for higher allocations at the start of a water year.

Recommendation 28

That the NSW Government consider designating conveyance as an environmental flow.

Recommendation 29

That the NSW Government review the amount of water that environmental water holders can carryover in New South Wales dams.

The water market

4.72 Trade of water allocation has been occurring in regulated rivers since the early 1980s under the *Water Act 1912*. Water sharing plans, the *Water Management Act 2000* and subsequent amendments provide for expanded trade opportunities, including permanent tagged interstate

trade. Groundwater trading is also available in all groundwater sources that are under a water sharing plan.[501]

4.73 The water trading market is well established in some water sources. The NSW Government indicated that the irrigation and mining industries strongly rely on water trading opportunities to manage their business risk and deal with climatic circumstances. The benefits of water trading include:

- providing water users with the flexibility to adjust to changes in water availability
- enabling water to move from lower to higher value uses
- assisting farmers to adjust business both on a short and long term basis.[502]

4.74 The NSW Government advised that with embargoes in place for new entitlements, trading is the only way that new enterprises can access water entitlements. Trade in the New South Wales part of the Murray-Darling Basin is conducted according to the 2010 Commonwealth Water Market Rules as well as Water Trading Rules in the Murray-Darling Basin Plan that commenced on 1 July 2014. From 2019, water trading will be addressed through the water resource plans in the basin. Water trading includes both trade of annual water allocations and sale of water entitlements.[503]

4.75 Interstate trade is mainly in the interconnected Southern Murray-Darling basin, namely, the Murrumbidgee and Murray Rivers but there is also trading between New South Wales and Queensland on the Border Rivers. Interstate water trade has been supported and implemented through the Murray-Darling Basin Authority's Tagging Entitlements for Extraction in another State Protocol 2010.[504]

4.76 The National Water Initiative investigates both intra and interstate trade to foster economic development and promote water use efficiency by encouraging water to move to higher value use. The Australian Competition and Consumer Commission (ACCC) also provides advice to the responsible Commonwealth Minister on the water market, trade and charge rules.[505]

4.77 The ACCC sets termination fee rules and the Department of Primary Industries – Office of Water facilitates the implementation of these rules. Over time, certain tasks have transitioned to the ACCC, and it now sets water market rules for water planning and management in the Basin Plan. In addition, it is required to monitor and report on regulated water charges, transformation arrangements, and compliance.[506]

4.78 Water can be sold from one person's account in one valley and purchased for use by another person in another valley, within a water trading framework and within physical limitations. The tracking of this exchange is done using an inter-valley transfer account for each valley.

501 Submission 48, NSW Government, p 23.

502 Submission 48, NSW Government, p 23.

503 Submission 48, NSW Government, p 23.

504 Submission 48, NSW Government, p 23.

505 Submission 48, NSW Government, p 23.

506 Submission 48, NSW Government, pp 23-24.

4.79 The NSW Government advised that the main inter-valley transfer activity is between the Murrumbidgee and Murray valleys. Trade of these systems is controlled under the Murray-Darling Basin Agreement, the Murray-Darling Basin Plan and under the respective water sharing plans.[507]

4.80 When water is sold to the Murray, the Murrumbidgee water user's account is immediately debited and the Murray water user's account is simultaneously credited. The Murrumbidgee account balance reflects, at any point in time, the volume of undelivered Murray water. This is water still in the Murrumbidgee valley storages that has been sold to the Murray, but is yet to be physically delivered.[508]

4.81 The inter-valley transfer account balance is carried from one water-year to the next. Inter-valley transfer account balances can be reduced in two ways:

- water paper-traded into the valley (known as back-trades)
- water physically delivered from the valley (accounted as flow past Balranald).[509]

4.82 To protect third parties from potential impacts, the inter-valley transfer account is operated within limits. Once the account balance reaches the limit, trade is closed. The Murrumbidgee and the Murray river limits are respectively 85 gigalitres and 100 gigalitres.[510]

4.83 A negative account balance means that water is 'owed' from the Murray to the Murrumbidgee. Since water cannot be physically delivered uphill into the Murrumbidgee, trade into the valley is closed until trades out of the valley restore a positive account balance.[511]

4.84 On the other hand, a large positive account balance means that a large volume of Murray water is occupying Murrumbidgee storages. Under wet conditions this can mean reduced allocations for Murrumbidgee water users. Additionally, if inter-valley transfer water spills from Murrumbidgee storages, this will result in a loss of 'payback' water to Murray water users.[512]

Concerns with the operation of the water market

4.85 A range of issues were raised with the committee regarding the operation of the water market and inter-valley transfers. Primarily these concerns related to an increase in the cost of water and the impact of water market speculators, inefficient operation and poor communication regarding the water market, and the role of the Commonwealth Environmental Water Holder.

4.86 West Berriquin Irrigators Inc indicated that a report by the consulting company Aither, prepared for the Murray-Darling Basin Authority, found that the impact of government water recovery on the temporary water market had increased prices by around 25 per cent. West

507 Submission 48, NSW Government, p 27.

508 Submission 48, NSW Government, p 27.

509 Submission 48, NSW Government, p 27.

510 Evidence, Mr David Harris, Chief Executive Officer, WaterNSW, 5 June 2017, p 38.

511 Submission 48, NSW Government, p 28.

512 Submission 48, NSW Government, p 28.

Berriquin Irrigators Inc argued that this, combined with more sophisticated players in the market, including investment companies and corporate agriculture, 'has put the average family farmer at a disadvantage with limited time and resources to devote to constantly monitoring the market'.[513]

4.87 Aither, had also prepared a report for the Department of Primary Industries – Office of Water in 2017 which analysed the water market in New South Wales. The report made the following finding:

- water markets are a fundamentally important tool for irrigators, regional urban water suppliers, environmental water managers, and investors. Trade is observed in all systems and is critical to driving improvements in productivity and efficiency in the New South Wales economy
- water markets are working as expected and have enabled successful responses to climatic variability and drought, and facilitated the return of water to the environment.
- there is a need to further improve the water market in New South Wales to keep pace with new and changing demands. Stakeholders identified various policy and implementation issues, including in information provision, education, data, assessments and approvals, groundwater trade, trade rules and unregulated trade. Improvements in these areas can improve productivity and efficiency and ensure the resilience and sustainability of the irrigation sector and regional communities.[514]

4.88 Edward River Council explained that previously, water was only owned by productive users and was traded between them to maximise production. The introduction of speculators holding large volumes of water entitlements as a commodity has increased the price of temporary water resulting in them generating substantial profits at the expense of farmers.[515]

4.89 Mr Graeme Pyle, Chairman, Southern Riverina Irrigators supported this view stating that the imbalance in the water market can make it untenable for rice growers to operate:

> We have rice growers, who are the base of the market. … They use the predominance of the water. When it becomes untenable for a rice grower to grow rice then people who would normally grow rice at say $100 or $120, at about that price they give up. Then they become water speculators, which is fair. … But it is exacerbated by the Aither discovery of the cost as the environmental water holder in the market. You go from maybe $80 or $100 very quickly to $200 because there is nobody selling water because all the holders are assuming that it is going to be $250.[516]

4.90 Mr Pyle explained that it is getting harder for irrigators to understand the system and make decisions. While bureaucrats 'know 200 acronyms', some irrigators 'probably choke on five' and there is now a 'disconnect between people that are highly productive, most efficient and very clever but are precluded from good decision-making by myriad facts that are not connected'.[517]

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513 Submission 71, West Berriquin Irrigators Inc, p 2.

514 Aither, Water markets in New South Wales: Final report, March 2017, p 13.

515 Submission 55, Edward River Council, pp 1-2.

516 Evidence, Mr Pyle, 28 February 2017, p 42.

517 Evidence, Mr Pyle, 28 February 2017, p 43.

4.91 Ms Helen Dalton, President of the NSW Farmers Association, Griffith Branch, indicated that some people are 'rorting' the system and not using trading for irrigation purposes:

> As we saw last week there are people that are making a lot of money—not that I am against people being successful but I think water for production should be used for production and people are rorting it. My farming business wanted to move water too because we have water in the Murray and the Murrumbidgee. We wanted to move it but we did not get a look-in. It was done. As I said, we farm. I think it has got to be a reasonably fair playing field. I suppose if I sat in the office and clicked the button before Mr Wilks did I might have got it through. I think we were ready for it too but we were way behind.[518]

4.92 Clr John Dal Broi, Mayor, Griffith City Council, also highlighted this case as an example of water trading for the purpose of making a profit, rather than for irrigation:

> What is of great concern for me … is what happened last week, when trade was opened between the Murrumbidgee and the Murray. There was 15,000 megalitres to be traded across the valley. One trader picked it up. He was well within the rules, but he purchased the water in the Murrumbidgee, in his wife's name, for $20 a megalitre. He sold it for $35 a megalitre.
>
> Is water all about making profits for brokers or is it about irrigation? This broker made nearly a quarter of a million dollars in a few minutes. I thought that when we are trading water between valleys, why can't I as an irrigator sell it to somebody in the Murray? I might be able to sell it more cheaply than $35.00. I mean, you can't do it. Who makes the decision that the trade is open? How do they know? Most of us walked around gobsmacked for the day and say, 'How did that happen?'[519]

4.93 In principle, Griffith City Council was in favour of inter-valley transfers for productive use, but argued that they 'should be restricted to productive water and not used by government agencies to transfer excess water from one valley to another in order to capitalise on/profit from/manipulate usages by water markets'.[520] Further, Griffith City Council stated that the opening of inter-valley transfers needs to be better communicated and the reporting of who is transferring water should be transparent.[521]

4.94 Clr Dal Broi indicated that most irrigators did not know when trade was going to be open between the Murrumbidgee and the Murray and explained that this is why many irrigators are now using brokers:

> If I were a farmer and I had excess water, why can I not sell it to someone in the Murray? Because it is too damn complicated. I tell you: Farmers just do not have the time to sit behind a computer 24/7 to say, "Okay, it's going to happen. Bang!" They cannot do it. That is a trader. Those rules have got to be more transparent and relaxed.[522]

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518 Evidence, Ms Helen Dalton, President, NSW Farmers Association, Griffith Branch, 1 March 2017, p 17.

519 Evidence, Clr Dal Broi, 1 March 2017, p 4.

520 Supplementary submission 17a, Griffith City Council, p 26.

521 Supplementary submission 17a, Griffith City Council, p 26.

522 Evidence, Clr Dal Broi, 1 March 2017, p 10.

4.95 Griffith City Council also contended that the way the state and federal governments hold and trade water has created an artificial hybrid market which acts like a quasi-tax on irrigators and deters new agricultural enterprises from being established:

> As the State and Federal Government have bought up significant volumes of water entitlements from so-called "willing sellers" and legislated water allocations away into new rule based categories, an artificial hybrid market has been developed which forces up the temporary water trading price. If Governments hold water allocations early in the irrigation season, working on worst case scenario inflows, irrigation allocations are held low and this influences the price of temporary water which impacts on the cost of production for irrigators. If Governments sell their water allocations on the temporary water market after the market has been inflated by the aforementioned practices the proceeds of water sales to the Government act like a quasi-tax. High prices for permanent water entitlements and temporary allocations are a deterrent to new enterprises. Increasing the availability of water by expanding storage capacity would help reduce a key barrier to entry for new and expanding enterprises and encourage industry and productivity growth.[523]

4.96 Mr Paul Pierotti, President, Griffith Business Chamber, made the important point that the so-called free market 'is far from free' as there is a large amount of government intervention, and these interferences, such as starting a season on low allocations, or with high levels of carryover, inflates the price of water:[524]

> It is the add-value side to all these commodities where the real money starts to churn and where the jobs and the community and the vibrancy actually really takes place. Every time you have interference, like government short-changing or start of season low allocations, or any of these other interferences, the start of season low allocations or huge carryover creates an inflated price. This is supposed to be a free market but it is far from free. You have got a lot of intervention from people who are not in agriculture. You have got a lot of intervention by government policy and behaviour. It is a limited market; it is not really like the stock market as such.[525]

4.97 Mr Pierotti argued that governments at both state and federal level have 'interfered dramatically' in water sharing and the water market. He further stated that environmental water should be traded if it is not needed, instead of just being held. This way the water can be used for productive purposes.[526]

4.98 Murray Irrigation called for 'more timely and transparent market information including inter-valley trade account status, trade limits, water shares, interstate storage, to enable a more informed water market based on accurate information'.[527] It also requested more timely processes be introduced to enable the New South Wales market to compete against other jurisdictions, as well as a commitment by the NSW Government to ensure that new

523 Supplementary submission 17a, Griffith City Council, p 7.

524 Evidence, Mr Pierotti, 1 March 2017, p 52.

525 Evidence, Mr Pierotti, 1 March 2017, p 52.

526 Evidence, Mr Pierotti, 1 March 2017, p 52.

527 Evidence, Ms Perin Davey, Executive Manager Corporate Affairs and Stakeholder Engagement, Murray Irrigation, 28 February 2017, p 22.

opportunities for water use do not come at the expense of already existing and established irrigation areas that have underpinned the economy for many years.[528]

4.99 It noted that the difference between jurisdictions is significant, as the Victorian Water Register has an automated process for allocation trade approval, which allows trades to be approved within hours. In New South Wales the process is not automated and takes time for market participants to receive this information.[529] Murray Irrigation recommended that New South Wales develop a system for automatic approvals of temporary trade to improve the operation of water markets. In New South Wales, allocation announcements are now made on the first and fifteenth day each month to inform water users of allocation adjustments. It argued that with the live river information now available, there should be more regular allocation forecasts to provide irrigators with better seasonal forecasts so they can effectively plan their cropping.[530]

WaterNSW management of market information

4.100 WaterNSW informed the committee that it took over management of the inter-valley transfer account in 2016 from the Department of Primary Industries – Office of Water. Mr David Harris, Chief Executive Officer, WaterNSW stated that before 2016 there was not a lot of publically available market information, but WaterNSW has implemented changes in two stages:

> Since that time we have had two iterations of providing more market information. In our first iteration we published on our website the state of the account between the 85 gigalitres cut-off and the 100 gigalitres cut-off for that account. We have since augmented that. Based on the trade outcome in March of this year, we have augmented that to show the full balance of that account—whether it is below 85 gigalitres or whether it is above 100 gigalitres. So to the fullest extent possible licensees, entitlement holders within both valleys have got good information on which to base a sale or buy decision.[531]

4.101 Mr Harris noted that the views of inquiry participants have been taken into account and real-time information regarding inter-valley transfers are now on the WaterNSW website:

> We would support the comments made in a number of submissions around market information and trading information. We took steps this year, for example, to put real-time information about the Murrumbidgee inter-valley transfer account on our website. That was very strongly welcomed by water users of the Murray and Murrumbidgee rivers because they had more visibility of that market information. We want to make more information available to people making commercial decisions in the water market so that they can make better-informed decisions. We would certainly act to deliver more market information as our systems allow it.[532]

528 Evidence, Ms Davey, 28 February 2017, p 22.

529 Submission 93, Murray Irrigation, p 7.

530 Submission 93, Murray Irrigation, p 7.

531 Evidence, Mr Harris, 5 June 2017, p 38.

532 Evidence, Mr Harris, 26 October 2016, p 35.

4.102 Mr Harris also indicated that a one-hour lag has been implemented along with an SMS notification service:

> As a result of the experience in March of this year, we have also implemented two other improvements. Previously it was first on the buzzer got the trade, and in March that trade closed within five minutes. We have now implemented a one-hour lag—we announce the trade is open at 9.00 a.m. but we do not take applications until 10.00 a.m. That gives more people the opportunity to, as it were, come in off their tractor or whatever they might be doing to be able to submit their bid at 10.00 a.m. We have also set up a SMS notification service as well, to which a number of people have subscribed so that they can get an SMS in advance of that account opening.[533]

4.103 Further, Mr Harris gave an undertaking that WaterNSW would continue to discuss with customers how the rules could be improved. He acknowledged that some customers 'say that first in is not a fair arrangement', but considered there is no broad agreement on how that can be improved.[534]

4.104 The Ricegrowers' Association of Australia congratulated WaterNSW on its recent improvements to the transparency of the Murrumbidgee-Murray inter-valley transfer account. However, it continued to advocate for real-time processing of trade applications.[535]

4.105 Ms Perin Davey, Executive Manager Corporate Affairs and Stakeholder Engagement, Murray Irrigation acknowledged the work done by WaterNSW to improve the system, but argued that as it is still a 24-hour process, savvy users can take advantage of the system, meaning that others miss out.[536] She contrasted the New South Wales system with Victoria:

> By comparison, in Victoria, they have virtually real-time updating of their inter-valley trade limits. This is the trade limit from the Goulburn into the Murray system … and it includes information about all of the trades that have gone on that day. So that is very up-to-date and they do not have the same issues that we seem to have. By the same token, the MDBA run a Barmah choke trade restriction live website, which shows not only what the current trade limit is … but also the daily trade limits for the preceding months. So that is really important information and allows free access to people who are in the water market, regardless of how much time you dedicate to it. By the same token, time limits are also an issue for water storage information, particularly in our region, which relies on interjurisdictional storages.[537]

4.106 Ms Davey explained that she can access total water in any of the Murray-Darling storages online, however she cannot see how much of that water is owned by New South Wales, or how much is in the account. She argued that this information is key to making informed business decisions.[538]

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533 Evidence, Mr Harris, 5 June 2017, p 38.

534 Evidence, Mr Harris, 5 June 2017, p 38.

535 Submission 57, Ricegrowers' Association of Australia, p 6.

536 Evidence, Ms Davey, 28 February 2017, p 21.

537 Evidence, Ms Davey, 28 February 2017, pp 21-22.

538 Evidence, Ms Davey, 28 February 2017, p 22.

Water exchanges

4.107 Murray Irrigation advised that there are several exchanges operating in the Australian water market. Some, such as H2OX and Waterfind, operate across jurisdictions while others including the Murray Irrigation Exchange operate in a single valley.[539]

Waterfind

4.108 Waterfind was established in 2003 and has developed a water market system, which it informed is now the most geographically widespread in the country, and whose client base holds over 65 per cent of Australian water entitlements. Waterfind noted that its mission is to increase the wealth of regional Australia.[540]

4.109 Waterfind operates within the regulatory framework to maintain the integrity of its online market, which allows its clients to trade with the confidence that all the necessary criteria to enable a successful trade have been assessed. Waterfind maintains a register of standards to ensure that all 84 water related rules and regulations are accounted for.[541]

4.110 Mr Tom Rooney, Chief Executive Officer, Waterfind Group, explained that in recent years there has been a large pricing differential between the Murrumbidgee and the Murray and this has resulted in a 'scramble' to sell water from one valley to the other before the limit is reached.[542] Mr Rooney indicated that the arbitrary trade limit of 100 GL in the Murray is the main cause for the pricing differential and argued that the limit should be pressure tested with a view to increase it:

> The reason why there is a pricing differential is because there is a limit on trade of 100 gigalitres. When was the last time that we really pressure tested that 100 gigalitres trade limit? Because if there was no trade limit—and I am not suggesting you should get rid of the trade limit—there would be no pricing differential between markets. Is 100 gigalitres really the trade limit or the limit of water that you can get from the Murrumbidgee to the Murray when you can transfer water between the Tooma power stations up the top of the system? And should we pressure test that 100 gigalitres? And if we pressure tested that 100 gigalitres and we changed it, say to 500 gigalitres, there would be no pricing differential because there would be no artificial rule put in place.[543]

4.111 Mr Graeme Pyle, Chairman, Southern Riverina Irrigators was not in favour of Waterfind because of its role speculating in the water market on behalf of its clients:

> It acknowledges wealth. We are pretty much lone rangers as irrigators. Some of us have connections with other irrigators, and then we have Waterfind, which has connections to everybody. It got a grant for $5.3 million to put in a computer program and it can tell me how much water I have got in my account, and what my history of use has been and a myriad of other interactions. If I was as smart as Waterfind, I would not be going crook, but I am, because all my members are not as

539 Submission 93, Murray Irrigation, p 7.

540 Submission 54, Waterfind, p 1.

541 Answers to questions on notice and supplementary questions, Waterfind, 29 June 2017, p 2.

542 Evidence, Mr Tom Rooney, Chief Executive Officer, Waterfind Group, 5 June 2017, p 7.

543 Evidence, Mr Rooney, 5 June 2017, pp 7-8.

> smart and they are targeted by Waterfind weekly, monthly, surely, about what their hopes and dreams and wishes might be. That is an unfair advantage by knowledge, and how you counteract that, I do not know. Why Murray Irrigation has not stepped up to the plate and put up a method or a market, or attempted to defeat Waterfind or compete with it is beyond me. I have raised that with them several times.[544]

Commonwealth Environmental Water Holder as a water trader

4.112 Trades by the Commonwealth Environmental Water Holder are announced on the Commonwealth Department of the Environment and Energy's website at least two days prior to opening. This announcement includes information on the location, volume of water, open and close time and reason for trade. The Commonwealth Environmental Water Holder also provides a quarterly summary of trading intentions.[545]

4.113 Waterfind noted that the Commonwealth Environmental Water Holder conducts sales via an off-market tender and contended that this compromises its 'objective not to distort the water market, as the Commonwealth Environmental Water Holder market engagement is perceived as a separate market activity by market participants compared to "regular" trades'.[546]

4.114 Mr Rooney indicated he had heard clients complain that governments were distorting the water market. He noted that although 'the impact of the [Commonwealth Environmental Water Holder] entering the marketplace was huge' the water holder has so far only traded very small amounts of water.[547] For example, it has completed trials in the Goulburn as well as the Peel and Gwydir to sell temporary water.[548]

4.115 Waterfind explained that poor reporting and transparency from the Commonwealth Environmental Water Holder can distort the water market and noted an example of vague updates that it provides:

> For example, the Commonwealth Environmental Water Holder's current portfolio management updates are very vague, along the lines of "the Commonwealth Environmental Water Office is currently investigating the feasibility of water allocation sales across a number of southern-connected Basin catchments in early 2017".
>
> Without the Commonwealth Environmental Water Holder giving any more details than this, or even up to date information about how much water is held in the Commonwealth Environmental Water Holder accounts, many market participants are making decisions based on this imperfect information as they anticipate that the eventual release of this water for sale will have a significant market impact. Therefore, water users may be holding back with their water purchases. As a consequence, the

544 Evidence, Mr Pyle, 28 February 2017, p 42.

545 Department of the Environment and Energy, *Trade of Commonwealth environmental water*, http://www.environment.gov.au/water/cewo/trade.

546 Department of the Environment and Energy, *Trade of Commonwealth environmental water*, http://www.environment.gov.au/water/cewo/trade.

547 Evidence, Mr Rooney, 5 June 2017, p 10.

548 Evidence, Mr Rooney, 5 June 2017, p 10.

> Commonwealth Environmental Water Holder's vague announcement to engage with the water market is having a larger impact than it should.[549]

4.116 Namoi Water rejected the current inter-valley transfer known as the 'Peel Trade Trial' as it has negatively impacted on Namoi licence holders. The Peel Trade Trial involved the transfer of temporary entitlement or dealings that trade water from the Peel to the Namoi rivers. Namoi Water noted that the last trade of 3,800 ML resulted in a negative 1.5 per cent water allocation needing to be made up in the delivery loss account. The trial was primarily aimed at improving Peel valley pricing through increased water sales (pricing in the Peel valley will be discussed in detail in the next section), however Namoi Water was of the view that this had not materialised.[550]

4.117 Further, it noted that the trial has passed the initial 12-month period and is yet to be assessed. Namoi Water considered this to be an example of governments amending water sharing plans mid-term without proper consultation or assessment, with the changes having a negative impact on existing licence holders' water reliability and access.[551]

4.118 Ms Jon-Maree Baker, Executive Officer, Namoi Water explained that the trial was meant to be removed from the regulation, but there had been a lack of communication between government bodies. Functionally this sat with the Department of Industries – Water, but 'nothing was done about it'. Ms Baker indicated that Namoi Water is perusing the issue with the government 'but it is a really long process to go through to have that rule removed even though it was a 12-month trial'.[552]

Committee comment

4.119 The committee notes the concerns of many inquiry participants that the water market is being misused as water speculators have entered the market with large volumes of water entitlements, generating profits at the expense of farmers. Further, there is a large amount of government intervention in the market, and these interferences, such as starting a season on low allocations, or with high levels of carryover, inflates the price of water.

4.120 The committee understands these important concerns and calls on the NSW Government to request IPART to conduct a review of the water market including considering whether it is operating transparently, efficiently, and fairly so as to eliminate market manipulation.

4.121 The committee commends WaterNSW for making a range of changes to the management of inter-valley transfers. These changes appear to be well received by stakeholders, as they provide users with more timely information. However we note that a number of stakeholders would like the system to go one step further and adopt an automated process for the allocation of trade approvals, similar to the Victorian Water Register. The committee is of this view this would be a valuable addition to the system and recommends accordingly.

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549 Answers to questions on notice and supplementary questions, Waterfind, pp 1-2.

550 Submission 110, Namoi Water, p 12.

551 Submission 110, Namoi Water, p 12.

552 Evidence, Ms Jon-Maree Baker, Executive Officer, Namoi Water, 16 May 2017, p 37.

4.122 Waterfind raised the issue that one of the key causes of the pricing differential between the Murray and Murrumbidgee valleys is that the 100 GL limit in the Murray is too low. The committee recognises that this is an issue and calls on the NSW Government to review the 100 GL inter-valley transfer account balance limit in the Murray, with a view to increasing it.

4.123 Throughout this report a number of concerns have been raised regarding a lack of accountability and publically available information regarding environmental water. As environmental water has become such an important aspect of water management in New South Wales we recommend that the Commonwealth Environmental Water Holder publicly release up-to-date information about the amounts of water held in its accounts and to generally improve its public reporting.

Recommendation 30

That the NSW Government request the Independent Pricing and Regulatory Tribunal to conduct a review of the water market including considering whether it is operating transparently, efficiently, and fairly so as to eliminate market manipulation.

Recommendation 31

That the NSW Government adopt an automated process for allocation trade approvals, similar to the Victorian Water Register.

Recommendation 32

That the NSW Government review the 100 GL inter-valley transfer account balance limit in the Murray, with a view to increasing the limit, as it is a factor in the pricing differential between the Murray and Murrumbidgee valleys.

Recommendation 33

That the NSW Government encourage the Commonwealth Environmental Water Holder, through the Council of Australian Governments, to publicly release up-to-date information about the amounts of water held in its accounts and to generally improve its public reporting.

Water pricing

4.124 The costs of river operations and water resource management incurred by government are shared with the holders of water access licences under principles in the National Water Initiative, agreed to by the Council of Australian Governments. These principles are applied by independent pricing regulators to determine the prices that should be charged in water sources. Water prices are independently determined by price regulators such as the Independent Pricing and Regulatory Tribunal (IPART) and the Australian Competition and Consumer Commission.[553]

553 Submission 48, NSW Government, p 8.

4.125 Consistent with the National Water Initiative and 'impactor pays' pricing principles New South Wales has adopted 'valley-based' pricing, where prices in each water source reflect the cost of delivering water and water management services in that particular source. WaterNSW's water prices are regulated by the ACCC in the inland (Murray-Darling Basin) regulated river systems and by the IPART elsewhere. Department of Primary Industries – Office of Water's charges are also regulated by IPART.[554]

4.126 The NSW Government advised that price regimes are based on rigorous assessment of the prudent and efficient cost of supplying water or providing the relevant water management service in water sources and are set through processes that explicitly take into account equity considerations, the economic and social impacts of the charges and the community's capacity to pay.[555]

4.127 Mr Matthew Edgerton, Executive Director, Water Pricing, Independent Pricing and Regulatory Tribunal indicated that the ACCC and IPART set prices on a valley basis, with prices reflecting the cost of servicing that particular valley. IPART considered this suitable 'because it provides efficient and appropriate signals to water users about the true costs of providing the services to their valleys'.[556] IPART also stated that this ensures that 'customers are faced with the true, efficient costs of the services they receive, which promotes efficient water consumption decisions, and the efficient use and allocation of resources'.[557]

Issues with water pricing in the Peel Valley

4.128 The committee heard from users in the Peel Valley that their prices far exceed those in other water sources in New South Wales. The Peel Valley Water Users Association indicated that general security regulated river water usage charges 'in the Peel Valley are $58.83 compared to $5.27 in the Murrumbidgee per megalitre'. It considered these water usage charges to be 'excessive, inequitable and anti-competitive' when compared to other valleys in the Murray-Darling Basin[558] Table 7 demonstrates a price comparison of river/valleys in New South Wales according to the association.

554 Submission 48, NSW Government, p 8.

555 Submission 48, NSW Government, p 8.

556 Evidence, Mr Matthew Edgerton, Executive Director, Water Pricing, Independent Pricing and Regulatory Tribunal, 7 November 2016, p 17.

557 Answers to questions on notice, IPART, 4 July 2017, pp 6-7.

558 Submission 21, Peel Valley Water Users Association, p 1.

Table 7 Price comparison of river/valleys in New South Wales[559]

River/Valley	Prices determined by ACCC for WaterNSW 2015/16 year	Prices proposed by DPI Water in 2020/21	Total General Security Water usage Charges (per ML)
	Usage Charge (per ML)	Usage 'Water Take' Charge (per ML)	
Peel	**$52.27**	**$6.56**	**$58.83**
Namoi	**$19.80**	**$1.89**	**$21.69**
Lachlan	**$19.33**	**$2.10**	**$21.43**
Macquarie	**$15.89**	**$1.88**	**$17.77**
Gwydir	**$11.89**	**$1.53**	**$13.42**
Border	**$10.18**	**$1.86**	**$12.04**
Murray	**$6.40**	**$1.15**	**$7.55**
Murrumbidgee	$4.28	$0.99	$5.27

4.129 The Peel Valley Water Users Association expressed concern that these charges will increase as in April 2016, WaterNSW issued a draft pricing document where it sought to increase prices to $71.03 by 2020/21 (see Table 8).[560]

Table 8 Peel Valley Draft Pricing 2017-2021 per ML[561]

Peel 40% Fixed						
	16-17	17-18	18-19	19-20	20-21	16-17 to 17-18 %
HS Fixed Charge	$35.40	$24.51	$25.12	$25.75	$26.40	-30.8%
GS Fixed Charge including	$3.89	$3.26	$3.34	$3.45	$3.58	-16.3%
Volatility Allowance	-	$0.93	$0.95	$1.00	$1.08	0.0%
Variable Usage Charge	$58.47	$65.96	$67.61	$69.30	$71.03	12.8%

4.130 The Peel Valley Water Users Association argued that all they want is 'a fair go' and for there to be a 'level playing field' where its users are charged an equitable amount compared to other users in the state. It indicated that it had 'repeatedly lodged submissions (and also appeared at various public hearings) to Water NSW, DPI Water, the ACCC, IPART, and met with numerous politicians in both the NSW state and Commonwealth governments'; however, no 'genuine attempt' has been made to rectify this imbalance.[562]

4.131 Mr Harris explained that the high price is due to the small customer base in the Peel and is exacerbated by very low usage. WaterNSW had attempted 'to alleviate that problem through a

559 Submission 21, Peel Valley Water Users Association, p 1.

560 Submission 21, Peel Valley Water Users, p 2.

561 WaterNSW, *2017-2021 MDB, Coastal and Fish River Valleys Pricing Submission, Draft Pricing 2017-2021* (18 April 2016), p 61, see: https://www.waternsw.com.au/__data/assets/pdf_file/0008/122102/WaterNSW-Rural-Pricing-Determination-2017-21-DRAFT-PRICES-RELEASE-18-04-16-LOWBIDGEE-Valley-Pack.pdf.

562 Submission 21, Peel Valley Water Users, p 2.

trading scheme, which did not work, basically because at the time it was drought and there was no water available to trade'.[563]

4.132 To explain the pricing differential, Mr Ildu Monticone, a member of the Peel Valley Water Users Association, stated that there are only 200 users in the Peel and the costs are divided among this small group of users.[564]

4.133 However, he and his association described this as grossly unfair as it does not cost 27 times as much to deliver water to the Peel as it does to other parts of the state. Further, just because there are a small number of users in the Peel, does not mean they should be penalised. Mr Monticone considered the prices to be contrary to the obligations of the ACCC to promote competition and fair trading.[565]

4.134 Mr Monticone contrasted the pricing differential with other industries stating that if 'the ACCC charged $54.97 in Tamworth for petrol and $2 in Albury the sky would fall in'. They are doing this with water and it 'defies logic' that the regulators are approving the price.[566]

4.135 Mr Monticone stated that in 2006, IPART said that 'in some valleys full cost recovery could not be achieved without substantial increases in tariffs that would have damaging impacts on users … In some instances (ie, North Coast, South Coast and Peel) the Tribunal considers that full cost reflectivity will never be achieved'. However, Mr Monticone contended that IPART continued to increase the prices in the Peel to the point where in 2016-17 it actually did reach full cost recovery. He argued that IPART did this 'knowing full well in their own words that it would have damaging impacts on users'.[567]

Case study – Mr David Gowing, Member, Peel Valley Water Users Association[568]

David is an irrigator in the Peel Valley. He believes that Peel regulated water is too unreliable and the prices of water in the valley are no longer economically viable. Because of this, David decided to operate without the use of regulated water and spent over $50,000 to achieve this. David planned to sell his regulated water and licence, but had little success due to the high price.

Following medical advice to reduce his workload, David put one of his small farms on the market. However, no one has inspected the property. David believes that irrigation properties are out of favour due to the high price of regulated water. Her considers that urgent action is required if the irrigation industry is to continue in the Peel Valley.

563 Evidence, Mr David Harris, Chief Executive Officer, WaterNSW, 5 June 2017, p 40.
564 Evidence, Mr Ildu Monticone, Member, Peel Valley Water Users Association, 16 May 2017, p 13.
565 Evidence, Mr Ildu Monticone, Member, Peel Valley Water Users Association, 16 May 2017, p 13.
566 Evidence, Mr Ildu Monticone, Member, Peel Valley Water Users Association, 16 May 2017, p 13.
567 Evidence, Mr Ildu Monticone, Member, Peel Valley Water Users Association, 16 May 2017, p 15.
568 Evidence, Mr David Gowing, Member, Peel Valley Water Users Association, 16 May 2017, p 12.

Case study – Ms Jannine Miles, President, Peel Valley Water Users Association[569]

Janinne has been an irrigator in the Peel Valley for 26 years and is a horse breeder. She has roughly 120 horses and operates the business with her 26 year old son. They have not used pumped water for the last two seasons and completely rely on rainwater. Her son detests pumping water due to its high cost.

Tamworth is a major horse industry in Australia with the federal and state governments investing between $30 and $40 million. Although the industry is growing, it is difficult to feed the horses. It is cheaper to truck hay from the Murray and the Lachlan than produce it in Tamworth. Due to the price of water, it costs 11 times as much to produce hay in Tamworth as in other regions. This also makes it unsustainable for Tamworth producers to sell hay, meaning producers in the Lachlan and the Murray are the ones making a profit.

Jannine has a mortgage and thinks that banks are 'terrified' of irrigators in the region due to the cost of water. She considers this to be devaluing local properties and makes it harder for new irrigators to invest in the region.

Initial response from IPART

4.136 In response to criticism, IPART stated that the draft prices for the Peel Valley are not perverse and WaterNSW would not be price gouging if it sought to increase the cost. The draft prices reflect the customer share of WaterNSW's efficient costs to store and deliver bulk water to customers.[570]

4.137 IPART argued that the level of water entitlements has remained stable in the Peel and there was no markedly observable downward trend in water usage, including the period 2006 to 2016, where prices were increased so that full cost recovery could be achieved.[571]

4.138 IPART explained that as a fundamental pricing principle, prices should be set within the efficient pricing band. The upper limit of this band reflects customers' willingness to pay. If prices are higher than the upper limit, there is a broad change in customer behavior which could include the surrender and return of licences and a clear reduction in water use. However, this has not happened in the Peel Valley. Therefore, it considered that the draft prices are consistent with the National Water Initiative principles.[572]

4.139 At the time of writing its submission to the inquiry, the Peel Valley Users Association stated that no progress had been made towards a more equitable system for the Peel Valley.[573]

569 Evidence, Ms Jannine Miles, President, Peel Valley Water Users Association, 16 May 2017, p 14.

570 Answers to questions on notice, IPART, 4 July 2017, pp 4-5.

571 Answers to questions on notice, IPART, 4 July 2017, pp 4-5.

572 Answers to questions on notice, IPART, 4 July 2017, pp 4-5.

573 Submission 21, Peel Valley Water Users, p 2.

Consideration of IPART draft determination

4.140 However, during evidence Mr Monticone acknowledged that Minister Niall Blair MLC had since spoken to the association suggesting the adoption a different pricing structure in the Peel.[574]

4.141 The current pricing structure is a 60:40 ratio where irrigators pay 40 per cent and Tamworth Regional Council covers 60 per cent of the cost. The Minister suggested a shift to an 80:20 model. This would involve the water usage charge dropping to about $18 per ML for irrigators; which was supported by the association.[575]

4.142 Clr Col Murray indicated that Tamworth Regional Council was keen to support the Minister's solution. However, this model would impose 'an additional $250,000-odd cost on its water users' per year'. He stated that the council considered this to be unacceptable.[576]

4.143 Tamworth Regional Council's submission to the IPART draft determination stated that it had considered the change from a 60:40 cost to an 80:20 cost closely and resolved not to support the change unless the NSW Government reimburses the council, in perpetuity, for lost savings. If an 80:20 split is imposed, the council 'will be directly subsidising general security users including irrigators'. Tamworth Regional Council argued that it is not 'part of its responsibility to directly subsidise some business over others'.[577]

4.144 Further, there may be flow on effects such as owners of licenses that have been inactive starting to irrigate again, or to trade to other active license holders. If more licenses become active, the long term average annual exceedance limit in the Peel may be breached, resulting in lower allocations for general security users across the board.[578]

4.145 Clr Murray argued that Tamworth Regional Council considered the basic formula that sits underneath pricing regime is flawed, and the real solution is a complete review of the whole structure of pricing.[579]

4.146 Tamworth Regional Council stated that it had repeatedly called for postage stamp pricing (uniform pricing) for bulk water within New South Wales. However, both the IPART and the ACCC have indicated their opposition to this.[580]

4.147 Tamworth Regional Council made the following arguments in support of postage stamp pricing, namely payment for supplementary or off-allocation flows from one valley to another,

574 Evidence, Mr Ildu Monticone, Member, Peel Valley Water Users Association, 16 May 2017, p 11.

575 Evidence, Mr Monticone, 16 May 2017, p 11.

576 Evidence, Clr Col Murray, Chairperson, Namoi Councils Joint Organisation, and, Mayor, Tamworth Regional Council, 16 May 2017, p 22.

577 Answers to questions on notice, Tamworth Regional Council, p 44. See: Response to the Independent Pricing and Regulatory Tribunal's Draft Determination, Review of Prices for Water NSW – Rural Bulk Water Services from 1 July 2017, p 4.

578 Answers to questions on notice, Tamworth Regional Council, p 44. See: Response to the Independent Pricing and Regulatory Tribunal's Draft Determination, Review of Prices for Water NSW – Rural Bulk Water Services from 1 July 2017, p 4.

579 Evidence, Clr Murray, 16 May 2017, p 22.

580 Submission 24, Tamworth Regional Council, p 6.

costs associated with water shepherding and legacy issues such as the cost of maintaining two small dams instead of one large dam:

- In the case of supplementary or off allocation flows, where water flows from one valley into another, there is some debate about the charges levied for that water if it is intercepted by a user in a valley that is not the valley the water originated from. For example if flow in the Peel River results in supplementary or off allocation flows in the Namoi, the Namoi irrigators pay to intercept this water at the Namoi valley costs, even though if the water had been intercepted in the Peel the price to intercept would have been double. Postage stamp pricing does away with this issue.
- Water shepherding rules. In a similar manner to the point above in the event environmental flows are released from one valley for the purposes of addressing environmental concerns in a downstream valley how much does the environmental water holder pay for that water – is it the cost associated with the valley it was released from or the cost associated with the valley it ends up. Postage stamp pricing would address this issue.
- Legacy issues. The cost of supplying raw water in some valleys is higher because of decisions made by governments before the notion of users pays was conceived. For example in the Namoi Valley two dams were constructed, Keepit and Split Rock. With the benefit of hindsight it may have been possible to construct one larger dam rather than two. In so doing the cost of raw water in the Namoi could have been reduced because no one argues that the operating cost of two separate smaller dams is higher than one larger dam. Present day users who are required to pay for raw water at costs which reflect the cost of operating two dams were not consulted at the time the decision was made, or able to consider the decision to build the second dam in terms of increased ongoing costs.[581]

4.148 While the council supported requiring suppliers to provide detailed cost break-ups associated with the delivery of bulk water in a particular valley, it contended that these costs could be aggregated and divided by the total amount of water delivered across the state to determine the postage stamp price.[582]

IPART releases final determination

4.149 A week after appearing before the committee to give evidence in June 2017, IPART released its final determination on the prices WaterNSW can charge for its monopoly rural bulk water services in the Peel Valley from 1 July 2017 to 30 June 2021.[583]

4.150 IPART indicated that it had decided to adopt an 80:20 fixed to variable tariff structure for the Peel Valley from 1 July 2018 onwards, on the basis that:

- it better reflects WaterNSW's largely fixed cost structure, and strikes a reasonable balance of risk sharing between WaterNSW and its customers
- the relatively low level of water allocations to licence holders in the Peel Valley would lead to a high usage charge under a 60:40 tariff, with associated low fixed charges.[584]

581 Submission 24, Tamworth Regional Council, p 6.

582 Submission 24, Tamworth Regional Council, p 6.

583 Media release, IPART, 'Peel Valley Bulk Water Prices Released', 13 June 2017.

584 Answers to questions on notice, IPART, 4 July 2017, pp 1-3.

4.151 The impact of the tariff structure change, along with a reduction in costs, will see the following changes:

- for a typical high security customer, a bill decrease of about 30 per cent, including inflation, over the period to 2020-21
- for a typical general security customer, a bill decrease of about 57 per cent, including inflation, over the same period.[585]

4.152 Peel Valley Water Users Association welcomed the announcement, stating that [i]t is great news for all irrigators in the Peel Valley, it's absolutely wonderful … That huge saving will hopefully mean more produce coming because it will be cheaper to irrigate'.[586]

4.153 IPART's decision means that the usage price in the Peel Valley decreases from the current (2016-17) $58.26 per ML to $18.36 per ML ($2016-17) from 1 July 2018 onwards. IPART maintained the existing 60:40 tariff structure for 2017-18 to allow Tamworth Regional Council one year to prepare for the change.[587]

Committee comment

4.154 The committee was initially very concerned after it had received evidence from the Peel Valley Water Users Association that costs in the Peel were becoming prohibitively high. The committee then questioned IPART in June 2017 regarding the fairness of these high costs. The committee was pleased with the IPART's decision, immediately following this June hearing, to adopt an 80:20 fixed to variable tariff structure for bulk water costs in the Peel Valley from July 2018.

4.155 The committee will monitor with interest how the new costing structure progresses in order to ensure it does not adversely impact on Tamworth Regional Council, which will now be directly subsidising general security irrigators in the Peel Valley.

Electricity costs in irrigated agriculture

4.156 The NSW Irrigators' Council indicated that electricity has become a major factor in irrigated agriculture. Many irrigators and growers have converted existing on-farm irrigation practices to reduce their water use dependency. While water savings have been achieved, it has created a side effect of higher energy usage.

4.157 This has also coincided with a sharp increase in electricity costs. The NSW Irrigators' Council noted that a small sample of electricity bills from irrigators and growers in 2014 indicated that electricity prices have increased in the sector by up to 300 per cent from 2009 to 2014, mainly due to rising network charges.[588]

585 Answers to questions on notice, IPART, pp 1-3.

586 Mr Jamieson Murphy, The Northern Daily Leader, Peel Valley irrigators saved by IPART water price decision, 13 June 2017.

587 Answers to questions on notice, IPART, pp 1-3.

588 Answers to questions on notice, NSW Irrigators Council, 4 August 2017, pp 1-2.

4.158 The NSW Irrigators' Council argued that despite their vital importance to rural and regional communities, 'the irrigation sector continues to be a 'cornered demographic' in the context of electricity – constrained in its access to, reliability of, and by the cost for electricity due to its rural location'.[589]

4.159 The council identified that the vulnerability of irrigators and growers arises from industry demand and the regulatory framework.

4.160 In regards to industry demand, higher energy costs are a major constraining factor for irrigators in their utilisation of water efficient irrigation equipment. This has exposed individual irrigators to electricity price volatility and price rises. Further, irrigators often do not have a choice when to use electricity, as it depends on statutory water management requirements and regulations around availability and access. For example, river pumpers may only be licenced to draw water for a short time period in a month.[590]

4.161 In terms of the regulatory framework, the cost increases for electricity as well as network tariffs have severely impacted irrigators' profitability and caused negative operational outcomes. These factors are incentivising irrigators to look for alternative energy sources, effectively moving away from the electricity grid, or forcing them to shut down high energy intensive irrigation equipment. These issues are being magnified by a 2014 rule change by the Australian Energy Market Commission which dictated the move to 'cost reflective tariffs', resulting in cost increases of up to 100 per cent with no corresponding change in electricity consumption.[591]

4.162 The NSW Irrigators' Council advised it has been seeking funding to conduct the following assessments to assist irrigators in their electricity cost challenges:

- assessing energy efficiency opportunities for irrigators and irrigation infrastructure operators – pilot study in conjunction with Cotton Australia and the NSW Office of Environment and Heritage with 11 irrigators/irrigation infrastructure operators on pump efficiency which highlighted savings ranging from $31,000 to $314,000
- assessing irrigators' capacity to transition from obsolete network tariffs to demand based tariffs
- assessing regional capacity constraints in the network to develop potential demand management solutions and analyse the effectiveness around the deployment of new technologies in those communities that have borne a significant portion of the network costs and have been negatively been impacted.[592]

589 Answers to questions on notice, NSW Irrigators Council, p 2.

590 Answers to questions on notice, NSW Irrigators Council, p 2.

591 Answers to questions on notice, NSW Irrigators Council, p 3.

592 Answers to questions on notice, NSW Irrigators Council, pp 3-4.

Case study - YellowDot Energy: off-grid solar–diesel hybrid power plant on a cotton farm[593]

YellowDot Energy, a specialist electrical engineering firm focused on designing and deploying power control and hybrid power systems for the agribusiness sector, has developed unique technology to provide bore irrigators with a hybrid solar/diesel power solution that delivers low cost energy for high volume irrigation pumps.

In Moree, YellowDot Energy has commissioned an off-grid solar-diesel power plant on a cotton farm which allows the cotton grower to pump high volumes of irrigation bore water while reducing diesel consumption by up to 60 per cent. The hybrid solar-diesel power plant allows 24/7 operation of the irrigation bore pump with daily volumes of up to 4 ML and an annual yield of 890 ML. The grower can choose to operate seasonally between hybrid and a solar-only mode and can monitor and control the system remotely via an internet connection. The committee was able to view this impressive off-grid solar-diesel power plant during its visit to Moree in May 2017.

Committee comment

4.163 The committee is concerned that the sharp increase in electricity costs in recent years is having a detrimental impact on irrigators and growers and is hampering their ability to utilise water efficient irrigation equipment. We commend the NSW Irrigators' Council for recognising this issue and identifying a number of assessments to assist irrigators. The committee therefore recommends that the NSW Government work with stakeholders to analyse the electricity cost challenges for irrigators.

Recommendation 34

That the NSW Government work with stakeholders to analyse the electricity cost challenges for irrigators.

593 Media release, YellowDot Energy Pty Ltd, 'Renewables reduce diesel use by 60% in irrigation water pumping', 17 November 2015.

Chapter 5 Water storages

This chapter provides an overview of the potential augmentation of existing dams and considerations for new water storages with reference to the proposed new dam at Cranky Rock, near Canowindra on the Belubula River. It also explores the potential of aquifer recharge as suitable water storages for the future.

Dams

5.1 In New South Wales water is held in numerous dams and other storages such as major irrigation and water supply storages, smaller water supply, and farm dams. Water storages provide valuable water to agriculture, irrigation, domestic supply and public recreation.[594]

5.2 There are over 30 major water storages in New South Wales which are managed by WaterNSW.[595] More background information about dams is included in chapter 6.

5.3 The last dam built in New South Wales was Split Rock Dam, on the Manilla River north-west of Tamworth, which was completed in 1987.[596] The dam was built to supplement supplies from the nearby Keepit Dam and also meet increased agricultural demand for water in the Namoi Valley.[597]

Existing storages and potential for augmentation

5.4 During 2013 Standing Committee on State Development *inquiry into the adequacy of water storages in stakeholders* suggested that any proposals for new water storages be subject to a proper and comprehensive assessment of cost, benefits, storage efficiency and suitability, environmental and social considerations (recommendation 17).[598]

5.5 In January 2014, the NSW Government advised that it supported the committee's recommendation, stating that all proposals for new dams or weirs require assessment and approval under both State and Commonwealth legislation.[599]

5.6 In August 2016, the NSW Government advised that it was committed to long term solutions for the security of regional water supply for irrigation, industry, environment, and the community, and was continuing to investigate existing storages and possible future schemes for the augmentation of water supply.[600]

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594 NSW Department of Primary Industries - Water, *Dams,* http://www.water.nsw.gov.au/realtime-data/storages.

595 WaterNSW, *Our Dams*, http://www.waternsw.com.au/supply/visit.

596 WaterNSW, *Split Rock Dam,* http://www.waternsw.com.au/supply/visit/split-rock-dam.

597 WaterNSW, *Split Rock Dam*, http://www.waternsw.com.au/supply/visit/split-rock-dam.

598 Standing Committee on State Development, NSW Legislative Council*, Adequacy of water storages in NSW* (2013), pp 152-153.

599 Correspondence from the NSW Government to the Clerk of the Parliaments, 30 January 2014.

600 Submission 48, NSW Government, p 10.

5.7 This was being achieved with the assistance of the federal government's National Water Initiative Development Fund, which provides funding for the detailed planning of 'building or augmenting existing water infrastructure'. The NSW Government outlined that this fund had provided for the following feasibility studies to progress:

- an investigation into a dam on the Mole river with a view to capturing large flood events occurring in the local river network and a potential to increase the security of supply for agriculture and the environment in the Border Rivers region
- a preliminary investigation into options to improve the water supply and flood security of Dungowan Dam, near Tamworth and,
- Stage 2 feasibility study on piping the Albert Priest Channel for improving water security for Cobar and Nyngan.[601]

5.8 Each of the above feasibility studies and investigations are expected to be completed by April 2018 and 2019.[602]

5.9 In September 2017, the NSW Government announced construction of an off-river storage facility at Nyngan to improve water security for the towns of Nyngan and Cobar. This was part of the long term plan of piping the Albert Priest Channel to connect to the aquifer at Warren. The storage, which will have a capacity of up to 700 ML, will 'supplement the existing water supply, especially during years of low allocation in the Macquarie River'. It is expected to be completed in early 2018.[603]

5.10 In addition, the *2014 State Infrastructure Strategy Update* has provided advice to the NSW Government about possible ways to 'ensur[e] waster security and quality of supply' for regional industries and communities.[604] This included recommendations for the government to:

- assess options for critical water infrastructure projects in four identified priority catchments
- secure water supplies in high priority regional towns
- ensure all regional towns are up to water quality and environmental standards
- investigate pricing and cost recovery for water security investment (Broken Hill)
- consider Hawkesbury-Nepean flood mitigation options.[605]

5.11 The NSW Government informed the committee that the following actions were being undertaken to address each of the recommendations of the *2014 State Infrastructure Strategy Update*:

601 Submission 48, NSW Government, p 12.

602 Council on Federal Financial Relations, *Schedule B to the Project Agreement for National Water Infrastructure Development Fund – Feasibility Component* (25 November 2018), http://www.federalfinancialrelations.gov.au/content/npa/environment/project-agreement/NWIDF_NSW.pdf.

603 Media release, Hon Kevin Humphries MP, Member for Barwon, 'Work begins on construction of off-river storage at Nyngan', 19 September 2017.

604 Submission 48, NSW Government, p 10.

605 Submission 48, NSW Government, p 10.

- WaterNSW is undertaking a feasibility study on infrastructure options in the Lachlan Valley as part of the recommendation made regarding critical water infrastructure. This will be explored in further detail in paragraph 5.42.
- the establishment of a $1 billon Regional Water Security and Supply Fund to meet the water challenges in regional communities
- the establishment of a $110 million Regional Water and Waste Water Backlog Program to ensure regional towns have water services of modern standards
- the implementation of the Hawkesbury-Nepean Valley Flood Risk Management Strategy worth $58 million.[606]

Support for increasing capacity of existing water storages

5.12 Several inquiry participants spoke of the advantages to be gained from augmenting existing water storages to increase their capacity.

5.13 The NSW Irrigators Council said it supported the 'investigation of augmentation of the capacity of existing dams as a more cost effective measure [than new dams] where this proves viable'.[607]

5.14 In the Murrumbidgee/Riverina region, stakeholders suggested augmenting Burrinjuck Dam which provides water for irrigation, 'town supplies, industry and domestic requirements, environmental flows, flood mitigation and recreation'.[608]

5.15 Ms Helen Dalton, Board member, Executive Council, NSW Farmer's Association, Griffith Branch, suggested the 'construction of a new dam wall on the Burrinjuck downstream from the existing wall would improve catchment opportunities'.[609] Such opportunities included increased storage for environmental water which would reduce flood damage to residents downstream on the Murray, and drought proofing water supplies for Sydney, Canberra and Goulburn through the construction of a pipeline.[610]

5.16 This was supported by Mr Paul Pierotti, President, Griffith Business Chamber, who argued that either constructing a new wall or extending the current wall of Burrinjuck Dam, would increase the capacity from 1,028 gigalitres to 4,000 gigalitres.[611] By increasing the capacity of Burrinjuck dam it would 'resolve cold water pollution problems by using top of the dam flows … create airspace for flood mitigation … [and] create significant storage for environmental water'.[612]

606 Submission 48, NSW Government, pp 10-11 and 17.

607 Submission 85, NSW Irrigators Council, p 3.

608 WaterNSW, *Burrinjuck Dam,* http://www.waternsw.com.au/supply/visit/burrinjuck-dam.

609 Evidence, Ms Helen Dalton, Board member, Executive Council, NSW Farmer's Association, Griffith Branch, 1 March 2017, p 13.

610 Answers to questions on notice, Ms Helen Dalton, Board member, Executive Council, NSW Farmer's Association, Griffith Branch, 21 March 2017, p 5.

611 Evidence, Mr Paul Pierotti, President, Griffith Business Chamber, 1 March 2017, pp 48-49.

612 Evidence, Mr Pierotti, 1 March 2017, p 48.

5.17 Mr Pierotti advised that the only consequence would be the relocation of Wee Jasper residents who would be inundated if a new dam wall was built.[613]

5.18 The upgrade of Chaffey Dam, which supplies irrigation and stock needs in the Peel Valley and town water to Tamworth, is an example of augmenting an existing water storage. It has enhanced water supply by increasing the capacity of the dam from 62 GL to 100 GL.[614]

5.19 Mr David Harris, Chief Executive Officer, WaterNSW reflected that it was the low reliability of water in the Peel that prompted the three levels of government to fund the upgrade of Chaffey dam in an attempt to provide greater reliability.[615]

Case study Chaffey Dam upgrade[616]

Chaffey Dam, which was completed in 1979, is located on the Peel River, near Tamworth. It was built to 'provide a regulated water flow for irrigation, stock and domestic use'.

It recently underwent an upgrade works to comply with Australian National Committee on Large Dams and Dams Safety Commission safety standards, and increase the dam's capacity from 62 gigalitres to 100 gigalitres.

The works were divided into two stages; upgrade works and augmentation works. The NSW Government funded stage one of the project, putting $13 million towards the construction of a 35 metre auxiliary spillway with release plug which was completed in 2011.

Stage two of the project, which cost $50 million was jointly funded by the Australian Government, NSW Government and Tamworth Regional Council. This stage of the project involved raising the dam wall by 8 metres to increase the capacity of the dam.

The project resulted in the dam being better equipped to withstand extreme floods; secured the long term water supply for Tamworth; and improved security of water entitlements for downstream users.

5.20 Mr Paul Maytom, Mayor, Leeton Shire Council stated it was 'worthwhile investigating … whether modifications to existing storage facilities could improve the supply and delivery of water'.[617]

5.21 Mr David Dreverman, Executive Director, River Management, Murray-Darling Basin Authority said that upgrades to existing infrastructure may be necessary in the future, 'particularly as populations get bigger … we need to enhance storages to make sure we can meet the water needs of humans'.[618]

613 Evidence, Mr Pierotti, 1 March 217, p 49; Answers to questions on notice, Mr Paul Pierotti, President, Griffith Business Chamber, 28 March 2017, p 2.

614 WaterNSW, *Chaffey dam upgrade and augmentation,* http://www.waternsw.com.au/projects/dam-safety/chaffey.

615 Evidence, Mr David Harris, Chief Executive Officer, WaterNSW, 5 June 2017, p 40.

616 WaterNSW, *Chaffey Dam upgrade and augmentation*, http://www.waternsw.com.au/projects/dam-safety/chaffey; See also WaterNSW, *Chaffey Dam,* http://www.waternsw.com.au/supply/visit/chaffey-dam.

617 Evidence, Mr Paul Maytom, Mayor, Leeton Shire Council, 1 March 2017, p 3.

618 Evidence, Mr David Dreverman, Executive Director, River Management, Murray-Darling Basin Authority, 5 June 2017, p 32.

5.22 The NSW Farmers Association stated that any considerations of the augmentation of existing storages (or construction of new storages) should be 'based on current and projected stakeholder demands; seasonal conditions; and the role that storages may play in respect of flood mitigation, water security and the provision of clean energy'.[619]

5.23 Some stakeholders did raise concerns with the impact changes to existing storages could have downstream.

5.24 For example, Mr Kevin Knight, Director, Barkandji Native Title Group Aboriginal Corporation stated that plans by Bourke Shire Council to raise the height of the main weir would impact on the flow of the Darling River and the life of the river downstream.[620]

Proposals and considerations for new water storages

5.25 Stakeholders highlighted the various proposals and considerations across the regions to the committee associated with planning and decision-making for new water storages with a number of participants advocating for more dams in order to improve water reliability and to service future needs.

5.26 While the NSW Farmers Association, Griffith Branch noted that any decision to build a new dam would require consultation with engineers, hydrologists and communities,[621] Ms Helen Dalton, Board member, Executive Council, NSW Farmer's Association, Griffith Branch, was of the view that new water storages in the Murrumbidgee would improve the reliability of available water:

> '[the] establishment of dams or water storages together with ancillary storages would allow much more flexible and economic use of available water from the highly variable flows from Mirrool Creek and the Murrumbidgee River … The construction of water reservoirs at places like Stony Point, Lake Coolah and Lake Mejum would be a practical solution and could be designed to capture floods and also supplementary water, which is regularly available during the wintertime.[622]

5.27 The association suggested several suitable locations across New South Wales for new dams that would improve water supply and security, including: a new dam on the Shoalhaven River such as the proposed Welcome Reef dam near Braidwood to 'supplement the Shoalhaven transfer scheme'[623]; a new dam east of Wagga Wagga near Narrandera which could be used for

619 Submission 52, NSW Farmers Association, p 10.

620 Evidence, Mr Kevin Knight, Director, Barkandji Native Title Group Aboriginal Corporation, 26 October 2016, p 4.

621 Submission 29, NSW Farmers Griffith Branch, p 8.

622 Evidence, Ms Dalton, 1 March 2017, p 13.

623 Submission 29, NSW Farmers Griffith Branch, pp 8-9; Submission 20, Shoalhaven City Council, p 5; *Questions and Answers Paper,* NSW Legislative Assembly, 6 May 2009, p 5510.

flood mitigation and supplementary water[624]; and new dams on the east coast of Australia such as the Tillegra Dam on the Hunter River to secure future water supply.[625]

5.28 Cr Col Murray, Chairperson, Namoi Councils Joint Organisation, and Mayor, Tamworth Regional Council, said there was a need for more water storages to ensure water security for industry, irrigation and residential use:

> We hear a lot from our community about concerns over the storage capacities. …I would suggest that part of the solution for the valley is more water storage. We hear the concerns of the irrigation sector of our community and also the town. We have got some very large water users in Tamworth. Residential water users only use about 50 per cent of the treated water in the city. The other 50 per cent is used by very high employment number companies, particularly the food processing companies like the three abattoirs that we have in the city and other food processors.[626]

5.29 Cr Murray advised that the council had engaged a consultancy group, Hunter H2O, to conduct a water viability investigation for the future of Tamworth.[627] The report recommended action in the following four areas:

- **Keepit Dam transfers:** Assessing the viability of acquiring water entitlements in the Namoi Valley (downstream of Keepit Dam) and converting to high security/local water utility licence, including discussions with DPI Water.
- **Upgrade Dungowan Dam:** Preliminary field investigations of the proposed site for a replacement of Dungowan Dam and assessment of potential property and infrastructure impacts.
- **Off-River Storage upstream of Tamworth:** A more detailed assessment of potential locations for an off-river storage upstream of Tamworth (in the Peel or Cockburn valleys) and assessing the viability of accessing uncontrolled flows in the Cockburn or Peel Rivers in association with DPI Water.
- **Groundwater (Peel alluvium):** Modelling and monitoring of the Peel Alluvium aquifer and its interaction with the Peel River to assess the potential yield available for bulk water supply purposes in association with DPI Water, including assessing the viability of transferring entitlements from Chaffey Dam to Peel Alluvium.[628]

5.30 Cr Murray expressed the view that a new Dungowan Dam would make more water available for irrigators and improve the viability of the sector in the region.[629]

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624 Submission 29, NSW Farmers Griffith Branch, pp 8-9; Evidence, Ms Dalton, 1 March 2017, p 13;

625 Submission 29, NSW Farmers Griffith Branch, pp 8-9; Submission 29, NSW Farmers Griffith Branch, Attachment 5, p 26; *Hansard,* NSW Legislative Assembly, 9 September 2010, p 25608 (Phillip Costa).

626 Evidence, Cr Col Murray, Chairperson, Namoi Councils Joint Organisation, and Mayor, Tamworth Regional Council, 16 May 2017, p 20.

627 Evidence, Cr Murray, 16 May 2017, p 23.

628 Answers to questions on notice, Tamworth Regional Council p 184. See: Hunter H20, Tamworth Regional Council, Tamworth Bulk Water Supply, Long-Term Augmentation Options Review: Final Report, November 2015, p iii.

629 Evidence, Cr Murray, 16 May 2017, p 23.

5.31 Alternatively, Mr David Wiggan suggested that a dam be built on the Cockburn River to 'help sustain the water supply for the Tamworth and northwest NSW region'.[630]

5.32 Investigations into a new water storage in the Borders Rivers region on the Mole River was supported by the NSW Irrigators Council. It was of the view that 'other potential dam sites in the region should also be assessed for greatest suitability'.[631]

5.33 The NSW Irrigators Council stated that it would support a new dam in the Border Rivers region if a cost-benefit analysis showed the project to be 'beneficial to irrigators at [an] acceptable additional cost'; did not introduce negative third party impacts; and was supported by the Border Rivers Food and Fibre, an organisation that represents water users from ten different associations in the Macintyre, Dumaresq and Macintyre Brook catchments in both New South Wales and Queensland.[632]

5.34 The Pastoralists Association of West Darling Inc., also recommended investigations be conducted into options for 'new weirs at key locations in the Darling River between Bourke and Wentworth, in response to the ongoing problems created by extended periods of low or no flow downstream of Bourke'.[633] However, the Pastoralists Association of West Darling Inc. advised that any 'new weirs should incorporate fish ladders and river gauges with the capacity to upload data to the internet in real time'.[634]

5.35 Meanwhile, the Riverina and Murray Regional Organisation of Councils suggested a number of dam projects in the Murrumbidgee and Lachlan valleys that would create additional storage. For example, in the Murrumbidgee Valley, a new dam east of Wagga Wagga could provide 750 gigalitres of extra storage and a downstream dam east of Narrandera could provide 250 gigalitires of extra storage.[635] In the Lachlan Valley, a new dam on the Belubula River could provide a 60 gigalitres of extra storage, and 300 gigalitres of extra storage could be provide if the wall of Wyangala Dam was raised.[636]

5.36 In the central west, a 2009 Centroc Water Security Study recommended that Lake Rowlands, a dam operated by Central Tablelands Water, be increased by at least 22 gigalitres to enhance water security for the region.[637] Centroc noted that the Lake Rowlands proposal has been in the planning stage for some time, but had now been put aside while proposals for a new storage on the Belubula River were considered.[638]

5.37 Furthermore, a 2013 study conducted by Central Tablelands Water concluded that 'construction of a larger dam on the Belubula [River] that might meet more water needs would be a better option when compared to enlargement of Lake Rowlands'.[639]

630 Submission 6, Mr David Wiggan, p 1.

631 Submission 85, NSW Irrigators Council, p 2.

632 Submission 85, NSW Irrigators Council, p 2.

633 Submission 118, Pastoralists Association of West Darling Inc, p 3.

634 Submission 118, Pastoralists Association of West Darling Inc, p 3.

635 Submission 25, Riverina and Murray Regional Organisation of Councils, p 7.

636 Submission 25, Riverina and Murray Regional Organisation of Councils, p 7.

637 Submission 66, Central NSW Councils, p 12.

638 Submission 66, Central NSW Councils, p 12.

639 Submission 66, Central NSW Councils, p 12.

5.38 Centroc was of the view that any feasibility studies for a new storage in the Lachlan catchment should also include 'an assessment of the impact of a new dam on the operation of Lake Rowlands and Carcoar Dam in relation to urban water security in the region.[640]

5.39 Mr David Dreverman, Executive Director, River Management, Murray-Darling Basin Authority, reflected that any new dam in the basin was unlikely to create new water, instead it would only provide for the 'shift[ing] of water from one part of a valley to another, or possibly across valleys'.[641] He added that if new dams were to be built, they would be 'limited to those that meet a really high economic output, such as urban supplies, or maybe mining', as demonstrated by the recent upgrade of Chaffey Dam's walls to enhance the water supply for Tamworth.[642]

5.40 The Inland Rivers Network also argued that new large dams would not create more water, but would 'redistribute the shares by shifting water away from downstream users, aquifer recharge, end of system flows and wetlands'.[643]

Government proposals for augmentation and new water storages

5.41 The *2014 State Infrastructure Strategy Update* identified four 'priority catchments' – Gwydir, Macquarie, Lachlan Rivers, and Upper Hunter – that required critical water infrastructure projects in order to ensure future water security and supply.[644] Infrastructure NSW recommended a combination of new dams and delivery efficiency projects to address the key issues in each catchment as outlined in the following table.[645]

Figure 5 Potential projects to ensure future water security and supply in priority catchments[646]

Catchment	Possible solutions
Gwydir	New re-regulating dam at Gravesend; or new Horton River dam
Macquarie	Augmentation of Burrendong Dam for drought security; new re-regulating storage for delivery efficiency
Lachlan	Additional storage for drought security and flood management, including The Needles and Cranky Rock sites, to be investigated
Upper Hunter	Augmentation of Lostock Dam and or water transfer scheme linking Lostock and Glennies Creek Dams to improve flow utilisation and drought security

640 Submission 66, Central NSW Councils, p 14.
641 Evidence, Mr Dreverman, 5 June 2017, p 32.
642 Evidence, Mr Dreverman, 5 June 2017, p 32.
643 Submission 58, Inland Rivers Network, p 4.
644 Infrastructure NSW*, 2014 State Infrastructure Strategy Update*, pp 80 and 83.
645 Infrastructure NSW, *2014 State Infrastructure Strategy Update,* pp 86 and 88-91.
646 Infrastructure NSW, *2014 State Infrastructure Strategy Update,* pp 88-91.

Cranky Rock dam proposal

5.42 In the 2014 *State Infrastructure Study*, the Department of Infrastructure identified the Lachlan Valley as one of four priority areas for the 'investment and delivery of critical water infrastructure projects in the next decade'.[647]

5.43 From this came the Lachlan Valley Water Security Project administered by WaterNSW which aims to: increase the reliability of Lachlan River allocations, improve urban water security, and improve flood management capability.[648]

5.44 During Phase 1 of the project in 2014, a feasibility study was conducted by WaterNSW to establish suitable dam sites, of which there were four options, (in order of preference): Cranky Rock, Abercrombie, The Needles and raising the existing Wyangala Dam. These four sites were selected as a result of their viability against a set of criteria that included: technical feasibility; likely yield of dam; environmental sustainability; cost effectiveness; compatibility with WaterNSW strategic plans and the Basin plan; capability to mitigate flooding; improve water security; and be within the interests of the community.[649] A map showing all potential dam sites is at figure 7.

5.45 On the basis of the results of each site against each of the above criteria, it was recommended that further investigations (Phase 2) commence in the Cranky Rock vicinity.[650] See figure 6.

5.46 Thus far, Phase 2, which commenced in late 2016, has involved modelling and site investigations at the two Cranky Rock sites; Cranky Rock 1 (also known as Pride of Oak) and Cranky Rock 2. It has also included contact with key stakeholders to establish reference groups and the development of a cost benefit analysis.[651]

5.47 The Cranky Rock 1 site has the potential to hold a dam with wall height of either 375m with a capacity of 100 GL or 393 m with a capacity of 310 GL, while the Cranky Rock 2 site has the potential to hold a dam that has a wall 270 m high with a capacity of 375 GL, 395 m with a capacity of 700 GL or 401m with a capacity of 1000 GL.[652]

5.48 A preliminary business case is expected to be submitted to the Department of Infrastructure in August 2017.[653]

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647 Tabled document, WaterNSW, *Lachlan Valley Priority Catchment Water Security Investigation,* June 2017, p 1.

648 Tabled document, *Lachlan Valley Priority Catchment Water Security Investigation*, p 2.

649 WaterNSW, Belubula and Lachlan River Dam Investigation, p vi.

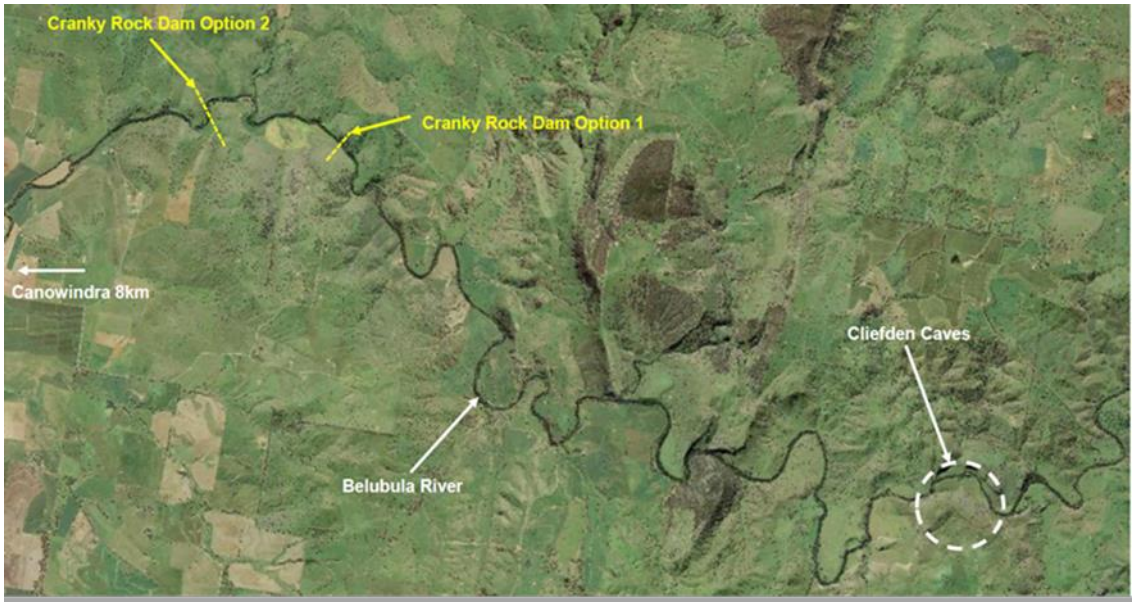
650 WaterNSW, Belubula and Lachlan River Dam Investigation, p x.

651 Tabled document, *Lachlan Valley Priority Catchment Water Security Investigation*, pp 4-6.

652 WaterNSW, *Project Bulletin Lachlan Valley Water Security Project Phase Two - July 2017,* p 3http://www.waternsw.com.au/__data/assets/pdf_file/0018/126612/LVWSP_Project-bulletin-2.pdf

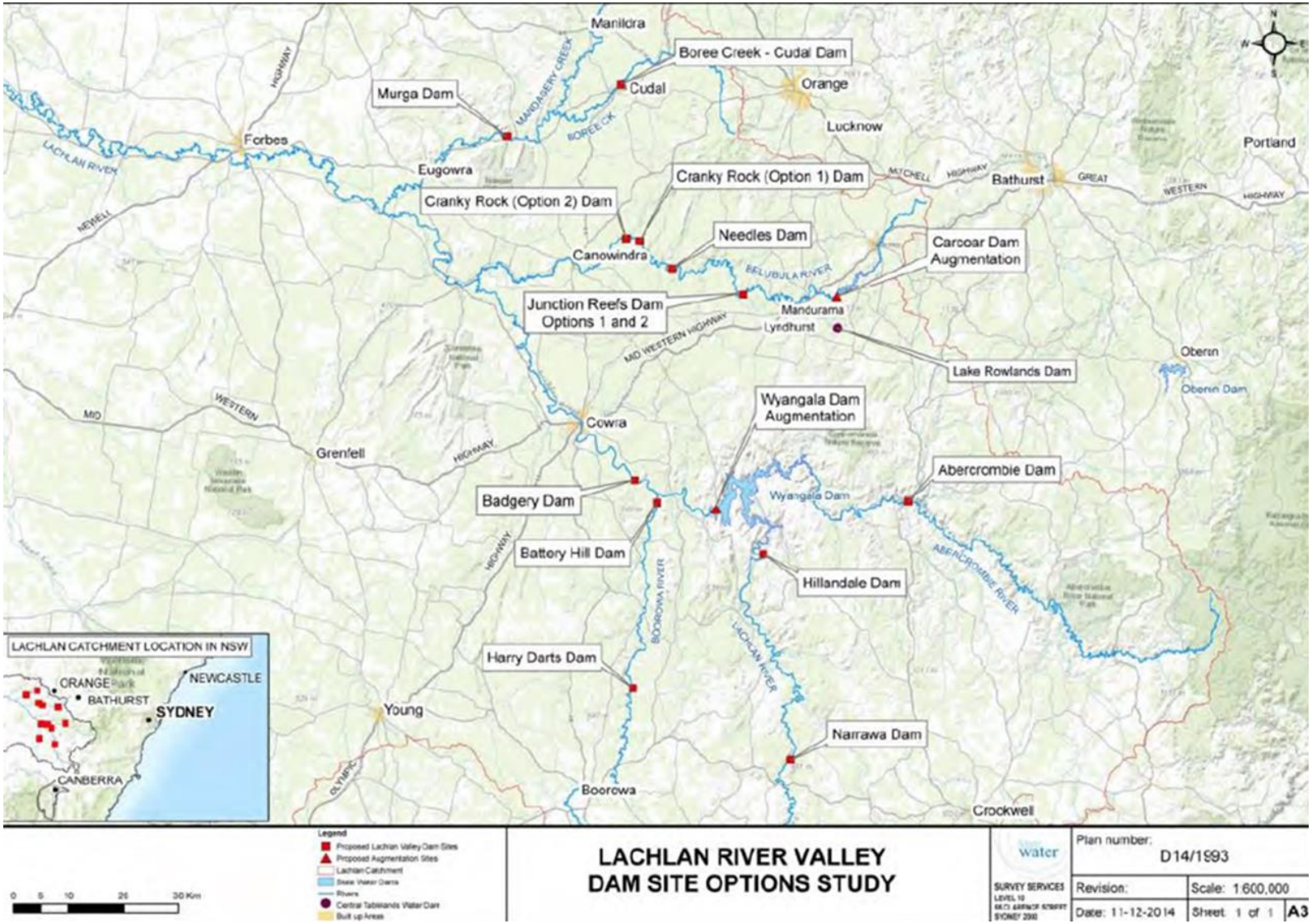
653 WaterNSW, Lachlan Water Security Investigation, http://www.waternsw.com.au/projects/belubula.

Figure 6 Aerial view of the two proposed Cranky Rock dam sites[654]



654 Tabled document, *Lachlan Valley Priority Catchment Water Security Investigation,* p 3.

Figure 7 Lachlan River Valley Dam Site options study



WaterNSW, Lachlan Water Security Investigation, http://www.waternsw.com.au/projects/belubula

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5.49 The proposed dam divided inquiry participants, with many opposing the new dam due to the potential impact it would have on nearby Cliefden Caves. Other participants showed support for the proposed dam, mostly due to the apparent benefits it would generate for water security in the catchment and flood management.[655]

5.50 Cr David Somervaille, Board Member, Centroc and Chair, Central Tablelands Water informed the committee that Centroc was a 'strong advocate of new water storage high in the Lachlan catchment' as it would address two primary concerns of the organisation; town water and irrigation water.[656]

5.51 Centroc noted that if the new dam was linked to Lake Rowlands and Carcoar Dam it had the 'potential to benefit downstream stakeholders by enhancing regional water security catering for future population growth in the region while also helping local communities improve agricultural productivity and combat drought conditions'.[657]

5.52 However, the support of Centroc and Lachlan Valley Water Inc for the proposed dam was based on the findings of WaterNSW's feasibility study and evidence that it would not create any environmental impacts on the Cliefden Caves.[658]

5.53 Similarly, Mr Mark McKenzie, Chief Executive Officer, NSW Irrigators Council, advised that the council was supportive of the proposed dam pending the outcome of the Cranky Rock feasibility study and the 'impact on irrigators in the broader Lachlan system.[659]

5.54 Mr Michael Payten, Chairman, Belubula Landholders Association said the association hoped the feasibility study would favour the construction of the dam due to the benefits for Central West towns and industries.[660]

5.55 Mr Joe Curran, Primary Producer, was also supportive of the new dam and stated it would offer many benefits such as a 'reliable supply of irrigation water for Belubula irrigators and flood mitigation', increased opportunities for additional irrigation and other industries, and recreational purposes such as 'fishing, swimming, waterskiing, [and] sailing'.[661]

5.56 A significant number of inquiry participants opposed the proposal of a new dam constructed at Cranky Rock mainly due to perceived impacts it would have on downstream users and environmental factors, including Cliefden Caves.[662]

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655 See Submission 25, Riverina and Murray Regional Organisation of Councils (RAMROC); Submission 60, AWEC; Submission 85, NSW Irrigators Council; Submission 111, Mr Joe Curran.

656 Evidence, Cr David Somervaille, Board Member, Centroc and Chair, Central Tablelands Water, 17 May 2017, p 2.

657 Answers to questions on notice, Centroc, 21 June 2017, p 12.

658 Submission 114, Lachlan Valley Water Inc, p 5; Evidence, Mr Bill West, Board member, Centroc, and Mayor, Cowra Shire Council, 17 May 2017, p 6.

659 Evidence, Mark McKenzie, Chief Executive Officer, NSW Irrigators Council, 17 May 2017, p 24.

660 Evidence, Mr Michael Payten, Chairman, Belubula Landholders Association, 17 May 2017, pp 31 and 33.

661 Evidence, Mr Joe Curran, Primary Producer, 17 May 2017, p 31.

662 See Submission 34, Ms Margaret Hilder; Submission 39, Daroo Orange Urban Landcare Group; Submission 50, The National Trust of Australia (NSW); Submission 53, Central West Environment Council; Submission 58, Inland Rivers Network; Submission 59, Sydney University Speleological

5.57 The Save Cliefden Caves Association was opposed to any dam on the Belubula River that would impact the Cliefden region, a unique site that had significant 'environmental, geological and cultural heritage values' such as 'Ordovician fossils, limestone caves, a warm spring, a habitat for threatened bat species and historic cultural sites'.[663]

5.58 Save Cliefden Caves Association stated the construction of a dam would flood the Cliefden Caves area and 'permanently alter and destroy the fragile fossil deposits' that are of international significance.[664]

5.59 Ms Anne Paul, Project Manager, Daroo Orange Urban Landcare Group informed the committee that a dam on the Belubula River would have a serious effect on flora and fauna, and reduce downstream flows.[665]

5.60 The Central West Environment Council argued the new dam would 'change existing water shares in the Lachlan River system affecting the current water sharing rules for both the Belubula River and the Lachlan River'. Instead, it considered 'water use efficiency savings and decreased demand' as the basis for future water augmentation proposals.[666]

5.61 Dr Stuart Khan, Associate Professor, UNSW Water Research Centre and School of Civil and Environmental Engineering, University of NSW, expressed the view that a dam at Cranky Rock was not an ideal solution for several reasons including: the devastating impacts to the Cliefden Caves; the loss of water to downstream users; high evaporation rates; and the proximity to Cadia Valley mining operations which pose 'significant water quality risks'.[667]

5.62 Stakeholders, such as the Save Cliefden Caves Association, proposed alternative options such as managed aquifer recharge and water recycling schemes should be investigated for the region.[668]

5.63 In August 2017, Cliefden Caves was granted heritage listing from the Minister for Heritage, the Hon Gabrielle Upton MP, under the State Heritage Register, affording it the highest level of protection in New South Wales.[669] As of 8 May 2018, WaterNSW has not stated how the heritage listing will impact the feasibility of the dam.[670]

Society; Submission 63, Environmentally Concerned Citizens of Orange; Submission 64, Ms Karen Taylor; Submission 73, Orange Speleological Society; Submission 74, Dr Stuart Khan (UNSW); Submission 75, Mr Philip Jeffreys; Submission 77, Save Cliefden Caves Association; Submission 92, Australian Speleological Federation.

663 Submission 77, Save Cliefden Caves Association, p 1.

664 Submission 77, Save Cliefden Caves Association, p 3.

665 Evidence, Ms Anne Paul, Project Manager, Daroo Orange Urban Landcare Group, 17 May 2017, p 15.

666 Submission 53, Central West Environment Council, p 2.

667 Submission 74, Dr Stuart Khan (UNSW), p 10.

668 Submission 77, Save Cliefden Caves Association, p 3.

669 Peter Hannam, 'Heritage listing for Cliefden Caves puts stopper in dam plan', *Sydney Morning Herald,* 30 August 2017, http://www.smh.com.au/environment/heritage-listing-for-cliefden-caves-puts-stopper-in-dam-plan-20170830-gy6x2z.html.

670 WaterNSW, Lachlan water security investigation, https://www.waternsw.com.au/projects/belubula.

On-farm water storages

5.64 During the *2013 inquiry into the adequacy of water storages in New South Wales*, the committee heard evidence from the NSW Government on their initiatives to modernise irrigation infrastructure in order to reduce water losses, particularly those due to evaporation. The committee heard that urban water use was considered a high priority; however agricultural water was a major component of water use according to other stakeholders.[671]

5.65 The committee determined that the NSW Government should support the agricultural industry in its practices for water efficiency, and where possible water savings should be returned to the irrigator.[672]

5.66 The NSW Government reported in January 2014 that it supported the committee's recommendation in principle, and it currently supports the agricultural sector toward better water efficiency through a number of mechanisms including infrastructure. These measures include the ability to secure water and drought proof regional communities, and incentives to farmers to upgrade their irrigation systems to increase water efficiency.[673]

5.67 The NSW Government advised in August 2016, that it continues to have a strong focus on water efficiency, particularly in the Murray-Darling Basin and that it has supported substantial federal funding into on-farm efficiency and water delivery efficiency programs to recover the water that is required under the Basin Plan.[674]

5.68 The NSW Government's focus on water efficiency is demonstrated by the Irrigation Farm Modernisation Project which aims to 'achieve water savings by improving on-farm water use efficiency and reduce … direct extraction … in the NSW Border Rivers, Gwydir, Namoi/Peel, Macquarie/Cudgegong and NSW Barwon–Darling water management areas'. This project will 'improve the long term sustainability of regional communities by allowing irrigators to adapt to reduced water availability and update irrigation infrastructure'.[675]

5.69 Other on-farm water efficiency projects, such as the Southern Basin On-Farm Irrigation Efficiency Program and the NSW Private Irrigation Infrastructure Operators Program, are administered by the federal government.

5.70 The Southern Basin On-Farm Irrigation Efficiency Program provides $626 million for the modernisation of on-farm irrigation infrastructure while returning water savings to the environment in the Murray, Murrumbidgee, and Lower Darling (south of Menindee Lakes) river catchments.[676]

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671 Standing Committee on State Development, *NSW Legislative Council, Adequacy of water storages in NSW* (2013), p 51.

672 Standing Committee on State Development, *NSW Legislative Council, Adequacy of water storages in NSW* (2013), p 51.

673 Correspondence from the NSW Government to the Clerk of the Parliaments, providing government response to the inquiry into the adequacy of water storages in New South Wales, 30 January 2014.

674 Submission 48, NSW Government, pp 31-32.

675 Submission 48, NSW Government, p 13.

676 Submission 48, NSW Government, p 13.

5.71 Similarly, the NSW Private Irrigation Infrastructure Operators Program provides $750 million to 'improve the efficiency and productivity of water use and management of private irrigation networks and deliver water savings for the environment'.[677]

5.72 In the north and western parts of New South Wales, large on-farm dams are used to store water sourced from supplementary access entitlements.[678]

5.73 Mr Michael Murray, General Manager, Cotton Australia, stated that on-farm storages in the north west of the state were a product of private industry in the 1960s and 1970s, with many of these storages holding similar quantities of water to that of government headwater dams. He was of the view that in the Gwydir Valley there is around 500,000 ML of on-farm storage, which in comparison to the 1.3 million ML in Copeton Dam, was a significant amount.[679]

5.74 The Broken Hill Darling River Action Group / Broken Hill Menindee lakes We Want Action Facebook Group spoke of on-farm storages in the upper Darling region being 'equivalent to 60 per cent of the total volume of government dams'.[680]

5.75 Dr Bill Fulkerson, North Milk Supply Officer, Norco said off-river storages on farms in the Northern Rivers would allow flood waters or semi flows to be caught and in turn 'take farmers off the river during dry times, because they would have their own water' as well as help alleviate, to some extent, the flood issue.[681]

5.76 In March 2006, the Harvestable Rights Order was gazetted and outlined the maximum harvestable right dam capacity for storages that rural landholders could construct on minor stream on their properties.[682] In the Central and Eastern Divisions, storages can capture '10 per cent of the average regional rainfall run-off on land' while in the Western Division, storages can capture up to 100 per cent on land'.[683]

Committee comment

5.77 The committee recognises the work of the NSW Government in identifying and investigating the potential of existing water storages to be augmented to increase storage capacity, as achieved by the Chaffey Dam upgrade. The committee sees merit in exploring the potential augmentation of Burrinjuck Dam and other projects within the four priority catchments as identified by Infrastructure NSW. This would help improve the reliability of available water in the Murrumbidgee for irrigators.

677 Submission 48, NSW Government, p 13.

678 Submission 48, NSW Government, p 7.

679 Evidence, Mr Michael Murray, General Manager, Cotton Australia, 2 June 2017, p 3; Submission 94, Cotton Australia, p 8.

680 Submission 3, Broken Hill Darling River Action Group / Broken Hill Menindee lakes We Want Action Facebook Group, p 5.

681 Evidence, Mr Bill Fulkerson, North Milk Supply Officer, Norco, 1 August 2017, p 53.

682 Department of Primary Industries – Water, *Harvestable rights – dams,* http://www.water.nsw.gov.au/water-licensing/basic-water-rights/harvesting-runoff

683 Department of Primary Industries – Water, *Harvestable rights – dams*, http://www.water.nsw.gov.au/water-licensing/basic-water-rights/harvesting-runoff

Recommendation 35

That the NSW Government:

(a) conduct a feasibility study into the augmentation of Burrinjuck Dam, and
(b) subject to the findings of the feasibility study, construct a new dam wall or extend the existing dam wall for Burrinjuck Dam.

5.78 We acknowledge the considerations associated with planning and building new water storages such as location, environmental impacts, cost and output. Even though it has been thirty years since the last dam was built in New South Wales, the committee is of the view that new water storages could improve the supply of water as well as potentially capture supplementary and flood waters.

5.79 We note the concerns of stakeholders regarding the location of the proposed Cranky Rock dam and the impact it may have on the nearby Cliefden Caves. If the risks posed to the caves by the new dam can be mitigated or eliminated, then we would endorse the construction of the dam. Therefore the committee recommends that, pending the findings of the feasibility study conducted by WaterNSW, the NSW Government should construct a dam at Cranky Rock or other suitable location within the Lachlan River Valley, including the augmentation of existing water storages.

Recommendation 36

That the NSW Government, subject to the findings of the WaterNSW feasibility study, construct a dam at Cranky Rock, or other suitable location within the Lachlan River Valley, including the augmentation of existing water storages.

5.80 The committee commends the NSW Government's commitment to water efficiency practices and programs for the agricultural sector. The committee supports the ongoing provision of programs and incentives offered by the NSW Government in collaboration with the federal government. This includes the Irrigation Farm Modernisation Project which seeks to attain water savings by improving on-farm water use efficiency. The committee sees merit in the continuation of water efficiency programs and incentives to equip irrigators with the knowledge and tools to better adapt to a potential reduced water supply.

Recommendation 37

That the NSW Government support the continuation of the Irrigation Farm Modernisation Project and other programs and incentives offered in collaboration with the federal government to increase water efficiency in the agricultural sector.

5.81 We note the possible benefit that on-farm water storages may have in alleviating flood waters in flood prone regions by acting as a form of flood mitigation. The committee also acknowledges that on-farm water storages could also reduce the pressure on river systems and government dams during times of limited water supply. We therefore urge the NSW

Government to conduct a study into the benefits of on-farm water storages and develop best practice guidelines for irrigators, and ensure this advice is in alignment with the Murray-Darling Basin Plan.

Recommendation 38

That the NSW Government conduct a study into the benefits of on-farm water storages and develop best practice guidelines for irrigators, and ensure this advice is in alignment with the Murray-Darling Basin Plan.

Managed aquifer recharge

5.82 Managed aquifer recharge was presented to the committee as another possible scheme for the augmentation of water. It is the 'intentional recharge of an aquifer under controlled conditions, either by injection or infiltration, in order to store a water source for later abstraction and use (indirect reuse) or for environmental benefit'.[684] See figure 8 for a visual representation of how managed aquifer recharge occurs.

5.83 Managed aquifer recharge systems provide storage and treatment for natural water sources such as surface water and groundwater; recycled water such as urban stormwater, industrial or urban wastewater; and desalinated seawater.[685]

5.84 According to Golder Associates, which provides consulting, design, and construction services in specialist areas of earth, environment, and energy, managed aquifer recharge can be used to secure water in regional Australia, by acting as an alternative water storage system whereby water can be stored underground in times of high flow for use during dry periods. It also supports environmental flows by 'allowing increase in sustainable abstraction for agricultural use in another location within the catchment'.[686]

5.85 To inject and extract water from an aquifer, a licence is required with the extraction being part of the normal groundwater extraction allocation.[687]

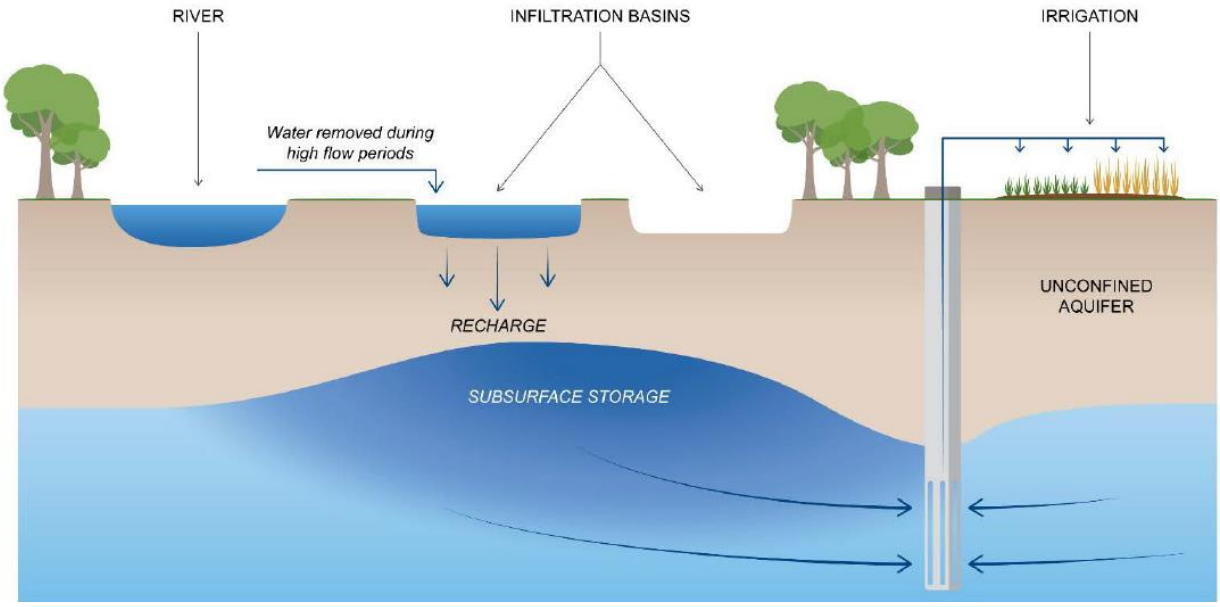
684 Tabled document, Golder Associates, *Managed Aquifer Recharge: Understanding a sustainable, practical approach to Integrated Water Management*, 22 February 2017, p 2.

685 CSIRO, Managed Aquifer Recharge, https://research.csiro.au/mar/.

686 Tabled document, *Managed Aquifer Recharge: Understanding a sustainable, practical approach to Integrated Water Management*, p 15.

687 Evidence, Dr Declan Page, Group Leader – Groundwater Contamination and Remediation Technologies, CSIRO, 2 June 2017, p 16.

Figure 8 Conceptual representation of a managed aquifer recharge system showing capture of flood flow, recharge/reinjection and recovery for irrigation[688]



5.86 Inquiry participants noted several advantages of managed aquifer recharge for Australia's future water supply such as: reducing evaporative losses; improving water quality and supply; and providing low cost and low environmental impacts compared to dams and other diversion systems.[689]

5.87 The International Association of Hydrogeologists highlighted the advantages of managed aquifer recharge, including 'increased water security, improved protection of groundwater-dependent ecosystems … avoidance of saline intrusion in coastal aquifers, and increasing productive use of water'.[690]

5.88 Similarly, Dr Stuart Khan, Associate Professor, UNSW Water Research Centre and School of Civil and Environmental Engineering, University of NSW, expressed the view that recycled water could enhance water supply security for rural and regional New South Wales during the next drought. He suggested government could 'foster community understanding, develop the capacity of government agencies to identify the opportunities, and expand the regulatory capability to assess and safely regulate diverse water supply systems'.[691]

688 Tabled document, *Managed Aquifer Recharge: Understanding a sustainable, practical approach to Integrated Water Management*, p 3.

689 Tabled document, *Managed Aquifer Recharge: Understanding a sustainable, practical approach to Integrated Water Management,* pp 4 and 17; Evidence, Dr Stuart Khan, Associate Professor, UNSW Water Research Centre and School of Civil and Environmental Engineering, University of NSW, 7 November 2016, pp 22-23; CSIRO, Managed Aquifer Recharge, https://research.csiro.au/mar/; Answers to supplementary questions, International Association of Hydrogeologists, 11 October 2017, p 2.

690 Answers to supplementary questions, International Association of Hydrogeologists, 11 October 2017, p 2.

691 Evidence, Dr Khan, 7 November 2016, p 21.

Considerations and concerns with aquifer management and recharge

5.89 Inquiry participants voiced a number of considerations and concerns about aquifer management and recharge, including governance, mapping, and cost-benefit of aquifer recharge.

5.90 Golder Associates noted a number of potential challenges to the establishment of managed aquifer recharge systems including: management of water quality; support from the community, water users and other stakeholders; over-reliance on desktop studies; and 'aligning the regulatory framework supporting implementation of managed aquifer recharge'.[692]

5.91 For example, Mr Michael Murray, General Manager, Cotton Australia, questioned how aquifer recharge fits within the current water management framework: 'Every drop of water is allocated at the moment to either the environment or to extractive uses of one form or another. Therefore, any change requires a change in shares.'[693]

5.92 The International Association of Hydrogeologists explained that managed aquifer recharge schemes would require 'a level of governance such as water accounting and water quality monitoring to ensure … [no] adverse impacts on other surface water users'.[694]

5.93 It also stated that 'excessive recharge and extraction' of numerous aquifer sites in one area should be avoided to prevent: over-pressurisation of an aquifer; an elevation of the water table to unacceptable levels; and/or the drawing down of 'groundwater to levels that adversely impact on other users'.[695]

5.94 The International Association of Hydrogeologists acknowledged that even the injection of 'high quality water into an aquifer could cause geochemical reactions or introduce contaminants that may impact on the uses of recovered water and of other users of the aquifer'.[696]

5.95 Gwydir Valley Irrigators Association Inc., also advised that a 'cautious "precautionary" approach' should be used when considering the 'application of aquifer recharge due to potential risks to other water sources'.[697]

5.96 Mr Austin Evans, Administrator, Murrumbidgee Council told the committee that the council was 'very, very wary of aquifer recharge' due to the potential risk of contamination. He said it was hard to shift community fear when the threat far outweighed the benefits of aquifer recharge.[698]

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692 Tabled document, *Managed Aquifer Recharge: Understanding a sustainable, practical approach to Integrated Water Management,* p 18.

693 Evidence, Mr Murray, 2 June 2017, pp 2 and 6.

694 Answers to supplementary questions, International Association of Hydrogeologists, 11 October 2017, p 2.

695 Answers to supplementary questions, International Association of Hydrogeologists, 11 October 2017, p 2.

696 Answers to supplementary questions, International Association of Hydrogeologists, 11 October 2017, p 2.

697 Submission 109, Gwydir Valley Irrigators Association Inc. p 15.

698 Evidence, Mr Austin Evans, Administrator, Murrumbidgee Council, 28 February 2017, p 10.

5.97 Mr Mark McKenzie, Chief Executive Officer, NSW Irrigators Council, told the committee that the council was not against aquifer recharge but that any aquifer recharge proposal had to 'stack up in terms of a business case and on the technicality of the potential down sides. If aquifer reinjection were to have an impact on the quality of water and the use of that water as a result in groundwater systems we would have a concern'.[699]

5.98 The NSW Government was of the view that there was still a way to go before the department would feel comfortable in undertaking aquifer recharge. While it did not think it was impossible, there are no 'specific large projects looking at aquifer interference across the State at the moment'.[700]

Concerns with re-injection from extractive industries

5.99 A number of stakeholders opposed the potential re-injection of treated water from the gas extraction industry due to the danger it posed to aquifers in terms of pollution. Stakeholders also opposed the financial credit the gas extractive industry would receive for doing so.[701]

5.100 The Lock the Gate Alliance argued that the government's consideration of allowing extractive industries to re-inject water for credits was contrary to the framework and objects established by the *Water Management Act 2000*.[702]

5.101 The NSW Irrigators Council urged 'extreme caution' towards the proposal of water reinjection by extractive industries into aquifers due to the unknown impacts it would have on 'aquifer water quality' and the 'limited knowledge of the hydrology of aquifers and potential for aquifer spoilage or interference'.[703]

5.102 Similarly, Gwydir Valley Irrigators Association Inc voiced 'serious concerns' about the lack of 'independent information on the impacts to water aquifers' as a result of coal seam gas extraction.[704]

5.103 Dr Rex Stanton, an academic, was of the view that was no evidence to confirm that coal seam gas extraction methods did not or would not 'significantly affect the long term capacity to extract good quality water from aquifers'. He added that 'unless the negative impacts of CSG extraction can be adequately demonstrated to be reversible, expansion of CSG operations should be halted, particularly if there is intent to rely upon underground aquifers for future potable water supplies'.[705]

5.104 Mr Anthony Pickard was concerned about the 'long term ramifications … on the environment [and] existing ground and surface water quality' if extractive industries began re-injection into

699 Evidence, Mr Mark McKenzie, Chief Executive Officer, NSW Irrigators Council, 17 May 2017, p 27.

700 Evidence, Mr Gavin Hanlon, Former Deputy Director General, Department of Primary Industries, 5 June 2017, p 45.

701 Submission 33, Name suppressed, p 1; Submission 41, Ms Keelah Lam, p 1; Submission 38, Coonabarabran residents against CSG, p 1; Submission 72, The Wilderness Society Newcastle, p 2.

702 Submission 46, Lock the Gate Alliance, p 3.

703 Submission 85, NSW Irrigator's Council, p 3.

704 Submission 109, Gwydir Valley Irrigators Association Inc. p 26.

705 Submission 65, Dr Rex Stanton, p 1.

aquifers. He also questioned what the socioeconomic impacts would be if it created 'adverse conditions'.[706]

5.105 As several inquiry participants noted the 'reinjection of treated or untreated water from gas production or extraction has the high potential to negatively impact the beneficial use characteristics of surface and groundwater systems, rivers and wetlands in inter-connected groundwater systems'.[707] Such a process could then leave aquifers that make up the 'southern discharge zone of the Great Artesian Basin, on which many landholders rely', open to contamination.[708]

5.106 It was also unknown where such water would migrate over the longer term as well as the potential impacts on surface waters and wildlife.[709]

5.107 Furthermore, some inquiry participants spoke of the 2015 Federation of American Scientists investigation of the 'impacts of aquifer reinjection and reported the technique could be behind the rapid increase in seismic activity [in the United States]'.[710]

Aquifer identification

5.108 A number of inquiry participants commented on the viability of managed aquifer recharge across the state citing lack of knowledge of aquifer sites.

5.109 Ms Hayley Greenham, Consultant, W. J. & A Seery Partnership, said there was a 'significant lack of knowledge of … local aquifers and their boundaries'. This made aquifer mapping extremely important in the Moree area as any contamination to the groundwater supply from coal seam gas production 'would render this entire water augmentation process as worthless'.[711]

5.110 Cr Bill West, Mayor, Cowra Shire Council and board member of Centroc stated that identifying the location and capacity of aquifers was essential to knowing how to best manage them. Cr West expressed the view that it would only be after this identification process that the government could consider investigating recharge on a regional and aquifer basis.[712]

5.111 This was echoed by Ms Jon-Maree Baker, Executive Officer, Namoi Water who advised a higher understanding of geological structures in the Namoi region would be needed before any support could be shown towards managed aquifer recharge.[713]

706 Submission 35, Mr Anthony Prickard, p 2.

707 Submission 33, Name suppressed, p 1; Submission 38, Coonabarabran residents against CSG, p 1; Submission 72, The Wilderness Society Newcastle, p 3.

708 Submission 33, Name suppressed, p 2; Submission 38, Coonabarabran residents against CSG, p 1.

709 Submission 33, Name suppressed, p 2; Submission 38, Coonabarabran residents against CSG, p 1.

710 Submission 31, Mrs Caroline Goosen, p 1; Submission 33, Name suppressed, p 2; Submission 38, Coonabarabran residents against CSG, p 1; Submission 41, Ms Keelah Lam, p 1; Submission 68, Armidale Action on Coal Seam Gas and Mining, p 1; Submission 72, The Wilderness Society Newcastle, p 2.

711 Evidence, Ms Hayley Greenham, Consultant, W. J. & A Seery Partnership, 15 May 2017, pp 28 and 30.

712 Evidence, Cr West, 17 May 2017, p 4.

713 Evidence, Ms Jon-Maree Baker, Executive Officer, Namoi Water, 16 May 2017, p 34.

5.112 According to the International Association of Hydrogeologists, the viability of managed aquifer recharge as a water source for New South Wales communities depended on 'mapping of managed aquifer recharge opportunities' and the provision of a 'regulatory regime that enables managed aquifer recharge to contribute to water supply and water security within the framework of water allocation plans.'[714]

5.113 The International Association of Hydrogeologists explained that mapping involved considering the types of water sources available for recharge and the hydrogeology of the areas under consideration.[715]

5.114 Dr Stuart Khan, Associate Professor, UNSW Water Research Centre and School of Civil and Environmental Engineering, University of NSW stressed to the committee that with aquifer recharge one could not 'simply pick up solutions from one city and drop them on another. There are very important local geographical considerations'.[716]

Cost efficiency of aquifer recharge

5.115 The NSW Irrigators Council stated that aquifer recharge as a potential storage option would 'require individual feasibility studies, and technical and cost - benefit analysis on an aquifer-by-aquifer basis'.[717]

5.116 Dr Declan Page, Group Leader - Groundwater Contamination and Remediation Technologies, CSIRO, advised that some of the cost benefits of managed aquifer recharge were hard to place in an economic model due to the benefits not always being monetary as exemplified by a case in Alice Springs:

> … in Alice Springs they wanted to look at aquifer recharge because the discharge was going to a swamp which was causing dengue fever outbreaks. It is a really difficult thing to bring into an economic model the avoided costs of having no dengue fever.[718]

Upscaling from studies to pilot programs

5.117 The committee heard of the importance of moving to pilot programs of managed aquifer recharge rather than further desktop studies where the full outcomes of aquifer recharge could not always be recognised.

5.118 Mr Scott Fidler, Regional Manager, Queensland, Golder Associates, said 'moving to trials in the field to study the practical application [of managed aquifer recharge] … would be the next step, rather than more studies'. This would assist in learning the potential of each location and likelihood of up-scaling the pilots to full-scale schemes.[719]

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714 Answers to supplementary questions, International Association of Hydrogeologists, 11 October 2017, p 1.

715 Answers to supplementary questions, International Association of Hydrogeologists, 11 October 2017, p 1.

716 Evidence, Dr Khan, 7 November 2016, p 24.

717 Submission 85, NSW Irrigators Council, p 3.

718 Evidence, Dr Page, 2 June 2017, p 20.

719 Evidence, Mr Scott Fidler, Regional Manager, Queensland, Golder Associates, 2 June 2017, p 28.

5.119 Mr Doug Brown, Water Management Specialist and Hydrogeologist, Golder Associates (New Zealand), added that there was no requirement to undertake large scale projects when small pilots could provide the same information about feasibility and scalability.[720]

5.120 This was supported by Dr Peter Main, Private researcher, and the International Association of Hydrogeologists who suggested pilot programs of managed aquifer recharge systems was the best way to advance knowledge and experience,[721] particularly in relation to 'design, operation, monitoring and governance'.[722]

5.121 Dr Declan Page, Group Leader – Groundwater Contamination and Remediation Technologies, CSIRO, told the committee of successful managed aquifer recharge projects in other jurisdictions, in particular Western Australia with Perth establishing the Beenup aquifer storage transfer and recovery project whereby reclaimed water or treated wastewater became part of the potable water supply:

> Perth uses predominantly groundwater supplies for its town water supply and it has a diminishing groundwater resource due to over-extraction, so it needed to somehow augment that supply. It went through various options—it has done desalinisation as well—but after a three-year trial it came to develop this technology where it highly treats its wastewater and injects it at one part of the aquifer and then can extract it later on from another part. … it is now looking at 14 gigalitres a year recharge.[723]

5.122 In New South Wales, the regional towns of Orange in the central west, and Broken Hill in the far west have given consideration to managed aquifer recharge as part of investigations into increasing water storage capacity and reliability of water supply.

Case study Orange City Council investigations into managed aquifer recharge

In 2011, Orange City Council investigated the potential of managed aquifer recharge as part of a study to increase water storage capacity for the local government area. It was proposed that a trial project would be conducted over a five year period which would increase operational knowledge of managed aquifer recharge as an effective form of water storage and confirm the ability of the Lachlan Ford Belt fracture rock aquifer to store and retrieve 20 gigalitres of water.[724]

In 2014, Orange City Council estimated the managed aquifer recharge trial project would cost $2.36 million.[725]

720 Evidence, Mr Doug Brown, Water Management Specialist and Hydrogeologist, Golder Associates (New Zealand), 2 June 2017, p 29.

721 Evidence, Dr Peter Main, Private researcher, 2 June 2017, p 22.

722 Answers to supplementary questions, International Association of Hydrogeologists, 11 October 2017, p 1.

723 Evidence, Dr Page, 2 June 2017, p 15.

724 See Correspondence from Mr Wayne Beatty, Water and Sewerage Strategic Manager, Orange City Council, to committee, 21 April 2017, *Orange City Council, Business Case Managed Aquifer Recharge,* 15 June 2011, pp 1-10; Correspondence from Mr Wayne Beatty, Water and Sewerage Strategic Manager, Orange City Council, to committee, 3 May 2017, *Orange City Council and Central Tablelands Water, Restart NSW, Water Security for Regions 2014-2015, Round 2 Submission, Potable Water Supply Pipeline – Orange-CTW*, 2014, pp 21-24.

725 Correspondence from Mr Wayne Beatty, Water and Sewerage Strategic Manager, Orange City Council, to committee, 3 May 2017, *Orange City Council and Central Tablelands Water, Restart NSW,*

Mr Wayne Beatty, Deputy Chair, Water Utilities Alliance, Centroc, said moving to stage two of the managed aquifer recharge trial would require external funding. He noted that the trial was included in Orange City Council's long term management plan.[726]

Case study Investigations into managed aquifer recharge in Broken Hill[727]

In 2013, Geoscience Australia and the CSIRO published a report that identified a site, called Talyawalka, near Broken Hill for managed aquifer recharge. This was put forward as a less costly alterative to the proposed Broken Hill pipeline.

The investigations included bore drilling and airborne geophysics measurements which measured the salinity of the ground water and the estimated volume of fresh water in the aquifer. The investigations found that the aquifer had an estimated minimum storage of 60 gigalitres and a maximum storage of 200 gigalitres, which would provide between six to 20 years of supply for Broken Hill. Although, the investigation noted that the rate of replenishment of the freshwater aquifer was unknown. It was proposed that recharge of the aquifer would be via wells.

However, in 2016 the Department of Primary Industries – Water identified the Renmark Group aquifer site on the north eastern side of Lake Menindee as the preferred site, instead of Talyawalka, even though it was a 'much deeper aquifer containing saline groundwater that would require desalination if it was to be used as a drinking water supply'. Since then, no information has been provided as to why the Talyawalker site was ruled out as a viable option. According to the International Association of Hydrogeologists the only publically available data is that of comparisons to a very inferior groundwater option and not the extensively scrutinised Geoscience and CSIRO site.

Committee comment

5.123 The committee acknowledges that the current level of knowledge and understanding about aquifer locations and sizes across the state is lacking. This presents a major challenge to those communities who wish to investigate the potential of aquifers for water storages.

5.124 We therefore recommended in the summary of key issues at recommendation 10:

- That the NSW Government invest in aquifer mapping across the state to locate potential new water storages.

5.125 The concerns of stakeholders regarding the NSW Government's consideration of aquifer re-injection by the coal seam gas sector and the possible consequences this poses to water quality are acknowledged by the committee. Knowledge about aquifer management and mitigating risks presents another area for research to instil confidence in managed aquifer recharge technology as a way forward for augmenting water supply.

Water Security for Regions 2014-2015, Round 2 Submission, Potable Water Supply Pipeline – Orange-CTW, 2014, pp 21-24.

726 Evidence, Mr Wayne Beatty, Deputy Chair, Water Utilities Alliance, Centroc, 17 May 2017, p 4.

727 Evidence, Dr Peter Dillon, Co-Chair, International Association of Hydrogeologists Commission on Managing Aquifer Recharge, 19 September 2017, pp 1-5; Media release, Dr Peter Dillon, Co-Chair of the International Association of Hydrogeologists Commission on Managing Aquifer Recharge – Adjunct Professor National Centre for Groundwater Research and Training at Flinders University, 'Scientists wade into Murray v Darling pipeline debate', 4 August 2017.

5.126 The committee notes that community confidence in the use of aquifers could be increased by upscaling desktop studies of managed aquifer recharge to small pilot studies to test the outcomes of viability. The committee sees great potential in the use of managed aquifer recharge in the future to secure water supply for rural and regional New South Wales.

5.127 We therefore recommended in the summary of key issues at recommendation 11:

- That the NSW Government invest in pilot programs to demonstrate the upscale capabilities of projects and new technology such as managed aquifer recharge schemes.

Chapter 6 Flood history and flood mitigation

This chapter briefly discusses the 50 year flood history in New South Wales including the financial and human costs, with a focus on the recent March-April 2017 floods in the Northern Rivers region of New South Wales. This is followed by an examination of flood mitigation technologies and tools.

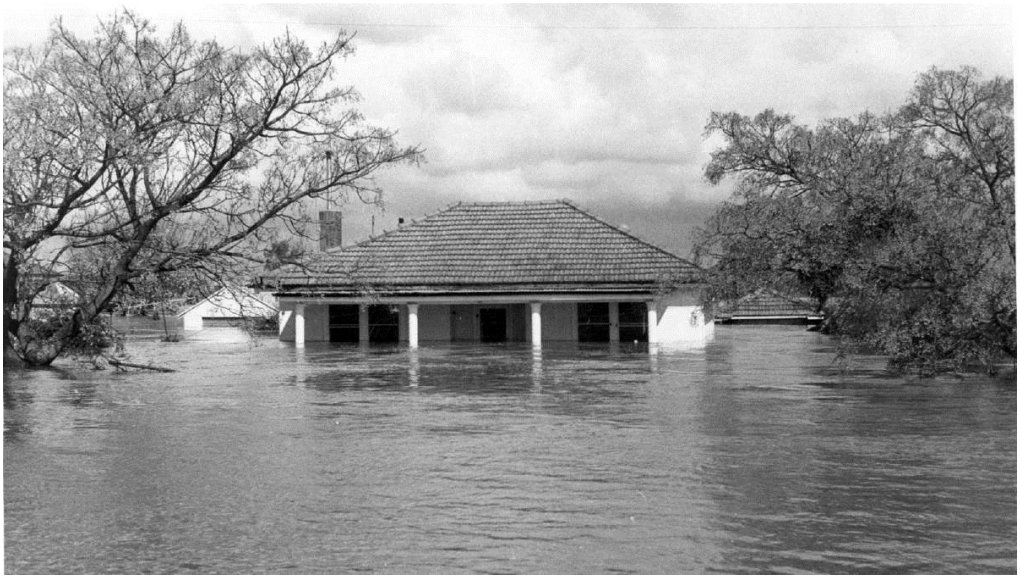
Flood history in New South Wales

6.1 Over the past 50 years, New South Wales has experienced some significant floods with even more significant impacts. There is no complete timeline of significant floods in New South Wales over the last 50 years. This section provides a brief overview of the flood history in New South Wales during this period.

6.2 The 1971 flood in the Peel, Namoi and Gwydir valleys left five people dead and caused extensive damage to stock, crops, roads and property in Gunnedah, Narrabri, Wee Waa and Moree.[728]

6.3 In 1974, Wagga Wagga recorded its worst flood in 120 years with the water flowing over the spillway of Burrinjuck Dam which was said to equal half the capacity of the storage.[729]

Figure 9 Flood water inundates a home in 1974. Picture: Regional Archives/Wagga and District Historical Society[730]



728 Emily O'Gorman, *Flood Country: An environmental history of the Murray-Darling Basin* (CSIRO Publishing, 2012), p 188; John Pigram, *Australia's water resources: from use to management* (CSIRO Publishing, 2006), p 35.

729 John Pigram, *Australia's water resources: from use to management* (CSIRO Publishing, 2006), p 35.

730 The Daily Advertiser, *Gallery: Historic Wagga floods* (20 January 2016), http://www.dailyadvertiser.com.au/story/1583702/gallery-historic-wagga-floods/#slide=54.

Figure 10 The water was unstoppable in 1974. Picture: Regional Archives/Wagga and District Historical Society[731]

6.4 The 1996 flood in northern New South Wales and south east Queensland, incurred insurance losses of $31 million and resulted in five deaths.[732]

6.5 In November 2011 and January 2012, Moree and surrounding shires were hit by floods which caused $40 million damage to public assets in the Moree shire alone, not including private assets and insurance payouts.[733]

6.6 In 2012, Yenda, a township 18km north east of Griffith, was heavily impacted by floods with losses estimated at $90 million and the human cost difficult to quantify. Flood waters remained for a long period due to the flat terrain.[734]

6.7 The Riverina was again hit by continual floods from May to October 2016. In the Griffith region 232 gigalitres of water moved through the system via Mirrool Creek.[735] This resulted in significant crop and irrigation infrastructure losses as well as road infrastructure damage which the Griffith, Narrandera and Carathool shire estimated at a cost of $9 million.[736]

731 The Daily Advertiser, *Gallery: Historic Wagga floods*, (20 January 2016), http://www.dailyadvertiser.com.au/story/1583702/gallery-historic-wagga-floods/#slide=65.

732 Bureau of Meteorology, *Severe weather and flooding South East Queensland May 1996*, p 3, http://www.bom.gov.au/qld/flood/fld_reports/se_qld_may1996.pdf; NSW Environment, Climate Change and Water, *Impacts of climate change on natural hazards profile, North Coast region December 2010,* p 5, file:///D:/My%20Documents/Downloads/10594CCNatHazardNthCoast.pdf.

733 Evidence, Ms Lila-Jane Fisher, Project and Development Manager, Moree Plains Shire Council, 15 May 2017, p 13.

734 Supplementary submission 17a, Griffith City Council, p 8; Evidence, Mr Graham Gordon, Director of Utilities, Griffith City Council, 1 March 2017, p 5.

735 Evidence, Ms Helen Dalton, President, NSW Farmers Association, 1 March 2017, p 13.

736 Evidence, Ms Dalton, 1 March 2017, p 13.

6.8 In Deniliquin, floods in September and October 2016, exacerbated by heavy rainfall and a large release from the Hume Dam, led to what some have described as a 'catastrophic' flood.[737] The Murray-Darling Basin Authority, in the lead up to the flood, had reduced the number of releases from the dam in order to reach and maintain 99 per cent full storage for the demands of irrigators and other entitlement holders later in the season.[738] It was argued that, if releases from the dam had been made earlier, more airspace would have been maintained, therefore lessening the significance and damage of the flood.[739]

6.9 In New South Wales, more than 100,000 buildings are at risk of flooding, with the average damage from flooding in coastal New South Wales and inland urban centres being around $200 million a year.[740]

6.10 Clarence Valley Council advised that since 1966, the Clarence River has experienced 29 floods of which 17 were major floods. In both 1974 and 1976, the local government area experienced four floods in each year and three floods in both 1967 and 2013.[741]

6.11 In terms of the human cost of floods, Clarence Valley Council advised that post-flood clean-up as well as mental health problems related to flooding and post-flood recovery was significant, while financial costs were most evident in the agricultural, transport and tourism sectors:

> Agricultural financial impacts are usually associated with the loss of crops, livestock, fences, machinery, etc. Transport impacts are associated with the closure of key transport routes resulting in the very long truck 'parking' areas either side of locations such as Grafton. The tourism industry impacts are both short-term (cancellations of bookings) and longer term with potential of a tarnished tourism image.[742]

6.12 Likewise, Tweed Shire Council stated that in the last 50 years, the Tweed Valley had experienced 11 flood events which exceeded the major flood classification at Murwillumbah. While half of these floods occurred in the 1970's, the biggest flood was in March 2017, which exceeded the previous record from 1954.[743]

6.13 Tweed Shire Council estimated the damage to public infrastructure caused by the March 2017 flood to be in excess of $34.6 million with the impacts on residential communities, business and industry, and public infrastructure being widespread and severe.[744]

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737 Evidence, Ms Louise Burge, Vice Chair and Executive Officer, Murray Valley Private Diverters, 28 February 2017, pp 36 and 40.

738 Evidence, M Burge, 28 February 2017, p 36; Karl Hoerr, 'NSW flooding leaves rural town of Deniliquin devastated, community set to feel impact for months', *ABC News*, 16 October 2016.

739 Evidence, Ms Burge, 28 February 2017, p 36; Karl Hoerr, 'NSW flooding leaves rural town of Deniliquin devastated, community set to feel impact for months', *ABC News*, 16 October 2016.

740 Office of Environment and Heritage, *Assessing Cumulative Flood Risk in Large Urban Release Area in the Camden Local Government Area in Sydney's South West* (2013), http://www.floodplainconference.com/presentations2013/11C-3-Sue-Ribbons.pdf.

741 Submission 86, Clarence Valley Council, p 2.

742 Submission 86, Clarence Valley Council, p 3.

743 Submission 116, Tweed Shire Council, p 7.

744 Submission 116, Tweed Shire Council, pp 7 and 16.

6.14 Although Byron Shire were not as badly affected as Lismore and Tweed, the floods still caused a significant impact on the community, with the damage to public infrastructure estimated to be $5 million.[745]

Lack of understanding about flood risks

6.15 Tweed Shire Council, Lismore City Council, Kyogle Council, Byron Shire Council, and Clarence Valley Council all agreed to varying degrees that large percentages of North Coast populations:

- are naïve to flood threat and are unaware of emergency procedures
- live in areas that were zoned for habitation prior to good understanding of flood risk
- place overreliance on flood mitigation infrastructure
- undertake building modifications and uses without due consideration of flood risk.[746]

6.16 Mr David Oxenham, Director, Engineering, Tweed Shire Council, said 'constructing levees and flood mitigation works provides people with an enormous level of comfort, but it makes them somewhat removed from their environment'.[747]

6.17 Likewise, Mr Rod Haig, Strategic Engineer (Water and Waste Water), Lismore City Council expressed the view that the levees in the local government area had possibly 'caused some people to rely too heavily' on them for protection.[748]

6.18 This was echoed by Mr Troy Anderson, Director, Works and Civil, Clarence Valley Council, who reflected that 'levees and flood mitigation build a level of complacency' in the community.[749]

6.19 Mr Greg Mashiah, Manager, Water Cycle, Clarence Valley Council spoke of the misguided assumption that a number of residents had about the role of levees in flood mitigation:

> Our concern … is that every time you order an evacuation of a town that is protected by a levee and the levee is not overtopped, people are reinforced in their minds that they have been protected by the levee.[750]

6.20 Mr Oxenham suggested communities needed to be educated, with more information about 'floods and their effects and what they can do in a flood to mitigate the damage to their property and themselves'.[751]

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745 Evidence, Mr Peter Rees, Manager, Utilities, Byron Shire Council, 1 August 2017, p 13.

746 Submission 116, Tweed Shire Council, p 6; Evidence, Mr Rod Haig, Strategic Engineer (Water and Waste Water), Lismore City Council, 1 August 2017, p 5; Evidence, Mr Graham Kennett, General Manager, Kyogle Council, 1 August 2017, p 17; Evidence, Mr Rees, 1 August 2017, p 17; Evidence, Mr Troy Anderson, Manager, Water Cycle, Clarence Valley Council, 1 August 2017, p 23.

747 Evidence, Mr David Oxenham, Director, Engineering, Tweed Shire Council, 1 August 2017, p 18.

748 Evidence, Mr Haig, 1 August 2017, p 5.

749 Evidence, Mr Anderson, 1 August 2017, p 23.

750 Evidence, Mr Greg Mashiah, Manager, Water Cycle, Clarence Valley Council, 1 August 2017, p 23.

751 Evidence, Mr Oxenham, 1 August 2017, p 18.

6.21 However, Mr Mashiah noted it was an 'ongoing challenge for the State Emergency Service … and council … to try and increase public awareness of those issues and keep those issues in the forefront of people's minds'.[752]

Case study 2017 Lismore flood[753]

In Lismore on 31 March 2017 at 4am, the levee wall built in 2005 to defend against a 'one in ten year' flood was overtopped, inundating Lismore. Sudden changes in flood heights led to evacuation orders being given much earlier than anticipated with little time for residents to effectively make preparations. This was the second flood for the area within a month, as in early March Lismore experienced a flood which reached higher peaks in some localities. With two flood events in close proximity, farming and agricultural industries on the lower floodplain were hit by a 'double whammy effect'.

The estimated combined total damage of infrastructure and agriculture in the local government area was just under $40 million, with at least 68 per cent of businesses in the Lismore central business district suffering flood damage. In addition, 1,800 insurance claims were lodged in the Lismore local government area of which 90 per cent were domestic and the remaining 10 per cent were businesses.

Since the flood, Lismore City Council in conjunction with the State Emergency Service and other government agencies who responded to the emergency, have held internal debriefs to look at how the response occurred and what improvements could be made to future flood responses.

Similarly, Rous Water, the bulk water supply authority, was reviewing flood mitigation infrastructure and ways to better protect the community.

Flood mitigation

6.22 Inquiry participants put forward several proposals for mitigating flood damage to communities and industry as well as how to improve flood management and responses.

NSW Government policy

6.23 According to the Office of Environment and Heritage 'managing flooding is an important priority for the State Government and local councils in NSW'.[754]

6.24 The NSW Government's Flood Prone Lands Policy 1984 aims to 'reduce the impact, offloading and flood liability on individual owners and occupiers, and to reduce public and private losses resulting from flooding' through floodplain risk management plans.[755] These risk

752 Evidence, Mr Mashiah, 1 August 2017, p 23.

753 Stephen Nelson, 'Counting the cost and facing the future', Report on the 31 March 2017 natural disaster for the Lismore Business Flood Recovery Taskforce, 20 June 2017; Evidence, Mr Haig, 1 August 2017, pp 2-11; Evidence, Mr Michael McKenzie, Manager, Planning and Delivery, Rous Water, Rous County Council, 1 August 2017, pp 2-11.

754 NSW Office of Environment and Heritage, *Flood Risk in NSW*, 8 September 2015.

755 Submission 48, NSW Government, p 16.

management plans are the responsibility of local government and the Office of Environment and Heritage. The Office of Environment and Heritage is also responsible for the implementation of the policy, providing councils with technical, policy and financial assistance for the development and implementation of the plans.[756]

6.25 As part of the Intergovernmental Agreement on the Murray-Darling Basin Reform, a NSW Healthy Floodplains Project was initiated in 2010 to reform the management of water on floodplains through floodplain management plans in addition to the licensing of floodplain harvesting water extractions. The project allows for the development of rural flood management plans under the *Water Management Act 2000* and provides the framework for coordinating the development of flood works on a whole of valley basis.[757] The management of floodplain extractions is overseen by NSW Department of Primary Industries - Water.[758]

6.26 In April 2017, the Department of Primary Industries – Water announced the Floodplain Harvesting Policy (2013) which will licence water extractions from the designated floodplain.

6.27 The Healthy Floodplains Project has sought registrations of interest from landowners in the Gwydir, Border Rivers, Namoi, Macquarie and Barwon-Darling valleys.[759] In February 2017, Gwydir landowners received the proposed Floodplain Harvesting Access Licence entitlements.[760]

6.28 The NSW Government has also committed to Hawkesbury-Nepean Valley Flood Risk Management Strategy; a $58 million investment to manage the risk posed by regional floods through increasing community flood risk awareness, improving flood evacuation road signage and working with the Bureau of Meteorology to improve flood forecasting as well as potentially raising the wall of Warragamba Dam.[761]

6.29 This was in response to the 2013 Standing Committee on State Development *inquiry into the adequacy of water storages in New South Wales* which recommended that the NSW Government publish the outcomes of its review of the potential role for Warragamba Dam in flood mitigation. This was based on stakeholder opinions that water storages could and should provide a facility for flood mitigation.[762]

6.30 The business case for the augmentation works at Warragamba Dam is due to be finalised in 2019, subject to planning approvals, with construction expected to take three to four years. It

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756 Submission 48, NSW Government, p 16.

757 Submission 48, NSW Government, p 18.

758 Submission 48, NSW Government, p 17.

759 NSW Department of Primary Industries – Water, *NSW Healthy Floodplains Project* (April 2017), http://www.water.nsw.gov.au/__data/assets/pdf_file/0009/548028/recovery_stb_healthy_floodplains_project.pdf.

760 NSW Department of Primary Industries – Water, *NSW Healthy Floodplains Project* (April 2017), http://www.water.nsw.gov.au/__data/assets/pdf_file/0009/548028/recovery_stb_healthy_floodplains_project.pdf.

761 Submission 48, NSW Government, p 17.

762 Standing Committee on State Development, *NSW Legislative Council, Adequacy of water storages in NSW* (2013), p 32.

would see the dam wall raised by 14 metres to 'prevent a potential flood disaster in western Sydney'.[763]

Dams as flood mitigation tools

6.31 The role of dams as a flood mitigation tool was questioned by inquiry participants. While some argued greater airspace and new dams would offer flood mitigation benefits, others argued this was contrary to the design and purpose of dams.

6.32 According to the Department of Primary Industries – Water, dams can 'provide a valuable resource during flood times by holding back water, delaying and reducing flood peaks downstream'.[764]

6.33 One submission author argued flood peaks in the Macleay River valley could be controlled by managing dam levels. It was suggested that for effective flood control to occur, there should be at least three dams in the catchment area: one to the north west, one to the west and one in the south west.[765]

6.34 The NSW Farmers Association suggested that the construction and/or augmentation of water storages could play a role in flood mitigation.[766] Ms Helen Dalton, Board member, Executive Council, NSW Farmers Association Griffith Branch expressed the view that increasing the storage capacity of Burrinjuck Dam would assist with flood mitigation. She explained that a new dam wall further downstream would 'give greater control for flood mitigation'.[767]

6.35 Meanwhile, the Murray Valley Private Diverters argued that the 'NSW Government must consider flooding risks in the management of major water storages and its decisions related to Murray-Darling Basin Authority environmental flows'.[768] It was of the view that a new dam (proposed Buffalo Dam) at the headwaters of the Ovens River would 'provide significant environmental water management benefits and flood risks benefits' in the Murray and Edward Wakool system.[769]

6.36 The NSW Government indicated that while storages were built for the purpose of irrigation, they did have a small ability to take the peaks off flood through airspace.[770] Mr David Harris, Chief Executive Officer, Water NSW, advised that there are two airspace operations currently in place at Burrendong Dam, upstream of Wellington in the central west, and Glenbawn Dam,

763 Sean Nicholls, 'Warragamba Dam wall to be raised to avoid catastrophic flood event', *The Sydney Morning Herald*, 17 June 2016.

764 NSW Department of Primary Industries - Water, *Dams*, http://www.water.nsw.gov.au/realtime-data/storages.

765 Submission 16, Name suppressed, p 2.

766 Submission 52, NSW Farmers Association, p 9.

767 Answers to questions on notice, Ms Helen Dalton, Board member, Executive Council, NSW Farmers Association Griffith Branch, 21 March 2017, p 1.

768 Submission 76, Murray Valley Private Diverters, p 18.

769 Submission 76, Murray Valley Private Diverters, p 18.

770 Evidence, Mr Gavin Hanlon, Former Deputy Director General, Department of Primary Industries, 5 June 2017, p 36.

near Scone in the Hunter Valley.[771] Burrendong Dam has a potential 489,000 megalitres of air space for flood mitigation while Glenbawn Dam has a potential capacity of 120,000 megalitres for flood mitigation.[772]

6.37 Water NSW further added that it 'continuously updates its airspace procedures with the latest weather and flood forecasting information systems … [allowing] WaterNSW to operate greater airspace in dams prior to floods without increasing risk to water security'.[773]

6.38 However, the Australian Water Exploration Co noted that most dams are for water supply storages rather than flood mitigation which is demonstrated by the fact that dams are not provided with flood gates for discharge control.[774]

6.39 The Australian Water Exploration Co referred to the Murray-Darling Basin Authority which prioritises the function of water supply dams in the following way: 'protect the structural integrity and safety of the dam; then maximise water availability; and then limit flood damage to downstream communities and increase benefits to the environment and public amenities'.[775]

6.40 Mr Austin Evans, Administrator, Murrumbidgee Council stated the 'harsh reality' was that dams were never built to be used for flood mitigation.[776]

6.41 Mr James Morrison, Member, Clarence Environment Centre, expressed the view that it was contradictory for dams to serve both purposes:

> [dams] cannot be both a flood mitigation device as well as provide water for irrigation, because to mitigate floods they have got to be kept empty, and to provide water for irrigation needs optimally they should be kept full.[777]

6.42 Tweed Shire Council explained that even if dams were designed for flood mitigation it would not guarantee flood prevention:

> Existing and future dams can only control small percentages of the overall floodplain catchment. So even if they are designed for flood mitigation and control, and there is available storage, other floodplain tributaries can still cause flooding downstream.[778]

771 Evidence, Mr David Harris, Chief Executive Officer, Water NSW, 5 June 2017, p 36.

772 Water NSW, *Our dams*, http://www.waternsw.com.au/supply/visit.

773 Answers to questions on notice, Water NSW, 14 July 2017, p 1.

774 Answers to supplementary questions on notice, Australian Water Exploration Co, 30 June 2017, p 1.

775 Answers to supplementary questions on notice, Australian Water Exploration Co, 30 June 2017, p 1.

776 Evidence, Mr Austin Evans, Administrator, Murrumbidgee Council, 28 February 2017, p 14.

777 Evidence, Mr James Morrison, Member, Clarence Environment Centre, 1 August 2017, p 58.

778 Submission 116, Tweed Shire Council, p 8.

Flood mitigation technology

6.43 The committee heard evidence regarding technologies available to mitigate flood damage, including diversion schemes that were currently in operation and proposed for the future, and stormwater management.

6.44 Both Clarence Valley Council and Moree Plains Shire Council spoke of the benefits of computer modelling for flood mitigation studies.

6.45 Clarence Valley Council advised that in 2011, it 'completed a detailed flood levee overtopping study' using computer modelling which led to confined evacuations during the 2013 floods.[779]

6.46 Ms Lila-Jane Fisher, Project and Development Manager, Moree Plains Shire Council, explained that computer modelling had assisted the council in identifying Copeton Dam as one option for mitigating low flood events.[780] Ms Fisher also stated that computer modelling could determine the effectiveness of flood diversion systems and assess the adverse impacts on downstream properties.[781]

6.47 Innovyze, a software provider working in the urban and regional water sector for over 20 years, advised of the industry leading software tools that can assist with real time flood forecasting and calculating flood damage.[782] Innovyze reflected that '[t]raditionally, flood management policies have been based on the design standard approach, where policy makers decide on an appropriate protection level to be achieved … In contrast, flood management policies based on risk, focus on the consequences of flood events and the best alleviation measures over a given time period'.[783]

6.48 Meanwhile, Tweed Shire Council informed the committee that there were 'few new mitigation works that would have a benefit in reducing the costs of flood damages relative to their cost to implement'. Instead, Tweed Shire Council were focusing on 'better development controls to promote more flood compatible land uses, while allowing natural floodplain processes to continue unhindered, as well as enhanced flood warning, emergency response planning and community flood awareness'.[784]

6.49 One submission author spoke of the flood mitigation scheme in the Macleay River valley. He advised that when managed correctly, the scheme did provide some control during minor and moderate floods, but was not effective in major floods. This led to regular and often 'disastrous' flooding.[785]

6.50 Meanwhile in the Riverina, the Griffith City Council Flood Plain Management Committee was seeking funding approval from the NSW Office of Environment and Heritage for an Early Warning and Emergency Canal Breaching Protocol. This protocol is a result of the cross flow

779 Submission 86, Clarence Valley Council, p 2.

780 Evidence, Ms Fisher, 15 May 2017, p 13.

781 Evidence, Ms Fisher, 15 May 2017, p 13.

782 Submission 67, Innovyze, p 1.

783 Submission 67, Innovyze, p 6.

784 Submission 116, Tweed Sire Council, p 8.

785 Submission 16, Name suppressed, p 1.

flood gates at the junction of Mirrool Creek and the Main Canal, 8 kilometres east Yenda, failing to mitigate the 2012 flood due to the de-commissioning of the flood gates in the late 1990s.[786] This would be one short term flood mitigation strategy 'incorporating new technology such as Bureau of Metrology rain forecasting, metering gauges and an emergency canal breaching protocol design to breach the Main Canal at strategic timing and location to prevent Yenda flooding again'.[787]

Stormwater harvesting as a flood mitigation tool

6.51 As mentioned in Chapter 2, during the inquiry, the committee visited the Orange City Council stormwater harvesting scheme for the purpose of looking at an example of innovative initiatives to increase water supply. The committee also learnt how stormwater management systems and stormwater harvesting schemes can be integrated to achieve flood mitigation.[788] (Stormwater harvesting schemes are discussed in detail in Chapter 7).

6.52 Orange has two stormwater harvesting schemes – Ploughmans Creek and Blackmans Swamp Creek – which capture high flows during storm events. A key feature of Ploughmans Creek is that it uses four constructed wetlands to provide peak storm flow reduction and stormwater quality and quantity controls.[789]

6.53 The wetlands store a permanent volume of water. In rainfall events, when the storage top water level is reached, water is then discharged from the storage through pipework that passes under the wall of the wetlands. Because of the volume of water in the storage, the runoff into the storage is slowed and, as a result, the downstream flow is slowed.[790]

6.54 Orange City Council advised that each of the wetland systems includes air space that can capture a portion of the water runoff and release it slowly to reduce peak flows through the creek system.[791]

6.55 Before the construction of the Ploughmans Creek wetlands, Orange City Council conducted testing to measure how effective the wetlands would be in reducing peak flows. The results of the testing demonstrated that 'in most cases the reduction is more substantial in the more frequent events, 1 and 5 year ARI (Average Recurrence Interval) storms which would help protect the creek system during these more frequent events'.[792]

786 Submission 36, Yenda Flood Victims Association Inc, pp 1-2.

787 Submission 36, Yenda Flood Victims Association Inc, p 2.

788 Correspondence from Mr Wayne Beatty, Water and Sewer Manager (Strategic), Orange City Council, to secretariat, 11 April 2018.

789 Correspondence from Mr Wayne Beatty, Water and Sewer Manager (Strategic), Orange City Council, to secretariat, 11 April 2018; Submission 66, Central NSW Councils, pp 24-25.

790 Correspondence, from Mr Wayne Beatty, Water and Sewer Manager (Strategic), Orange City Council, to secretariat, 18 April 2018.

791 Correspondence from Mr Wayne Beatty, Water and Sewer Manager (Strategic), Orange City Council, to secretariat, 11 April 2018.

792 Correspondence from Mr Wayne Beatty, Water and Sewer Manager (Strategic), Orange City Council, to secretariat, 11 April 2018.

6.56 It is possible for dams and weirs to also be used as 'detention dams', similar to household stormwater systems, that merely slow the runoff flow, rather than 'retaining' the water as in a normal dam or weir.

Potential diversion of the Clarence River to the west

6.57 As mentioned in chapter 2, the suggestion of diverting the Clarence River west of the Great Dividing Range as a flood mitigation strategy for the Northern Rivers was debated by inquiry participants.

6.58 Clarence Valley Council advised that it had unanimously resolved six times not to support the diversion of the Clarence River.[793] The council stated the proposal could not be justified from an economic, environmental or social perspective'.[794]

6.59 Mr Troy Anderson, Director, Works and Civil, Clarence Valley Council informed the committee that the decision was also based on a *Healthy Rivers Commission inquiry into the Clarence* which identified the 'importance of regular flood events in terms of the fishing industry and also the cane industry'.[795]

6.60 Likewise, Tweed City Council did not think a diversion scheme to the Murray-Darling Basin or Western New South Wales was feasible or worth further investigation due to the catchment not being 'geographically compatible'.[796]

6.61 The Australian Water Exploration Co, an organisation dedicated to researching Australian water projects to meet the challenges of a dry continent, viewed an east to west diversion scheme as an essential flood mitigation strategy for the Clarence Valley. According to the Australian Water Exploration Co, the proposed diversion scheme would reduce flood damage in the Clarence; ease pressure on the river system; potentially slow down the rapid rise of the river; and allow for run-offs to be diverted into nearby dams during extreme rain events.[797]

6.62 The Australian Water Exploration Co and Griffith City Council noted that a Clarence River Diversion Scheme would require detailed assessment and studies to determine the impact of 'diverting and regulating large quantities of water annually'[798] in addition to the 'potential economic, social and population impacts'.[799]

6.63 Dr Rex Stanton, an academic, reflected that the benefits of diversion schemes had to outweigh the potential environmental impacts and infrastructure costs in order to be successful and worthwhile:

> [P]otential environmental impacts within a donor river valley resulting from diversion of typical water flows need to be weighed against the benefits potentially derived in the recipient areas. Capturing runoff from episodic events that would normally lead to

793 Evidence, Mr Anderson, 1 August 2017, p 26.

794 Submission 86, Clarence Valley Council, p 3.

795 Evidence, Mr Anderson, 1 August 2017, p 26.

796 Submission 116, Tweed Shire Council, p 8.

797 Supplementary submission 60a, The Australian Water Exploration Co, pp 8-9.

798 Answers to question on notice, Griffith City Council, 7 April 2017, p 2.

799 Supplementary submission 60a, The Australian Water Exploration Co, p 11.

> flooding would require strategically placed storage facilities with carefully planned trigger levels so that typical water flows down the length of the river are not adversely affected. The success of such a venture, and return on the capital outlay on infrastructure, would depend on the storage facilities being able to hold sufficient quantities to provide end users of the stored water with some certainty of regular annual supply from that source without need to harvest water outside of mitigation of flood events.[800]

Case study – Potential east to west diversion scheme[801]

The concept of diverting water inland from the coast was first proposed by Professor John Bradfield around 1928.

Some sixty years later, in 1983, Mr David Coffey proposed the diversion of water from the east coast of New South Wales to regions west of the Great Dividing Range. It was proposed that water would be diverted via a tunnel under the Great Dividing Range using gravity, see figures 11-13 for maps of the diversion scheme.

This diversion would serve a variety of purposes including the generation of hydroelectricity, supplying water to the Murray-Darling Basin, and flood mitigation for the Clarence Valley.

According to the Australian Water Exploration Co, the 'need for a project of this type still remains' with the organisation exploring and evaluating the opportunities offered by the project for both east and west. It estimated that 1,400 GL of water could be released into western inland catchments annually, if the upper Clarence tributary rivers were diverted west to the Gwydir River and Copeton Dam. This would help regional communities 'flourish' and 'contribute far more significantly to food production'. It was also of the view that the scheme could 'store more than six million megalitres of water on the Upper Clarence for use in dry times'.

The Australian Water Exploration Co argues the project would also 'produce better environmental outcomes for both east and west; ensure permanent water supplies to the Darling River; provide better management of the fishery industry on the Clarence River; … and help counteract the effects of severe drought sequences'.

Furthermore, the Australian Water Exploration Co suggested the east to west project could assist the NSW Government in meeting its goals under the State Infrastructure Study through: 'securing water supplies in high priority regional towns; and bringing all regional towns up to water quality and environmental standards'.

Improving flood mitigation, management and response

6.64 Local councils voiced their frustrations concerning flood mitigation planning, management and responses. Several suggestions were offered by inquiry participants as to how these frustrations could be alleviated.

800 Submission 65, Dr Rex Stanton, p 2.

801 Submission 60, The Australian Water Exploration Co; Submission 60, The Australian Water Exploration Co, Attachment 2; Supplementary submission 60a, The Australian Water Exploration Co; Tabled document, The Australian Water Exploration Co, *Proposed Construction – Clarence Basin/Copeton Dam Concept,* June 2017.

Oversight role

6.65 Stakeholders discussed the possibility of consolidating the powers of the various water agencies in the state into one oversight role.

6.66 Both Mr Anthony Burnham, Manager, Waste and Wastewater, Tweed Shire Council and Mr Graham Kennett, General Manager, Kyogle Council expressed the view that the Department of Primary Industries – Water should have an oversight role and veto power over all other agencies that deal with flood management services.[802]

6.67 Mr Burnham explained that the Department of Primary Industries would be best suited to this role as it had 'generally had that role without the power over the years and … had an understanding of our circumstances'.[803]

6.68 According to Mr Kennett, this 'type of regulatory reform for water bodies will provide a genuine partnership between State and local governments, and provide a clear direction for the industry into the future'.[804]

Funding issues

6.69 Both Tweed Shire Council and Kyogle Council were of the view that current funding provided by the state government for flood mitigation works and floodplain risk management plans, was insufficient and needed to be changed.[805]

6.70 Mr David Oxenham, Director, Engineering, Tweed Shire Council, suggested the state government focus on providing additional funding and opportunities to local governments to assist in making communities more resilient: 'An increase in the annual grant allocation for the Office of Environment and Heritage for the flood management program is well overdue. There need to be opportunities for multiple funding rounds'.[806]

6.71 Mr Kennett commented that despite all councils having floodplain risk management plans, the issue was not about a 'lack of knowledge about what needs to be done … [but] around the lack of funding to actually get these things done'.[807]

802 Evidence, Mr Kennett, 1 August 2017, p 14; Evidence, Mr Anthony Burnham, Manager, Waste and Wastewater, Tweed Shire Council, 1 August 2017, p 19.

803 Evidence, Mr Burnham, 1 August 2017, p 19.

804 Evidence, Mr Kennett, 1 August 2017, p 14.

805 Evidence, Mr Oxenham, 1 August 2017, p 12; Evidence, Mr Kennett, 1 August 2017, p 14.

806 Evidence, Mr Oxenham, 1 August 2017, p 12.

807 Evidence, Mr Kennett, 1 August 2017, p 14.

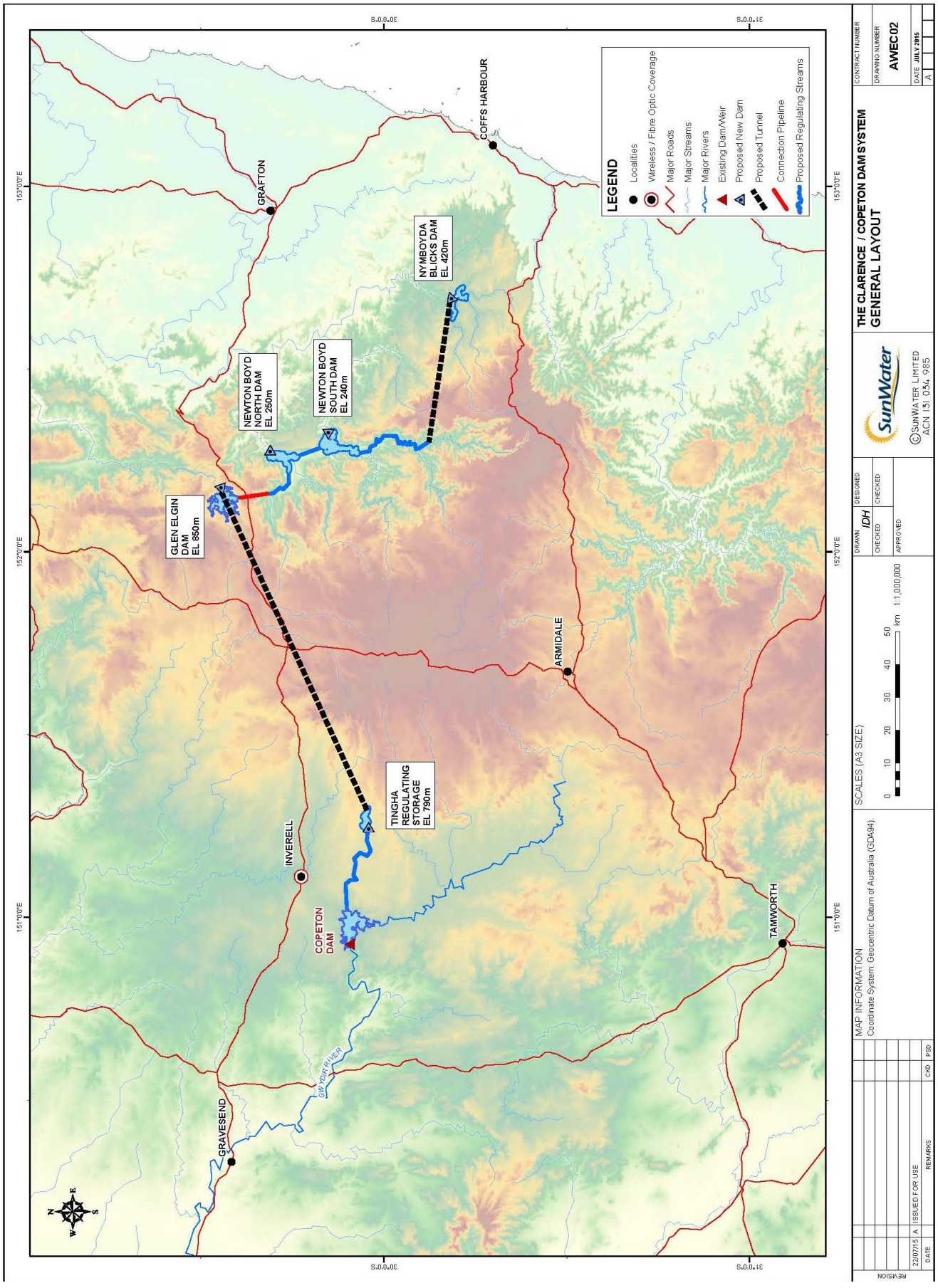


Figure 11 Map of the proposed east to west diversion scheme, Australian Water Exploration Co.

Figure 12 Clarence River Diversion Scheme Map 1, Griffith City Council

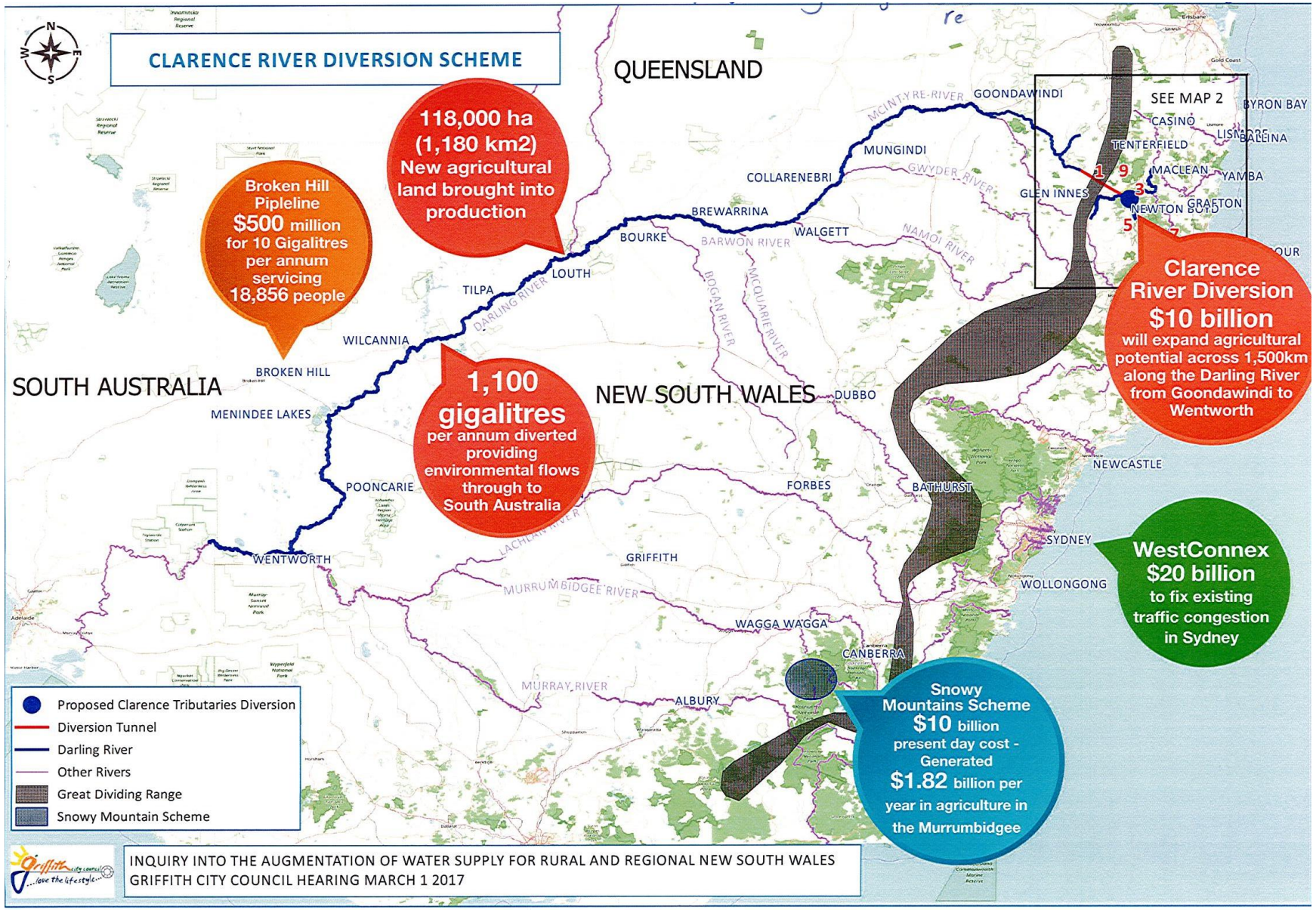
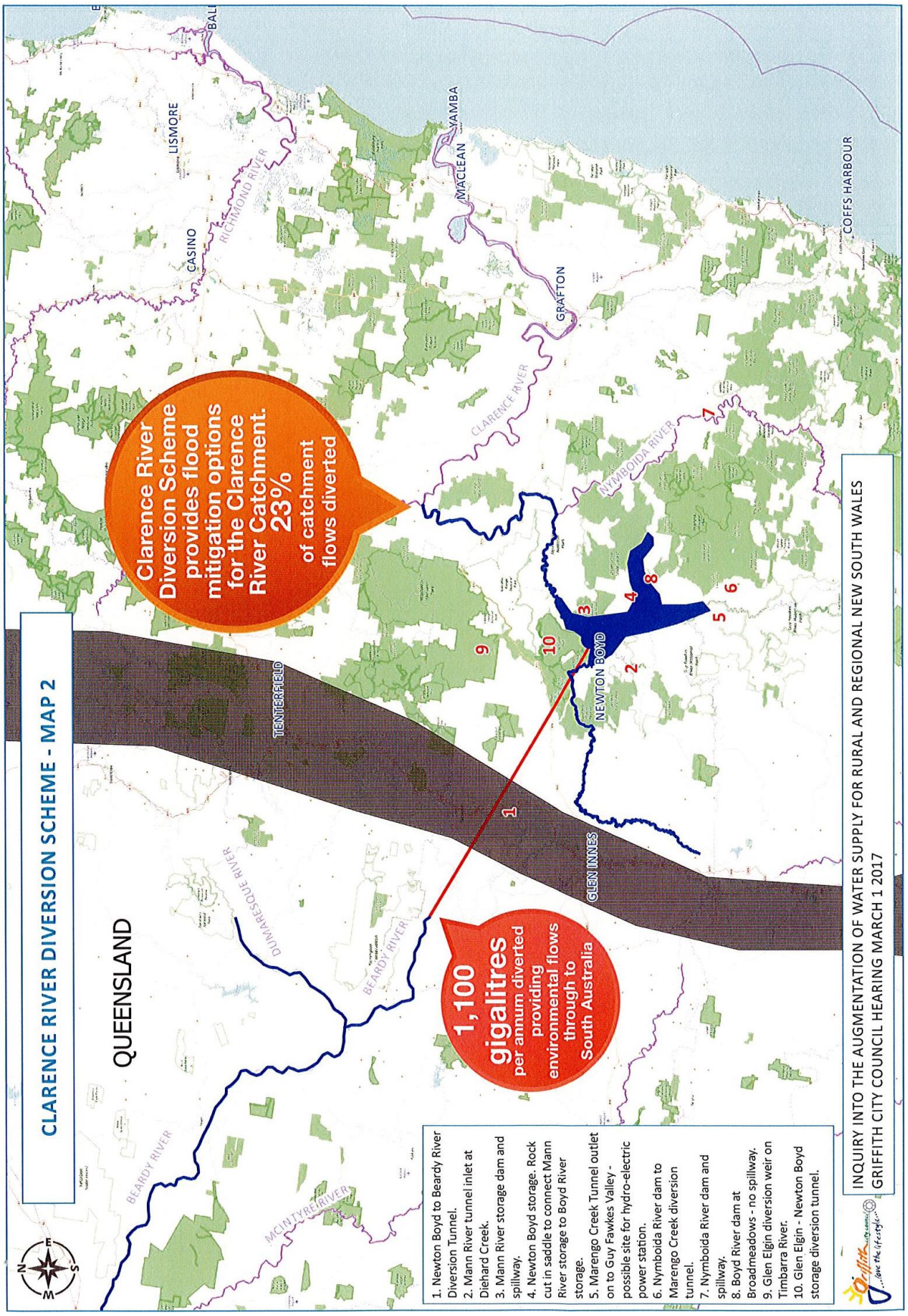


Figure 13 Clarence River Diversion Scheme Map 2, Griffith City Council



Resources for flood response

6.72 In relation to responding to flood events, Mr Haig advised that both Lismore City Council and local tradespeople were stretched of available resources for the long term in regards to repairs and rehabilitation of public infrastructure.[808]

6.73 This was supported by Mr Anderson who stated that any repairs undertaken within normal operating hours by council staff or equipment was not compensable as per the Natural Disaster Relief and Recovery Arrangements. He advised this was a severe hindrance as the Clarence Valley Council did not have 'ready access to what self-contractors there are to be able to do that, or plant and machinery'.[809]

6.74 Under the federal government's Natural Disaster Relief and Recovery Arrangements funding is provided to states to 'alleviate the financial burden on the states and to facilitate the early provision of assistance to disaster affected communities …[with] states determin[ing] the type and level of assistance to make available.[810]

6.75 Within the Natural Disaster Relief and Recovery Arrangements betterment of infrastructure damaged by floods is defined as 'restoration or replacement of an essential public asset to a more disaster resilient standard than its pre-disaster standard'.[811]

6.76 However, Mr Anderson spoke of the 'narrow interpretation' of the Natural Disaster Relief and Recovery Arrangements by the Department of Public Works which has prevented councils from building and repairing infrastructure to be flood resilient as demonstrated by the councils' inability to properly repair a road leading to Grafton airport:

> The classic example of where we are not building resilient infrastructure and the narrow interpretation of the National Disaster Relief and Recovery Arrangements [NDRRA] guidelines is Six Mile Road in Glenugie, which is a rural road which leads to Grafton airport, a small airport. Since I have been at Clarence since midway through 2013 we have had five declared disaster events, all of varying scale, but that road has been washed out every time and we keep going back to repair it in exactly the same manner through the narrow interpretation from the State in regard to building resilience into the infrastructure.[812]

6.77 Mr Kennett argued that the Natural Disaster Relief and Recovery Arrangements should undergo review so as to allow councils to receive financial assistance when restoring damaged infrastructure using council staff and equipment after the initial emergency response.[813]

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808 Evidence, Mr Haig, 1 August 2017, p 9.

809 Evidence, Mr Anderson, 1 August 2017, p 25.

810 Australian Government Department of Home Affairs, *Natural Disaster Relief and Recovery Arrangements,* https://www.disasterassist.gov.au/Documents/Fact-sheets/NDRRA-Factsheet.pdf.

811 Commonwealth Government, Natural Disaster Relief and Recovery Arrangements Determination 2017, p 5; Answer to questions on notice, Clarence Valley Council, 31 August 2017, p 1.

812 Evidence, Mr Anderson, 1 August 2017, p 22.

813 Evidence, Mr Kennett, 1 August 2017, p 14.

Flood mitigation infrastructure

6.78 The impact of floods on industry was described by Mr Ross Farlow, President, NSW Cane Growers Association, who noted that since 2000, there had been a 'steady decline' in the sugar cane industry as a result of the impact of flooding, and flood mitigation infrastructure not being adequately maintained or fit for purpose.[814]

6.79 Likewise, Mr Pat Battersby, Executive Officer, New South Wales Cane Grower Association, expressed the view that over the past 20 years, the effectiveness of flood mitigation systems had been diminished by insufficient funding, government red tape, urbanisation and lack of maintenance.[815]

6.80 The NSW Cane Growers Association acknowledged that flood mitigation and flood resilience could be achieved by 'improving the maintenance and therefore effectiveness of drainage systems already in place'.[816]

6.81 In December 2014, the *Flood Ready Cane Farming Strategic Plan for the North Coast Region of New South Wales* was finalised which sets out how the industry can 'mitigate, prepare for, respond to and recover from the risk and impact of floods in order to maintain the long term productivity and sustainability of the sector'.[817]

6.82 While the strategic plan was developed between the Department of Primary Industries and the sugar cane industry, Mr Farlow informed the committee that the plan was of little use if it could not be readily implemented to achieve the desired outcome.[818]

Use of local knowledge and public consultation

6.83 With regards to the March 2017 Lismore floods, the NSW Irrigators Council and its North Coast member were of the view that the management and response to the floods was 'poorly handled'.[819] This assessment was founded on the following reasons:

> a) The Bureau of Meteorology relied too heavily on a small number of electronic gauges in the NSW North Coast to provide data/information on approaching flood risk. The Bureau of Meteorology did not account for any manual gauge data in the area which would have provided better data/information on possible flood risk.
>
> b) The central NSW State Emergency Service did not provide adequate notification to for-warn individuals in the NSW North Coast of the likelihood of floods.
>
> c) An assessment of flood risk was concentrated on Lismore but did not take into account the impacts/risks of surrounding areas. Insufficient information was provided

814 Evidence, Mr Ross Farlow, President, NSW Cane Growers Association, 1 August 2017, p 45.

815 Evidence, Mr Patrick Battersby, Executive Officer, New South Wales Cane Grower Association, 1 August 2017, p 54.

816 Evidence, Mr Farlow, 1 August 2017, p 45.

817 NSW Department of Primary Industries – Water, *Flood Ready Cane Farming Strategic Plan for the North Coast Region of New South Wales*, p 7.

818 Evidence, Mr Farlow, 1 August 2017, p 45.

819 Answers to questions on notice, NSW Irrigators Council, 4 August 2017, p 4.

to individuals outside of Lismore on the likelihood and risks of the approaching floods.[820]

6.84 In order to address these apparent 'weaknesses', the NSW Irrigators Council and its North Coast member suggested transferring control of North Coast flood events from the Bureau of Meteorology and the State Emergency Service Department to 'local State Emergency Service staff who have more in-depth knowledge and understanding of the system and are able to more accurately assess important trigger points that indicate upcoming flood events'.[821]

6.85 Mr Alan Mathers, an irrigation dairy farmer, was of the view that genuine public consultation was required when it came to flood mitigation strategies and projects. He spoke of a project in Barham that, if genuine public consultation had been conducted, better outcomes would have been achieved.[822]

Case study: Barham Town Flood study[823]

The Barham Town Flood study conducted by the former Wakool Shire Council in 2014 evaluated the Barham flood levy for a 1 in 100 year flood. The standard set for all town levies by the NSW Government is 600mm of freeboard above the 1 in 100 year flood. The estimated cost of a town levy that meets the 600mm standard is $9 million.

However, the community argued a 300mm freeboard above the 1 in 100 flood level was sufficient as Barham has never flooded, due to flood waters travelling through the forest north of Barham. After the 2016 floods, which clearly demonstrated that a 300mm freeboard is more than adequate for a Barham flood levy, the consultants of the flood study agreed with the community that this was true.

Committee comment

6.86 The committee recognises the hard work of local government, in conjunction with the State Emergency Service, in responding to flood events and providing assistance with post flood recovery.

6.87 We note the difficulties faced by local government in educating communities and creating greater awareness, about floods, their impacts and how to mitigate damage. The lack of knowledge about the risks and dangers of floods is concerning as it is for local councils in flood prone areas. Therefore, the committee recommends the NSW Government collaborate with local governments in flood prone communities to create and implement education campaigns about floods and ways to mitigate flood damage.

820 Answers to questions on notice, NSW Irrigators Council, 4 August 2017, p 4.

821 Answers to question on notice, NSW Irrigators Council, 4 August 2017, p 4.

822 Submission 104, Barham Irrigation Dairy Farmer, pp 2-3.

823 Submission 104, Barham Irrigation Dairy Farmer, p 3.

Recommendation 39

That the NSW Government collaborate with local governments in flood prone communities to create and implement education campaigns about floods and ways to mitigate flood damage.

6.88 The committee considers the Orange stormwater harvesting scheme to be an innovative and environment-friendly approach to flood mitigation. The main benefits of stormwater harvesting are increased water supply and, reduced peak flows during storm events. Orange's approach is both inspirational and logical for urban environments. We are impressed by the work displayed in Orange and believe that their stormwater harvesting scheme could be a model for flood mitigation in other communities such as the Northern Rivers. The committee therefore recommends that the NSW Government consider establishing a stormwater and/or flood harvesting pilot program for flood mitigation in the Northern Rivers.

Recommendation 40

That the NSW Government consider establishing a stormwater and/or flood harvesting pilot program for flood mitigation in the Northern Rivers.

6.89 The committee heard evidence from some inquiry participants that there may be potential benefits of diverting the Clarence River to the west. These inquiry participants were of the view that there is merit to any strategy that seeks to mitigate floods and flood damage in the Clarence Valley and provide additional water for agriculture in the Barwon region. The committee acknowledges that stakeholders were divided on the issue of water diversion. However, some inquiry participants held strong views against diverting waters from the Clarence River to the west.

6.90 We also acknowledge the work of local councils in undertaking repair work for public assets and infrastructure and the strain that such labour has on council resources, finances and staff. The committee acknowledges that stakeholders called for the National Disaster Relief and Recovery Arrangements to undergo a review in order to compensate for council resources and staff, the committee supports this idea and recommends the NSW Government pursue this through the Council of Australian Governments.

Recommendation 41

That the NSW Government pursue a review of the National Disaster Relief and Recovery Arrangements through the Council of Australian Governments.

6.91 Instead, the committee considers the funding provided by the Office of Environment and Heritage to local government for flood mitigation works and floodplain risk management plans could be assessed with a view to provide increased annual allocations or multiple rounds

of funding to support flood mitigation projects and risk management plans. Therefore the committee recommends that the NSW Government through the Office of Environment and Heritage increase funding allocations to local government for flood mitigation works and floodplain risk management plans.

Recommendation 42

That the NSW Government through the Office of Environment and Heritage increase funding allocations to local government for flood mitigation works and floodplain risk management plans.

6.92 In addition, we believe that some of this funding allocation could be used for infrastructure resilience projects to minimise the constraints currently experienced by local government under the National Disaster Relief and Recovery Arrangements.

6.93 The committee understands the inconsistencies experienced by local councils with regards to seeking approval for projects from the various and numerous agencies that deal with water supply and services. This corresponds with stakeholder views noted in chapter 3 that NSW Government water agencies tend to work in silos and it is difficult for the community to get timely and adequate information.

6.94 We therefore reiterate the importance of recommendation 23 in chapter 3 that NSW Government ensure that the Department of Industry – Water, WaterNSW and the Office of Environment and Heritage along with any other water agencies in the state, work closely together to deliver a unified and collaborative approach to water management for the benefit of New South Wales.

Flooding risk and the Barmah choke

6.95 As noted in chapter 3, the Murray Valley Private Diverters have argued that to achieve environmental flow targets down the Murray River, there are third party impacts on riparian landholders and other businesses. They argued that the Murray-Darling Basin Authority has ignored the natural capacity of the Murray River and the natural fault lines that constrain the flow volumes downstream when setting these end of system flow targets.[824]

6.96 For example, below the town of Tocumwal, there are the naturally formed Millewa Choke and Barmah Choke. The river-regulated capacity through the Millewa Choke is approximately 10,600 ML and the Barmah Choke capacity is approximately 8,000 ML.[825] This section of the Murray River is only 27 metres wide and two metres deep.[826]

6.97 The Barmah Choke is a narrow section of the River Murray through the Barmah-Millewa Forest. The forest formed as a result of regular flooding. Winter and spring flooding, caused

824 Submission 76, Murray Valley Private Diverters, pp 5-6.

825 Evidence, Ms Burge, 28 February 2017, p 39.

826 Evidence, Murray Valley Private Diverters, p 15.

by the Choke, is critical to the health of the forest. River regulation has reduced the frequency and size of winter and spring floods, and increased the incidence of unseasonal flooding in summer and autumn, leading to a decline in the health of forest ecosystems.[827]

6.98 During summer and autumn, the basin authority aims to keep flows at or below channel capacity to minimise unseasonal flooding. This constraint provides challenges in meeting downstream peak water use demands and transferring water to Lake Victoria and South Australia. The constraint has also led to restrictions in water trade from areas upstream to downstream of the Barmah Choke.[828]

Figure 14 Diagram of the Barmah Choke[829]

6.99 In major floods the Goulburn River flows can stop the Murray River's southward flow and up to 83.3 per cent of flood waters can be pushed back northwards into the Edward and Wakool River systems.[830]

6.100 The Murray Valley Private Diverters noted that in November 2013 the Murray-Darling Basin Authority released a constraints management strategy which identified that the delivery of environmental flows was more complex than the authority had previously considered. A

827 Murray Darling Basin Commission, *Barmah Choke Study, Fact sheet 1: project background*, February 2008, p 1, https://www.mdba.gov.au/sites/default/files/archived/mdbc-tlm-reports/2092_Barmah_Choke_factsheet.pdf.

828 Murray Darling Basin Commission, *Barmah Choke Study, Fact sheet 1: project background*, February 2008, p 1, https://www.mdba.gov.au/sites/default/files/archived/mdbc-tlm-reports/2092_Barmah_Choke_factsheet.pdf.

829 Submission 76, Murray Valley Private Diverters, p 16.

830 Submission 76, Murray Valley Private Diverters, p 16.

Yarrawonga to Wakool Junction Constraints Advisory Group was then established which advised the authority for two years on the matter.[831]

6.101 The Murray Valley Private Diverters noted that a second constraints annual progress report was released in 2014. The group argued that the Murray-Darling Basin Authority report misled the federal and state governments on safe and practical flow scenarios and 'continued to prescribe high flow targets for the Murray River, the same flow targets that the Yarrawonga to Wakool Junction Constraints Advisory Group had rejected'.[832]

6.102 In 2016 the NSW Government took over management of the constraints management process and made public statements that it would be managed differently from the Murray-Darling Basin Authority. However, the Murray Valley Private Diverters asserted that this has not eventuated.[833]

6.103 In light of this, the Murray Valley Private Diverters recommended that the NSW Government recognise the flooding risks posed by environmental flow targets for the Murray River and ensure that the Murray-Darling Basin Authority factors in these flooding risks into environmental flow targets.[834]

6.104 Mr Neil Gorey, former Mayor of Wakool Shire Council also suggested that there is potential for third party damage in the Edward Wakool river system due to the restrictions placed on the Murray River downstream at the Barmah Choke during floods. He also argued that the Barmah Choke's limited capacity places constraints on the system when water needs to be released from the Hume dam. He further noted that the capacity of the Barmah Choke has also recently been reduced as a result of the unnatural flows. According to Mr Gorey the consequence for the system is that large flows are pushed out through the Edward River which is experiencing flood levels not seen since 1974.[835]

6.105 Mr Gorey noted that the flooding will cause huge economic loss to many farmers in the region. He further noted that although it could be argued that this is a natural event, anecdotal evidence indicates that the flows are not behaving as predicted and the flood levels are much higher than expected.[836]

Committee comment

6.106 The committee notes the strong concern of stakeholders regarding the effects of Murray River environmental flow targets set by the Murray-Darling Basin Authority on the Barmah Choke. Pushing large amounts of water through the Choke has the potential to cause unseasonal flooding and huge economic loss to farmers in the region.

6.107 The committee therefore recommends that the NSW Government should publicly recognise the flooding risks posed by environmental flow targets in the Murray River. Further we

831 Submission 76, Murray Valley Private Diverters, p 17.

832 Submission 76, Murray Valley Private Diverters, p 17.

833 Submission 76, Murray Valley Private Diverters, p 17.

834 Submission 76, Murray Valley Private Diverters, p 17.

835 Submission 99, Mr Neil Gorey, p 1.

836 Submission 99, Mr Neil Gorey, p 1.

recommend that, if New South Wales does not withdraw from the Murray-Darling Basin Plan, the NSW Government should urge the Murray-Darling Basin Authority to factor in the flooding risk caused by the Barmah Choke when setting environmental flow targets.

6.108 The committee also sees merit in the re-establishment of the Yarrawonga to Wakool Junction Constraints Advisory Group to advise and consult the NSW Government on the impacts of high flow targets and strategies to reduce flooding risks. Therefore, the committee recommends that the NSW Government re-establish the Yarrawonga to Wakool Junction Constraints Advisory Group to advise and consult on the impacts of high flow targets and strategies to reduce flooding risks.

Recommendation 43

That the NSW Government publicly recognise the flooding risks posed by environmental flow targets in the Murray River.

Recommendation 44

That, if New South Wales does not withdraw from the Murray-Darling Basin Plan, the NSW Government urge the Murray-Darling Basin Authority to factor in the flooding risk caused by the Barmah Choke when setting environmental flow targets.

Recommendation 45

That the NSW Government re-establish the Yarrawonga to Wakool Junction Constraints Advisory Group to advise and consult on the impacts of high flow targets and strategies to reduce flooding risks.

Chapter 7 Water security and innovation projects

Throughout the inquiry the committee heard about a number of water security projects and innovations in New South Wales. This chapter begins by analysing the major water security project currently underway to construct a pipeline from the Murray River to Broken Hill. It then discusses the innovations of stormwater harvesting and recycling and computer-aided river management.

Pipeline from the Murray River to Broken Hill

7.1 This section discusses the management of water in Broken Hill and the Menindee Lakes, including the proposed pipeline from the Murray River to Broken Hill. The intention of the pipeline is to provide water security to Broken Hill and secure the town's social and economic future. The section analyses support and opposition for the pipeline, including its cost. It also considers a number of possible alternatives to the pipeline.

Broken Hill and the Menindee Lakes

7.2 For the past 50 years Broken Hill has been supplied with water from the Menindee Lakes system via a pipeline.[837]

7.3 The Menindee Lakes water supply scheme is owned by New South Wales and managed under the Murray-Darling Basin Agreement. A discussion of the management of water in the Menindee Lakes under this agreement is contained in chapter 3. That discussion noted stakeholder concerns that the Menindee Lakes are being mismanaged under the Murray-Darling Basin Agreement, as water is released at a rapid rate and supplied to South Australia.[838]

7.4 Broken Hill City Council noted that the Menindee Lakes water supply scheme is vitally import to the economic, social and cultural fabric of the city and the region. In Broken Hill alone approximately 19,000 people rely on the scheme for the basic water necessities that would be taken for granted in any other city of a similar size and population. The council noted that under the scheme, storage of water is now at a critical level.[839]

7.5 Ms Marion Browne, Councillor, Broken Hill City Council advised that Menindee Lakes are enormously important for recreation, fishing, and holidaying for Broken Hill:

> Many Broken Hill and Menindee residents have a considerable economic stake in the area. The consequences for the amenity of the area, not to mention its environmental values, would be severely compromised if there is to be more rapid draw-down for the lakes.[840]

837 ABC News, *Broken Hill water crisis: NSW to build Murray River pipeline under $500m supply plan* (16 June 2016), http://www.abc.net.au/news/2016-06-16/mike-baird-broken-hill-water-pipeline-plan/7515854.

838 Evidence, Mr Thomas Kennedy, President of the Broken Hill and Darling River Action Group and the Broken Hill Menindee Lakes We Want Action Facebook Group, 26 October 2016, p 45.

839 Submission 61, Broken Hill City Council, p 1.

840 Evidence, Councillor Marion Browne, Broken Hill City Council, 26 October, 2016, p 25.

7.6 Mr Thomas Kennedy, President, Broken Hill and Darling River Action Group and the Broken Hill Menindee Lakes We Want Action Facebook Group advised that the Menindee Township is economically important to Broken Hill, however tourism has dropped in recent years due to water shortages:

> Menindee injects a lot of money into the Broken Hill community. Over the period when it has been dry for the past two or three years, tourism has dropped significantly … when you go up there Menindee was depressing to even look at. That is the Menindee Township. People are flat; people are depressed. … You go to people's houses, they are talking about how bad it is; when do you think it will get better?[841]

7.7 As discussed in chapter 3, the Menindee Lakes system is the responsibility of the NSW Government when its storage capacity rests at 480 GL or less. When it reaches a capacity of 640 GL or greater, jurisdiction falls to the Murray-Darling Basin Authority where a water sharing agreement extends use of the water to the Lower Darling river area in South Australia.[842]

7.8 In the 2013 Legislative Council Standing Committee on State Development report on the *Adequacy of water storages in New South Wales* , it was recommended that representations be made to the federal government regarding the funding of augmentation works at Menindee Lakes. It was also recommend that the government reaffirm and complete plans to enable construction to commence as soon as practicable.[843]

7.9 The committee made these recommendations as it considered that improved efficiency in the management of the Menindee Lakes through augmentation works to minimise evaporation will have positive impacts for water users. It also noted that plans and funding for these augmentation works were already being considered.[844]

7.10 In January 2014, the NSW and federal governments announced a funding agreement of up to $800,000 for the NSW Government to undertake project planning, stakeholder consultation and a detailed design for a water saving project to reduce the average evaporation at the Menindee Lakes by 80 GL.[845]

7.11 The NSW Government then announced that a $500 million commitment had been made to secure Broken Hill's water supply, which included short-term projects such as a reverse osmosis plant, and a long-term solution of a pipeline from the Murray River.[846]

841 Evidence, Mr Thomas Kennedy, President, Broken Hill and Darling River Action Group and the Broken Hill Menindee Lakes We Want Action Facebook Group, 26 October 2016, p 46.

842 Submission No.48, NSW Government, p 47.

843 Standing Committee on State Development, *NSW Legislative Council, Adequacy of water storages in NSW* (2013), p 109.

844 Standing Committee on State Development, *NSW Legislative Council, Adequacy of water storages in NSW* (2013), p 109.

845 Correspondence from the NSW Government to the Clerk of the Parliaments, 30 January 2014.

846 Submission 48, NSW Government, p 35.

Timeline for construction of the pipeline

7.12 The NSW Government announced in June 2016 the construction of a 270 km pipeline, to form part of a $500 million investment intended to secure water supply for Broken Hill.[847]

7.13 Following the completion of the new pipeline, the Government advised Broken Hill will no longer need to rely on the Menindee Lakes for its water supply of approximately 10 GL of water per year.[848] The NSW Government also advised that the pipeline would assist New South Wales to meet its targets under the Murray-Darling Basin Plan.[849]

7.14 WaterNSW indicated that the pipeline will supply up to 37.4 ML of a peak daily demand of raw water to the local water provider in Broken Hill. The water provider will continue to retain responsibility for water treatment and water distribution to customers.[850] The then Deputy Premier said 'This historic project will have benefits across the Basin as it reduces the need for further buybacks of productive water'.[851]

7.15 WaterNSW discussed its input in proposing solutions for Broken Hill's water supply, advising that a number of stakeholders, including WaterNSW were invited to submit their ideas. Mr David Harris, Chief Executive Officer of Water NSW advised that it made two suggestions to the NSW Government. One of which was to enlarge the storages in the upstream tributaries, including a dam to improve the availability and security of water for the northern basin and the lakes. The second which was to access Great Artesian Basin water through bores and a pipeline.[852]

7.16 In reaching its decision, the government advised that the pipeline will run from the Murray River at Wentworth and generally follow the Silver City Highway corridor through to the water treatment plant at Broken Hill.[853]

7.17 In June 2017, Mr Harris advised that WaterNSW has done an 'enormous' amount of work in preparing the concept design for the pipeline and has been out to the market for expressions of interest. He noted that four consortiums would be invited to tender.[854]

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847 ABC News, *Broken Hill water crisis: NSW to build Murray River pipeline under $500m supply plan* (16 June 2016), http://www.abc.net.au/news/2016-06-16/mike-baird-broken-hill-water-pipeline-plan/7515854.

848 ABC News, *Broken Hill water crisis: NSW to build Murray River pipeline under $500m supply plan* (16 June 2016) http://www.abc.net.au/news/2016-06-16/mike-baird-broken-hill-water-pipeline-plan/7515854.

849 Submission 48, NSW Government, p 35.

850 WaterNSW, *River Murray to Broken Hill Pipeline*, https://www.waternsw.com.au/projects/murray-to-broken-hill-pipeline.

851 Media release, NSW Government, *New pipeline to secure Broken Hill water supply* (16 June 2016) https://www.nsw.gov.au/your-government/the-premier/media-releases-from-the-premier/new-pipeline-to-secure-broken-hill-water-supply/.

852 Evidence, Mr David Harris, Chief Executive Officer, WaterNSW, 26 October 2016, p 35.

853 WaterNSW, *River Murray to Broken Hill Pipeline*, https://www.waternsw.com.au/projects/murray-to-broken-hill-pipeline.

854 Evidence, Mr Harris, 5 June 2017, p 48.

7.18 In October 2017, WaterNSW announced it had appointed a consortium of John Holland, MPC Group and TRILITY to design, construct, operate and maintain the pipeline. Construction started in January 2018 and the pipeline is scheduled to be completed and ready for water by December 2018.[855]

Impact on Menindee Lakes

7.19 The NSW Government indicated in a fact sheet that the proposed pipeline will have no impact on recreational access to the Menindee Lakes and will not see the decommissioning of the lakes as they 'are an instrumental part of the Murray-Darling Basin water supply system and are of critical importance for water supplies to the Lower Darling River and the people who live and work in this remote part of NSW'.[856]

7.20 Further, NSW Government stated it was developing designs for potential new infrastructure to improve the management and efficiency of the Menindee Lakes system.[857] This included exploring a scope of works that could allow the lakes to achieve significant water savings, in line with a triple-bottom line approach that will help New South Wales meet its Basin Plan commitments. This project is currently being assessed by the Commonwealth and, if endorsed, 'comprehensive stakeholder and community engagement will be undertaken in 2018'.[858]

Support for the pipeline

7.21 Ms Browne from Broken Hill City Council advised that there was anxiety in the Broken Hill community about what would happen if the pipeline is not built, as it could have a serious impact on the future of Menindee and the Menindee Lakes, and the security of water for Broken Hill:

> The Menindee Lakes are enormously important for recreation, fishing, and holidaying for Broken Hill people. The economic survival of our neighbour Menindee will be dependent on there being water in the lakes. Many Broken Hill and Menindee residents have a considerable economic stake in the area. The consequences for the amenity of the area, not to mention its environmental values, would be severely compromised …[859]

855 WaterNSW, *River Murray to Broken Hill Pipeline awarded*, https://www.waternsw.com.au/about/newsroom/2017/htriver-murray-to-broken-hill-pipeline-contract-awarded.

856 NSW Deparment of Industry – Water, *Broken Hill long-term water supply solution: Summary of final business case*, http://www.water.nsw.gov.au/__data/assets/pdf_file/0007/739699/Broken-hill-long-term-water-supply-solution-qanda.pdf, p 3.

857 Submission 48, NSW Government, p 35.

858 NSW Deparment of Industry – Water, *Broken Hill long-term water supply solution: Summary of final business case*, http://www.water.nsw.gov.au/__data/assets/pdf_file/0007/739699/Broken-hill-long-term-water-supply-solution-qanda.pdf, p 3.

859 Evidence, Clr Marion Browne, Broken Hill City Council, 26 October, 2016, p 25.

7.22 Broken Hill City Council stated that the pipeline 'is generally supported by the community'.[860] However, the council argued that that the community must be properly consulted and informed about the implications of the proposed pipeline, including any additional costs.[861]

7.23 The NSW Irrigators Council welcomed the announcement of the pipeline, as it removes the absolute reliance of Broken Hill on surface water storage in the Menindee Lakes. However, the council urged the government to explore an alternative route for the pipeline in order to provide water to the Pooncarie and Menindee townships and Lower Darling landholders:

> Nevertheless, NSWIC would urge the NSW Government to explore an alternative pipeline route option that that could draw water from the Murray weir pool in the Darling at Ellerslie (30 kms north of Wentworth); then through a pipeline following the Darling River north on its eastern bank to provide water to the Lower Darling townships of Pooncarie and Menindee, as well as stock and domestic water to Lower Darling landholders at times of low or no flow in the Lower Darling, as recently experienced. This alternative route would utilise a refurbished Menindee – Broken Hill pipeline and provide a short term water security back-up with water from the Menindee Lakes when pipeline pumps or other pipeline infrastructure require maintenance.[862]

7.24 The NSW Irrigators Council ultimately noted that whichever route is chosen it will remain fully supportive of the project.[863]

7.25 Cotton Australia also welcomed the NSW Government's decision to augment Broken Hill's water supply with a pipeline, stating that all citizens should have access to a safe and reliable water supply.[864] Mr Michael Murray, General Manager, Cotton Australia described the pipeline as a 'fantastic initiative', stating that his organisation has been calling for an alternative water supply for quite some time. He considered that the NSW Government deserves to be congratulated for its initiative.[865]

7.26 Mr Murray explained Cotton Australia's support for the pipeline, as better management of the Menindee along with construction of the pipeline, will provide flexibility and reliability to the system:

> By providing Broken Hill with an alternative water supply, it gives both the NSW Government and the Federal Government … far greater flexibility. Why this makes real sense for the guys in southern New South Wales, even though they might see 6,000 ML coming out of the river system, is that if management is done right, they will make far greater than 6000 ML in savings in evaporation losses by having the freedom to use the water out of Menindee Lakes earlier to meet the requirement for downstream users, including the flows in South Australia, and maintaining water longer in the more efficient storage of Dartmouth and Hume, and to a greater or lesser extent Blowering and Burrinjuck. If you were a reasonably uninformed person you might think there is going to be 6,000 ML coming out of the river and you would

860 Submission 61, Broken Hill City Council, p 1.

861 Submission 61, Broken Hill City Council, p 2.

862 Submission 85, NSW Irrigators Council, pp 4-5.

863 Submission 85, NSW Irrigators Council, pp 4-5.

864 Submission 94, Cotton Australia, p 1.

865 Evidence, Mr Michael Murray, General Manager, Cotton Australia, 2 June 2017, p 5.

> be receiving a loss, but if you actually look through the process and the savings that better management of Menindee will deliver, they will be well and truly compensated by a greater reliability in their systems.[866]

7.27 Namoi Water also supported the NSW Government's decision to augment Broken Hill's water through the construction of a pipeline, as it will remove the 'absolute reliance of Broken Hill on surface water storage in Menindee lakes to supply the urban needs'.[867]

7.28 Mr Harris indicated that the Menindee Lakes is under a great deal of strain at the moment as it must facilitate many competing water interests. He stated that construction of the pipeline will remove one of these matters by securing water supply for Broken Hill:

> Many things are being asked of the lakes at the moment; a secure town water supply for Broken Hill; environmental flows for the lower Darling River and the Murray River; and meeting New South Wales's obligations as a State under the Murray-Darling basin agreement to provide flows to South Australia. To the extent that the pipeline disconnects one of those demands from the lakes, I think it is a good idea. It then opens up opportunities in terms of how those lakes may be operated differently to deliver the other things being asked of them.[868]

Opposition to the pipeline

7.29 The issue of the future of the Menindee Lakes system, following the NSW Government's announcement of the location of the proposed pipeline, has caused controversy for local residents and other community stakeholders who have relied on the lakes in various ways for their livelihoods.

7.30 Some stakeholders who gave evidence to the inquiry were not in favour of the pipeline, largely due to its expense. Stakeholders also submitted alternate ideas about water management and infrastructure solutions which could potentially augment the town's water supply and include the utilisation of the existing Menindee Lakes system.

7.31 Mr Thomas Kennedy, President of the Broken Hill and Darling River Action Group and the Broken Hill Menindee Lakes We Want Action Facebook Group, advised the committee that he did not support the pipeline and that he foresaw it could have a devastating effect on the social fabric of Broken Hill and negatively impact local businesses. Mr Kennedy believed the real beneficiaries of the proposed pipeline would be the irrigators north of Bourke, not the Broken Hill community.[869]

7.32 Mr Mark Hutton, Treasurer of the Broken Hill and Darling River Action Group and the Broken Hill Menindee Lakes We Want Action Facebook Group, also raised concerns regarding the government announcement of the new pipeline. Mr Hutton expressed unease about the decision-making process and the potential negative impacts on the local community:

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866 Evidence, Mr Murray, 2 June 2017, p 6.

867 Submission 110, Namoi Water, p 11.

868 Evidence, Mr Harris, 26 October 2016, p 35.

869 Evidence, Mr Thomas Kennedy, President, Broken Hill and Darling River Action Group and the Broken Hill Menindee Lakes We Want Action Facebook Group, 26 October 2016, pp 45-46.

> There does not seem to be any accountability for the decisions that are made that adversely affect thousands of people out here in the far west. We have lost millions of dollars in tourism. Our local businesses have gone broke because of the decisions that were made by the DPI, the Murray-Darling Basin Commission and the New South Wales Government.[870]

7.33 Griffith City Council indicated that the pipeline is a 'significant and ill-placed expenditure' and a better solution would be to improve the management of environmental water.[871]

7.34 Mr William Brian 'Badger' Bates, Director, Barkandji Native Title Group Aboriginal Corporation indicated he did not support the pipeline, and instead considered that the current pipeline from Menindee should be fixed:

> We need the pipeline from Menindee fixed and our water to stay there. If you put too much pressure on the Murray, it's finished—okay? We want our river flowing and we want our water for Broken Hill to come through Menindee.[872]

7.35 Inland Rivers Network considered that the proposed pipeline will have a significant impact on current water sharing arrangements between New South Wales, Victoria and South Australia. Inland Rivers Network did not support the proposal because 'it circumvents the opportunities to improve water policy in the Barwon-Darling River system to reinstate a fair share of water for downstream towns, cultural uses and values, stock and domestic users and the riverine environment'.[873]

7.36 Central West Environment Council did not support the proposed pipeline as they considered it will cause a shift away from understanding and correcting poor management of flows in the Darling River system.[874] While the International Association of Hydrogeologists stated that all participants could benefit from a groundwater supply and replenishment scheme at Menindee at a cost less than half that of a pipeline from the Murray to Broken Hill.[875]

7.37 A Change.org petition in early 2018 to the Premier of New South Wales called for a moratorium on the pipeline 'until all current inquiries into allegations of non-compliance, water theft, corruption, and mismanagement of the Murray-Darling Basin water supply, are complete'. The petition received over 13,000 online signatures.[876]

7.38 The petition stated that the pipeline makes no economic sense; there has been negligible consultation; no full business case; or an Environmental Impact Statement. It also argued that

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870 Evidence, Mr Mark Hutton, Secretary, Broken Hill and Darling River Action Group and the Broken Hill Menindee Lakes We Want Action Facebook Group, 26 October 2016, p 46.

871 Supplementary submission 17a, Griffith City Council, p 16.

872 Evidence, Mr William Brian 'Badger' Bates, Director, Barkandji Native Title Group Aboriginal Corporation, 26 October 2016, p 5.

873 Submission 58, Inland Rivers Network, p 9.

874 Submission 53, Central West Environment Council, p 4.

875 Submission 27, International Association of Hydrogeologists, p 2.

876 Change.org, *Call for moratorium on River Murray to Broken Hill pipeline*, https://www.change.org/p/premier-of-new-south-wales-call-for-moratorium-on-river-murray-to-broken-hill-pipeline.

the economic burden for households and businesses will not be known until 2019 when IPART releases its pricing determination.[877]

7.39 The Mayor of Broken Hill, Clr Darriea Turley, stated that the council had called for a moratorium on the construction of the pipeline since July 2017 when allegations of non-compliance was first brought to light (see chapter 1 for more details).[878]

The cost of the pipeline

7.40 A number of stakeholders expressed concern regarding the unknown cost of the pipeline due to a lack of available information provided by the government for costs relating to ongoing maintenance and operation.

7.41 Ms Browne for Broken Hill City Council advised the committee that the NSW Government's announcement of the proposed pipeline had raised a number of questions for her constituents, most notably concern that the NSW Government may attempt to recoup the cost from the Broken Hill community.[879]

7.42 Mr Hutton also had concerns regarding the possible cost implications, stating 'we have got a lot of pensioners in Broken Hill. It is an ageing population, and they cannot afford to have their water bills doubled, which is probably what it would be'.[880]

7.43 Similarly, Mr Graeme Pyle, Chairman, Southern Riverina Irrigators argued that the NSW Government is constructing the pipeline on a 'whim' in order to 'keep political votes in Broken Hill'. He was also concerned that money will be levied against the residents in Broken Hill, many of which are pensioners who will not be able to absorb the large cost increase.[881]

7.44 Although in favour of the pipeline, Mr Dennis Roach, Public Officer, Broken Hill Chamber of Commerce indicated that many members of the chamber were concerned about the pipeline's cost:

> … we have not been able to get a satisfactory answer from the NSW Government as to what the service charges are going to be to maintain it and it is not a short-term thing. Once that pipeline is built, it is going to be here for a long time and it is going to have to be maintained and as it gets older it will cost more and more to maintain. Many of the businesses in Broken Hill though would rather see the pipeline to Menindee repaired and maintained and our water supply coming from here. [882]

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877 Change.org, *Call for moratorium on River Murray to Broken Hill pipeline*, https://www.change.org/p/premier-of-new-south-wales-call-for-moratorium-on-river-murray-to-broken-hill-pipeline.

878 Sydney Morning Herald, *'Outrageous': Farmers, Broken Hill mayor call for $467 million pipeline halt* (6 February 2018), https://www.smh.com.au/politics/nsw/outrageous-farmers-broken-hill-mayor-call-for-467-million-pipeline-halt-20180205-h0u04k.html.

879 Evidence, Clr Browne, 26 October, 2016, p 25.

880 Evidence, Mr Hutton, p 46.

881 Evidence, Mr Pyle, 28 February 2017, p 30.

882 Evidence, Mr Dennis Roach, Public Officer, Broken Hill Chamber of Commerce, 26 October 2016, p 20.

7.45 Mr Roach was also alarmed that the cost of the pipeline will likely be factored into the standing charges for water for the city of Broken Hill, as the pipeline would require a significant amount of money in order to be maintained. This was a concern as Broken Hill businesses are already affected by high water costs.[883]

7.46 Namoi Water noted that the Independent Pricing and Regulatory Tribunal (IPART) cannot make a pricing decision on the pipeline until it is half constructed, but argued that regardless of cost, the pipeline must not be charged to the users as they will not be able to afford it. Namoi Water considered the pipeline will cost $500 million plus yearly interest, depreciation and operating costs.[884]

7.47 A local resident, Ms Barb Webster, described the fact that IPART will not be able to determine user pricing for the pipeline until it is half constructed as something out of the satirical TV show *Yes Minister*.[885]

7.48 IPART explained its approach to determining water prices where a water utility has proposed a forward capital works program, such as in the case of the proposed Broken Hill pipeline project. Mr Hugo Harmstorf, Chief Executive Officer, advised that IPART would typically engage an expert consultant who would assist to provide an assessment in terms of the program's prudency and efficiency and would, if appropriate, further determine an assessment on a return on capital. Mr Harmstorf elucidated:

> What that means is that we would set prices such that the utility could not only recover the depreciation on the asset but also it could cover the interest payments on any money borrowed to fund it … and the operating costs as well.[886]

7.49 Mr Harmstorf explained that these assessments were generally done following the capital works investment being made and not at the proposal stage, as in the case of the proposed Broken Hill pipeline. [887]

7.50 Mr John Coffey, Acting Manager, Water Operations, Essential Water whose organisation is responsible for operating the existing pipeline, advised the committee that the proposed $500 million construction figure accommodates not only the pipeline, but the pre-treatment of water at Wentworth. Mr Coffey stated that the proposed pipeline would mean that effectively the Broken Hill community would get an asset that could last for 80 years with a minimum amount of maintenance required in the early years. Mr Coffey also advised that he had not seen the 'final detailed design' of the proposed pipeline. However, he thought that there was a solar farm planned, which would offset costs of the pipeline. [888]

7.51 The NSW Government advised that, once constructed, ongoing costs for the pipeline will be funded by Broken Hill customers and the government. The IPART will be asked to ensure

883 Evidence, Mr Roach, 26 October 2016, p 19.

884 Submission 110, Namoi Water, p 11.

885 Submission 102, Ms Barb Webster, p 2.

886 Evidence, Mr Hugo, Harmstorf, Chief Executive Officer, Independent Pricing and Regulatory Tribunal, 7 November 2016, p 11.

887 Evidence, Mr, Harmstorf, 7 November 2016, pp 11-12.

888 Evidence, Mr John Coffey, Acting Manager Water Operations, Essential Water, 26 October 2016, p 41.

that the share of the cost borne by Broken Hill customers is fair and affordable, and in reviewing water prices, IPART will consider a range of matters, including:

- the cost of providing the service
- consumer protection against abuse of monopoly power by a water utility
- the need to promote competition in the supply of the service
- the need for greater efficiency in the supply of the service to reduce costs to consumers and taxpayers
- appropriate rates of return on public sector assets
- the social impact of their determinations
- the need to maintain ecologically sustainable development and protect the environment.[889]

Possible alternatives to the proposed pipeline

7.52 A number of stakeholders who were opposed to the pipeline provided alternate solutions that could help solve the issue of water supply to Broken Hill.

7.53 Mr Alan Whyte, Member, Lower Darling Horticultural Group stated that if reliability of the water supply was restored there would be no need for a 'very expensive pipeline'.[890] To achieve this, he stated that the Lower Darling Horticultural Group would support enlarging the outlet capacity of Lake Menindee and reinstating high storage levels in Menindee-Cawndilla as well as supporting the proposed regulator between Lake Menindee and Cawndilla,. Mr Whyte considered that this would conserve water in the top two Menindee Lakes as a reservoir in order to supply Broken Hill and the Lower Darling.[891]

7.54 Alternatively Mr Whyte argued that if constructed, a different path for the pipeline should be chosen:

> If the decision is to have a pipeline … [i]t should follow the roads on the eastern side of the river. Then it would cover off every high priority use—that is, people, towns, and livestock. It would cover the people who are currently reliant on Menindee. If it follows the highway to Broken Hill, as is currently proposed, it ignores all of the high priority users along the river—again, people, towns, and livestock. They have just as much right to water as someone in Broken Hill, yet they have been ignored.[892]

7.55 Mr Whyte further stated that the group's preference was to basically 'fix the river' which would solve most of the issues on its own, rather than a new pipeline.[893]

7.56 Ms Rachel Strachan, Member, Lower Darling Horticultural Group discussed a proposal which entailed a pipeline alternately running from the Murray up towards Pooncarie, and following the road up to Menindee. Ms Strachan also advised that refurbishing the existing pipeline

889 NSW Department of Industry – Water, *Broken Hill long-term water supply solution: Summary of final business case*, http://www.water.nsw.gov.au/__data/assets/pdf_file/0007/739699/Broken-hill-long-term-water-supply-solution-qanda.pdf, p 3.

890 Evidence, Mr Alan Whyte, Member, Lower Darling Horticultural Group, 26 October, 2016 p 11.

891 Evidence, Mr Whyte, 26 October 2016, p 11.

892 Evidence, Mr Whyte, 26 October 2016, p 14.

893 Evidence, Mr Whyte, 26 October 2016, p 12.

between Menindee and Broken Hill would be much cheaper as there was already infrastructure in place. Ms Strachan also made the point that if the proposed Broken Hill pipeline was to go ahead, it would still not service those in the Lower Darling, should the Menindee Lakes run dry.[894]

7.57 A submission by Lower Darling residents argued that 'taking water from the Murray River to Broken Hill seems a very false economy'. They contended that even if the pipeline provides water to a mine south of Broken Hill and allows for more water to irrigate almond and cotton plantations; this will not make up for the environmental losses along the length of the Darling, or the extra strain placed on the Murray. Instead they argued that the following should be considered:

- Wentworth to Pooncarie: Low Weir or other environmentally friendly barrier at Ashvale to serve lower Darling to Pooncarie in order to utilise Murray weir influence.
- Upper Darling: 100 km pipeline from East to West to contribute to large scale irrigation requirements and feed into upper Darling tributaries.[895]

7.58 Dr Stuart Khan, Associate Professor, UNSW Water Research Centre, advised that long water transfer pipelines should never be considered in isolation, as there were other possible options to manage the water supply, including the option to recycle water which he believed had not been considered in this case.[896] Dr Khan recommended that the NSW Government undertake a full options assessment for the enhancement of water security for Broken Hill and publicly release the results. This should include a triple-bottom line assessment of all available options, including the expanded use of urban stormwater harvesting and water recycling.[897]

7.59 One submission author did not want the proposed pipeline constructed and instead stated that the government should fix or replace the pipeline from Menindee to Broken Hill, as more water is required to flow down the river and be stored in Menindee Lakes. The author argued that the government does not want to run the pipeline from Menindee because it instead wants to mine Lake Menindee.[898]

7.60 Mr Roach from the Broken Hill Chamber of Commerce recommended that a series of social and economic assessments be undertaken to determine the impact on the community of the proposed new pipeline, the possible decommissioning of the existing pipeline and 'downgrading' of the Menindee Lakes System.[899]

7.61 Specifically the chamber recommended that an assessment tool such as the 'Assessments of impacts on Communities' be applied to consider the following issues:

- the impact of current water policies on the health of the Menindee Lakes system and tourism in the Far West

894 Evidence, Ms Rachel Strachan, Member, Lower Darling Horticultural Group, 26 October 2016, pp 16-17.

895 Submission 22, Lower Darling Residents, pp 2-3.

896 Submission 74, Dr Stuart Khan, p 12.

897 Submission 74, Dr Stuart Khan, p 14.

898 Submission 101, Name suppressed, p 1.

899 Answers to questions on notice, Broken Hill Chamber of Commerce, 26 October, 2016, p 2.

- the social and quality of life cost if the decommissioning of the pipeline includes the downgrade of the Menindee lakes system
- the social, environmental and economic impact on the township of Menindee if the pipeline between Menindee and Broken Hill is decommissioned
- the possible effects of the pricing structure for the new pipeline's ongoing operation and maintenance in relation to the financial viability of existing businesses in the region.[900]

7.62 The NSW Government advised in a fact sheet that in order to find a long-term solution for Broken Hill, it investigated '19 potential options, including sourcing water from deep aquifers, different pipeline routes, changing existing surface water arrangements, and even doing nothing'. According to the NSW Government, the proposed pipeline was identified by water experts 'from DPI Water, NSW Public Works and Infrastructure NSW as the best solution as it provides the greatest confidence in meeting the objective of a quality, safe and secure water supply for Broken Hill'.[901]

Committee comment

7.63 The committee notes that a sustainable long-term solution to water management issues is required for Broken Hill. Although there is some opposition to the proposed pipeline from the Murray to Broken Hill, we note that a number of stakeholders, including the peak industry body, the NSW Irrigators Council, support the measure.

7.64 However the committee remains concerned that the Broken Hill community may be shouldered with burden of covering the costs for the pipeline, as well as pay for its maintenance. We note that water bills are already high for local residents, many of whom are pensioners, and will not be able to afford a large increase in costs.

7.65 We therefore recommended in the summary of key issues at recommendations 1 and 2:

- That the NSW Government immediately make a commitment to not increase the water bills for residents of the Broken Hill area in order to pay for the construction and ongoing maintenance of the Broken Hill pipeline.
- That the Independent Pricing and Regulatory Tribunal take into account its 2017 pricing determination for Peel Valley water users when determining water pricing for residents of the Broken Hill area following the construction of the Broken Hill pipeline.

7.66 We also understand that the NSW Government does not intend to decommission the Menindee Lakes following the completion of the pipeline as it is an instrumental part of the Murray-Darling Basin water supply system.

7.67 However, given the concerns in the community, we recommended in the summary of key issues at recommendation 3:

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900 Answers to questions on notice, Mr Dennis Roach, Broken Hill Chamber of Commerce, 26 October, 2016, p 2.

901 NSW Department of Industry – Water, *Broken Hill long-term water supply solution: Summary of final business case*, http://www.water.nsw.gov.au/__data/assets/pdf_file/0007/739699/Broken-hill-long-term-water-supply-solution-qanda.pdf, pp 1-2.

- That the NSW Government make a commitment to maintaining and improving the operation of the Menindee Lakes following the construction of the Broken Hill pipeline.

Computer Aided River Management

7.68 Computer Aided River Management Systems (CARM) is a new management model for natural river systems, designed to ensure that efficient operational settings are achieved and that 'irrigators, environmental and other customers receive the right amount of water at the right location at the right time'.[902]

7.69 WaterNSW indicated that the need to meet irrigation, environment and town water demands often results in excess water being released from dams which is surplus to requirements.

7.70 CARM is a new technology which 'is based on hydraulic flow models with real time flow and rainfall telemetry measurement, allowing greater optimisation of dam releases and unregulated flows to meet water use demands at the right time, quantity and duration'. According to WaterNSW, CARM enables the organisation to provide better customer water sharing management services and delivery of resources.[903] Efficiency gains are delivered through combining:

- forecast of inflows and demands
- measurements of river flows and diversions
- knowledge of river behaviour.[904]

7.71 The Standing Committee on State Development's report *Adequacy of water storages in New South Wales* recommended that the NSW Government fund and implement CARM across all New South Wales river systems (recommendation 10) and implement a water metering project to support the statewide implementation of CARM (recommendation 11).

7.72 The State Development inquiry received evidence regarding the difficulties of current technology to model water requirements in New South Wales.[905] However, CARM was described during the inquiry as a sophisticated river management system that had revolutionised regulated storage management and water delivery on the Murrumbidgee River. It is able to measure water flow, demand and use and report in real time all the inputs required to manage a regulated river system.[906]

7.73 The NSW Government advised in January 2014 that it supported in principle the committee's recommendation to fund and implement CARM and that it is supportive of efforts to save water through accurate water metering systems. The NSW Government then advised this committee in August 2016 that WaterNSW is assessing the feasibility of a Northern Rivers

902 WaterNSW, Computer Aided River Management, http://www.waternsw.com.au.

903 WaterNSW, Computer Aided River Management, http://www.waternsw.com.au.

904 Presentation, WaterNSW, Computer Aided River Management (CARM), 20 June 2017, p 3.

905 Standing Committee on State Development, *NSW Legislative Council, Adequacy of water storages in NSW* (2013), pp 88-99.

906 Standing Committee on State Development, *NSW Legislative Council, Adequacy of water storages in NSW* (2013), p 93.

CARM project. The proposition is to deliver a staged system to maximise river operational efficiency benefits.[907]

7.74 The *Adequacy of water storages in New South Wales* report also discussed the government's metering program, which was operating in the southern area of New South Wales as part of two pilot projects. The metering program provides technologies that support both on-farm and off-farm efficiencies.[908] The government advised this committee in August 2016 that in addition to the CARM technology implementation, metering projects were underway in the Lower Darling area as well as the Murray valley and Murrumbidgee. It noted that an alternative approach was agreed to in the Northern Rivers, and as a result, this area was not part of the metering project as CARM did not meet the business case.[909]

7.75 On 20 June 2017 the committee received a briefing from WaterNSW representatives on the operation and benefits of CARM. WaterNSW informed that CARM will greatly improve demand forecasting and reduce order timeframes.[910]

7.76 WaterNSW noted that operational losses have been occurring due to too much water being released from dams. The main causes of operational losses are:

- tributary inflows not fully accounted in operational decisions due to a lack of visibility
- irrigation demands change at short notice within order timeframes
- water in the river channel storage not fully accounted and varies due to interactions with groundwater system[911]

7.77 WaterNSW informed that precision water deliveries through CARM will:

- release water from dams when it is needed
- reduce operational losses whilst increasing water availability for irrigators
- maximise the efficiencies of environmental flow deliveries
- improve flood operations[912]

7.78 Dr Adrian Langdon, Executive Manager, Systems Operations and Asset Maintenance, WaterNSW indicated that CARM is operational in the Murrumbidgee and has 'really updated the way we run that system'. He stated that WaterNSW is currently updating river models around the New South Wales from an operational standpoint, using the same technology that CARM is based on.[913]

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907 Submission 48, NSW Government, p 34.

908 Standing Committee on State Development, *NSW Legislative Council, Adequacy of water storages in NSW* (2013), p 37.

909 Submission 48, NSW Government, p 34.

910 Presentation, WaterNSW, Computer Aided River Management (CARM), 20 June 2017, p 15.

911 Presentation, WaterNSW, Computer Aided River Management (CARM), 20 June 2017, p 8.

912 Presentation, WaterNSW, Computer Aided River Management (CARM), 20 June 2017, p 18.

913 Evidence, Dr Adrian Langdon, Executive Manager, Systems Operations and Asset Maintenance, Water, 5 June 2017, p 43.

Computer Aided River Management in the Northern Rivers

7.79 Ms Jon-Maree Baker, Executive Officer of Namoi Water stated that her organisation generally supports the implementation of CARM in New South Wales. However, she viewed that it is not economically justifiable in the Northern Rivers:

> … our over-delivery is less than 5 per cent. If you can get a saving of water delivery out of that 5 per cent out of the northern systems we do not see that it is economical, nor is it a justification of the need for computer-aided river management.[914]

7.80 Namoi Water argued that the northern basin rejected the accompanying metering business case for CALM as 'it was an unsound project, the savings did not exist and the project would have resulted in a negative third party impact on licence holders'.[915]

7.81 Ms Baker described some of the reasons for the metering project's failure, including lack of recognition of technical detail in the business case and poor stakeholder engagement:

> The initial business case was for a State priority project for Commonwealth-funded meters across all of New South Wales. What there was not as part of that business case was a recognition that if you believe that there was a saving from pattern approved meters you would then also need to go back and review the diversion limits that were applied through achieving sustainable groundwater entitlements because the modelling was based on that same previous metering. So there was a lack of recognition of some of the technical detail associated with that business case. Functionally, the reason it failed was because there was extremely poor stakeholder engagement at the development stage of the business case.[916]

7.82 Ms Baker noted that CARM and the metering business case are examples where a one-size-fits-all approach does not work for the state. Ms Baker indicted that the NSW Government recognised this and removed the requirement for the metering business case to be applied in the north.[917] Namoi Water appreciated that the NSW Government recognised these limitations and supported the project's funding being redirected into on-farm modernisation projects.[918]

914 Evidence, Ms Jon-Maree Baker, Executive Officer, Namoi Water, 16 May 2017, p 27.

915 Evidence, Ms Baker, 16 May 2017, p 31.

916 Evidence, Ms Baker, 16 May 2017, p 28.

917 Evidence, Ms Baker, 16 May 2017, p 27.

918 Submission 110, Namoi Water, p 10.

7.83 However, Ms Baker argued that if CARM was to be implemented in the Northern Rivers it should be funded by the Commonwealth Environmental Water Holder:

> The issue with CARM is that it provides a significant benefit to the Commonwealth Environmental Water Holder. If that benefit and the user pays principle apply then the Commonwealth should fund CARM as it does provide greater transparency on how environmental water is utilised.[919]

Committee comment

7.84 The committee is satisfied that the NSW Government has achieved some progress in implementing CARM, following the Standing Committee on State Development's 2013 recommendation that the NSW Government fund and implement CARM across all New South Wales river systems.

7.85 However, we note the view of some inquiry participants following the failed business case in the Northern Rivers, that CARM is not suited for uniform implementation across the New South Wales. For this reason we encourage the government to continue to roll out CARM across the state, while being mindful that it may not be appropriate for all regions.

Stormwater harvesting and water recycling

7.86 Stormwater is rainwater that runs across gardens, roads and parks and into stormwater drains, creeks, the harbours and the ocean. It picks up significant pollution in the process. Harvesting some of this water can help to save drinking water and also reduces water pollution.[920]

7.87 The costs of large-scale storage and treatment can be high. The NSW Government considers that stormwater harvesting is most efficient at a local scale, where the costs of storing, treating and distributing the stormwater are low. Most stormwater pipes and channels are owned by local councils and councils manage most stormwater recycling schemes. Funding is also available from the NSW Government under the $80 million Urban Sustainability Program to help councils undertake stormwater management projects, including harvesting and reuse.[921]

7.88 The committee heard evidence regarding the innovative stormwater harvesting scheme in Orange, as well as examples of water recycling in other jurisdictions.

7.89 The Orange Stormwater Harvesting Scheme, implemented by the council, is an innovative approach to supplementing the town's water supply from high flows during storm events.[922] During the millennium drought, Orange City Council investigated 'a range of options aimed at both reducing water consumption within the city as well as investigating opportunities for

919 Evidence, Ms Baker, 16 May 2017, pp 27-28.

920 NSW Department of Industry - Water, *Stormwater*, http://www.water.nsw.gov.au/urban-water/recycling-water/stormwater.

921 NSW Department of Industry - Water, *Stormwater*, http://www.water.nsw.gov.au/urban-water/recycling-water/stormwater.

922 Submission 66, Central NSW Councils, pp 24-25.

augmenting supplies'.[923] The result was the Blackmans Swamp Creek Stormwater Harvesting Scheme which was an emergency project that could be delivered quickly.[924]

7.90 Central NSW Councils advised that the 2009 Blackmans Swamp Creek Stormwater Harvesting Scheme is the first large scale, indirect-to-potable stormwater harvesting project in New South Wales, if not Australia. The project provides between 1300-2100 ML of additional water into the Orange's raw water supply each year from the city's stormwater system, meeting up to 40 per cent of the city's total water needs. The scheme involves capturing a portion of the high flows in Blackmans Swamp Creek during storm events and transferring these into the nearby Suma Park Dam to augment the city's bulk water supply.[925]

7.91 Central NSW Councils indicated that the Ploughmans Creek Stormwater Harvesting Scheme followed soon afterwards. This scheme transfers a portion of the storm flows from the Ploughmans Creek catchment into Suma Park Dam where it supplements Orange's raw water supplies.[926]

7.92 The Ploughmans Creek Stormwater Harvesting Scheme comprises four wetlands to provide stormwater quality and quantity controls, and two small 'underflow' weirs and associated pumps to pool and harvest stormwater flows. The average volume harvesting by the scheme under current catchment conditions is estimated at 700 ML per year.[927]

7.93 Central NSW Councils argued that a 'drier future, albeit with more extreme storm events, makes stormwater harvesting from an urbanised catchment a sensible option to consider'. It noted that the scheme should be managed flexibly so that downstream users and the aquatic environment are not compromised.[928]

7.94 Mr Garry Styles, Board Member, Centroc and General Manager, Orange City Council, reflected that the stormwater harvesting scheme has been a 'very cost effective solution to increasing the water supply' with up to 30 per cent of reclaimed water being put in the city's total supply.[929]

7.95 Mr Kent Boyd, Board member, Centroc and General Manager, Parkes Shire Council, expressed the view that stormwater harvesting was a 'very viable option for towns, particularly towns that are remote from water sources'; but noted it may not be viable for all areas.[930]

7.96 In terms of other jurisdictions, Dr Declan Page, Group leader – Groundwater Contamination and Remediation Technologies, CSIRO informed the committee of two aquifer storage and

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923 Orange City Council, *Blackmans Swamp Creek Stormwater Harvesting Scheme*, http://www.orange.nsw.gov.au/site/index.cfm?display=147115.

924 Tabled document, Orange City Council, *Orange City Council Water Management*, May 2017, p 8.

925 Submission 66, Central NSW Councils, p 25.

926 Submission 66, Central NSW Councils, p 25.

927 Submission 66, Central NSW Councils, p 25.

928 Submission 66, Central NSW Councils, p 25.

929 Evidence, Mr Garry Styles, Board Member, Centroc and General Manager, Orange City Council, 17 May 2017, p 11.

930 Evidence, Mr Kent Boyd, Board member, Centroc and General Manager, Parkes Shire Council, 17 May 2017, p 12.

recovery projects in South Australia and Western Australia that have been storing and recovering recycled water in aquifers for both potable and non-potable uses.[931]

7.97 In South Australia stormwater has been stored and recovered for non-potable uses around Adelaide with 20 GL a year being stored and recovered at present. Similarly, in Perth reclaimed or treated wastewater is being stored for future recovery as part of the city's potable water supply.[932]

7.98 Dr Page reflected that aquifer recharge needs to be managed through regular maintenance and the quality of water injected into the aquifer. He referred to the managed aquifer recharge systems in Europe which have been in use for decades as well as South Australia's experience as examples of how feasible they could be.[933]

7.99 The 2013 Legislative Council Standing Committee on State Development report on the *Adequacy of water storages in New South Wales* recommended that the NSW Government and local councils continue to support and promote demand management practices and urban water conservation measures such as stormwater harvesting and recycling waste water.[934]

7.100 This recommendation was based on evidence from concerned stakeholders about the security, sustainability and importance of managing demand for urban water within both metropolitan and regional New South Wales.[935]

7.101 The NSW Government supported this recommendation,[936] and in August 2016, advised this committee that it was progressing the development of an Urban Stormwater Harvesting Policy in consultation with local government.[937]

7.102 In relation to water recycling, the government advised it is reducing the regulatory burden and compliance costs of achieving the outcomes outlined in its Best Practice Management Framework that includes the ten key national requirements for urban water supply and sewerage.[938]

7.103 In relation to demand management, the government advised it has practices built within the Metropolitan Water Plan for Sydney and the Lower Hunter Water Plan which includes strategies to reduce potable water demand, water recycling, re-use and other water efficiency initiatives.[939]

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931 Evidence, Dr Declan Page, Group leader – Groundwater Contamination and Remediation Technologies, CSIRO, 2 June 2017, p 15.

932 Evidence, Dr Page, 2 June 2017, p 15.

933 Evidence, Dr Page, 2 June 2017, p 18.

934 Standing Committee on State Development, Legislative Council, *Adequacy of water storages in New South Wales*, (2013), p xix.

935 Standing Committee on State Development, *NSW Legislative Council, Adequacy of water storages in NSW* (2013), p 37.

936 Correspondence from the NSW Government to the Clerk of the Parliaments, 30 January 2014.

937 Submission 48, NSW Government, p 31.

938 Submission 48, NSW Government, p 31.

939 Submission 48, NSW Government, p 31.

Committee comment

7.104 The committee is impressed by the Orange Stormwater Harvesting Scheme to supplement the town's water supply and notes evidence that these types of schemes are most economically viable when implemented at a local level. We also note that the NSW Government is yet to finalise its Urban Stormwater Harvesting Policy, which it last discussed with the committee in 2016, and recommends that this be finalised by 31 December 2018.

Recommendation 46

That the NSW Government finalise its Urban Stormwater Harvesting Policy by 31 December 2018.

Chapter 8 International case studies

The terms of reference for this inquiry called on the committee to investigate international examples of strong social, economic and environmental water management practices. This chapter examines water management practices in Israel, California in the United States and Germany, but will focus on Israel as it is considered a world leader in this area. The committee ascertained its evidence on Israel's water management practices through its engagement with the Israel Water Authority and Mekorot – Israel's National Water Company.

Israel

> Out of seven billion people in the world today … only about one billion have truly safe, always available, high quality water. Most of these one billion are in humid areas like North America or Europe. What is remarkable is that Israel—which is an arid region—has both safe water and reliable systems. This is harder to achieve than you would imagine.[940]
>
> —Haim Gvirtzman
> Professor of Hydrology, Hebrew University

8.1 Israel is considered to be a world leader in the management of water due to its holistic strategic planning of water along with technological advances in using desalination plants, aquifers and treated effluent water.

8.2 The committee was very honoured to be briefed by Israeli water officials on Israel's water management practices. On 6 November 2017 two employees of Mekorot, Israel's national water company, spoke to the committee while visiting Sydney. On 20 November 2017 the committee heard from an Israel Water Authority representative via Skype. Both of these events were private briefings, the transcripts of which have since been made public by the committee and are available online.

8.3 Seth M Siegel in his book *Let there be water: Israel's Solution for a water-starved world*, noted that Israel has a national water philosophy that underpins the country's views on the management of water. This philosophy has 12 key elements, which 'can be adapted to a variety of economic and social settings'.[941] They are:

1) the water belongs to the nation
2) plan today for long into the future
3) cheap water is expensive
4) regulators, not politicians
5) creating a water-respecting culture
6) innovation wanted

940 Haim Gvirtzman, Professor of Hydrology, Hebrew University in Siegel, S. M., 'Let there be water: Israel's Solution for a water-starved world', *Thomas Dunn Books*, 2015, p 236.

941 Siegel, S. M., 'Let there be water: Israel's Solution for a water-starved world', *Thomas Dunn Books*, 2015, p 236.

7) the time to act is now
8) use water fees for water
9) measure and monitor
10) advocates needed
11) use water to unify the country
12) all of the above.[942]

Governance of water in Israel

8.4 One of the core concepts in Israel is that water belongs to the government, not to the citizens.[943] Israeli considers that public ownership and government management of water achieve the best outcomes.[944] Siegel explains that '[b]y popular agreement, Israel's water sector is centrally controlled, with pricing, allocation, and planning in the hands of a technocratic government authority'.[945] Every farmer or farmers' corporation has their own allocation. The government can even reduce an allocation, or take an allocation and give it to other farmers. For example, due to a recent drought in the north of Israel, the allocations of farmers in the south have been reduced to supply the north.[946]

8.5 However, even with this centralised system, water innovation by private companies and through public-private partnerships is highly regarded and encouraged.[947] Israel has an arid climate, and this lack of water requires it to be innovative with its water use and to locate and develop alternative water sources.[948]

8.6 The Mekorot company was established in 1937. It supplies 85 per cent of Israel's drinking water and 70 per cent of the total water in Israel. As part of water recycling programs it also reuses 60 per cent of treated wastewater. It operates more than 1,000 wells, 12,000 kilometres of pipes and 3,000 facilities. Mekorot invests in approximately $US350 million per year for water and water technologies and its total revenue is $1.3 billion per annum.[949]

942 Siegel, S. M., 'Let there be water: Israel's Solution for a water-starved world', *Thomas Dunn Books*, 2015, pp 236-251.

943 Evidence from private briefing, Mr Moti Shiri, Vice President, Planning and Development, Mekorot, 6 November 2017, p 1, published by resolution of the committee on 6 March 2017.

944 Siegel, S. M., 'Let there be water: Israel's Solution for a water-starved world', *Thomas Dunn Books*, 2015, p 236.

945 Siegel, S. M., 'Let there be water: Israel's Solution for a water-starved world', *Thomas Dunn Books*, 2015, pp 244-245.

946 Evidence from private briefing, Mr Zaide, 20 November 2017, p 4, published by resolution of the committee on 6 March 2017.

947 Siegel, S. M., 'Let there be water: Israel's Solution for a water-starved world', *Thomas Dunn Books*, 2015, p 245.

948 PowerPoint presentation, Mekorot, 6 November 2017, p 7.

949 Evidence from private briefing, Mr Shiri, 6 November 2017, p 3, published by resolution of the committee on 6 March 2017.

8.7 The Israel Water Authority is the regulator of the Israeli water sector, and the regulators of Mekorot. It is also the planning department for water and is responsible for formulating long-term regional plans and master plans for the Israeli water sector.[950] Although plans need to be implemented straightaway, Mr Miki Zaide, Head of Strategic Unit Department of the Israel Water Authority indicated that the policies contained in those plans need to consider a long term horizon out to 2050.[951]

8.8 The authority was responsible for completing the 2012 *Long-term master plan for the national water sector*[952] which is both a policy document and an implementation plan. The vision, goals and objectives of the national water sector are laid out in the document.[953] This includes developing and maintaining agriculture, land conservation and the development of the national economy. In addition, management and sustainable development of the water sector is to be carried out professionally, efficiently, fairly and transparently.[954] The aim of the plan is to actualise this vision in order 'to bridge the gap between what exists and what is desired'. The implementation plan is divided into a planning component and its development.[955]

8.9 The plan considers a vast range of factors including social, economic and environmental uses for water along with supply from a range of different water sources. This information was then used to develop a scenario for a water balance for Israel stretching to 2050:

> The basic national balance indicates the need for an overall addition to the natural supply of about a minimum of approximately 1,500 mcm/year by the year 2050 … Of this volume, about 500 mcm/year (33 per cent) is water that is supplied to the neighbours (Jordan and the Palestinian Authority).[956]

8.10 Figure 15 below outlines the basic scenario for Israel's national water balance to 2050.

8.11 While long-term strategic planning is not uncommon in other jurisdictions, plans are often not mandatory. Mr Zaide indicated in Siegel that water plans are strictly implemented in Israel. Siegel noted that while individuals tend to think in terms of months and years, water planners need to think in decades.[957]

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950 Evidence from private briefing, Mr Zaide, 20 November 2017, p 1, published by resolution of the committee on 6 March 2017.

951 Evidence from private briefing, Mr Zaide, 20 November 2017, p 1, published by resolution of the committee on 6 March 2017.

952 Israel Water Authority, *Long term master plan for the national water sector: Part A: Policy document (version 4)*, August 2012.

953 Israel Water Authority, *Long term master plan for the national water sector: Part A: Policy document (version 4)*, August 2012, p 2.

954 Israel Water Authority, *Long term master plan for the national water sector: Part A: Policy document (version 4)*, August 2012, p 8.

955 Israel Water Authority, *Long term master plan for the national water sector: Part A: Policy document (version 4)*, August 2012, p 2.

956 Israel Water Authority, *Long term master plan for the national water sector: Part A: Policy document (version 4)*, August 2012, p 53.

957 Siegel, S. M., 'Let there be water: Israel's Solution for a water-starved world', *Thomas Dunn Books*, 2015, p 248.

Figure 15 The Israeli national water balance – basic scenario[958]

Population		
Year	National popn. (millions)	Per capita consumption (cu.m. per capita per year)
2010	7.6	100
2020	9.1	99
2030	10.9	98
2050	15.6	95

Water Sources (mcm/year)							
Year	Natural freshwater (1)	Brackish (direct consumption)	Treated wastewater (incl. Dan Region STP)	Desalination of brackish waters	Desalination of sea water (2)	Additional Required (3)	Total supply *
2010	1,200	174	450	23	280	4	2,131
2020	1,140	150	573	50	750	9	2,672
2030	1,080	140	685	60	750	50	2,765
2050	1,020	130	930	70	750	671	3,571

In 2008, an additional 46 mcm of floodwater was used that was not taken into account.
(1) Total average replenishment of natural freshwater, less losses for water with less than 400 mg. of chloride per liter.
(2) "Desalination" – according to the approved government decisions.
(3) "Required supplement" = the difference between total consumption of freshwater (bottom table) and total sources of freshwater.

Year	Urban	Water Consumption (mcm/year)												
		Industry			Agriculture				Regional *	Reservoir storage recovery	Nature and landscape**		Unforeseeable	Total consumption
		Fresh-water	Brackish	Total	Fresh-water ***	Brackish	Treated wastewater (ind. Dan Region STP)	Total			Fresh-water	Total		
2010	764	90	30	120	500	144	400	1,044	143	0	10	60	0	2,131
2020	902	95	30	124	490	120	528	1,138	143	200	50	95	70	2,672
2030	1,064	99	30	129	470	110	645	1,225	143	0	50	90	114	2,765
2050	1,482	108	30	138	450	100	900	1,450	143	0	50	80	278	3,571

* Regional consumption includes supplies to the PA and Jordan.
** Some of the treated wastewater used for nature and landscape is treated wastewater that is not actually used, and flows in riverbeds.
*** The decline in consumption of freshwater for agriculture is contingent on conversion to high quality treated wastewater, and a change in definitions of well protection radii.

8.12 Effective long term strategic planning for water is challenging as it also requires planning to be conducted by other departments. Mr Zaide noted this challenge and explained that he is currently waiting for Israel's Ministry of Agriculture to complete its own long term plan so that the water authority can update its water master plan:

> This is quite a challenge in Israel because at the moment, sometimes in other ministries the strategic plans are not ready. I take the most that I can from other ministries: for instance, from the Israel Central Bureau of Statistics I take population forecasts for 2050 and that is how we build our forecast. … A challenge that we have, for instance, is the Ministry of Agriculture. They did not make their own long-term plan so I cannot know the demand they are going to have in agriculture in 2050. They are preparing it at the moment.[959]

Water types in Israel

8.13 A key aspect of Israel's water supply is the five different types of water that it uses: groundwater, desalinated water, effluent water, brackish water and surface water.

[958] Israel Water Authority, *Long term master plan for the national water sector: Part A: Policy document (version 4)*, August 2012, p 54.

[959] Evidence from private briefing, Mr Zaide, 20 November 2017, p 2, published by resolution of the committee on 6 March 2017.

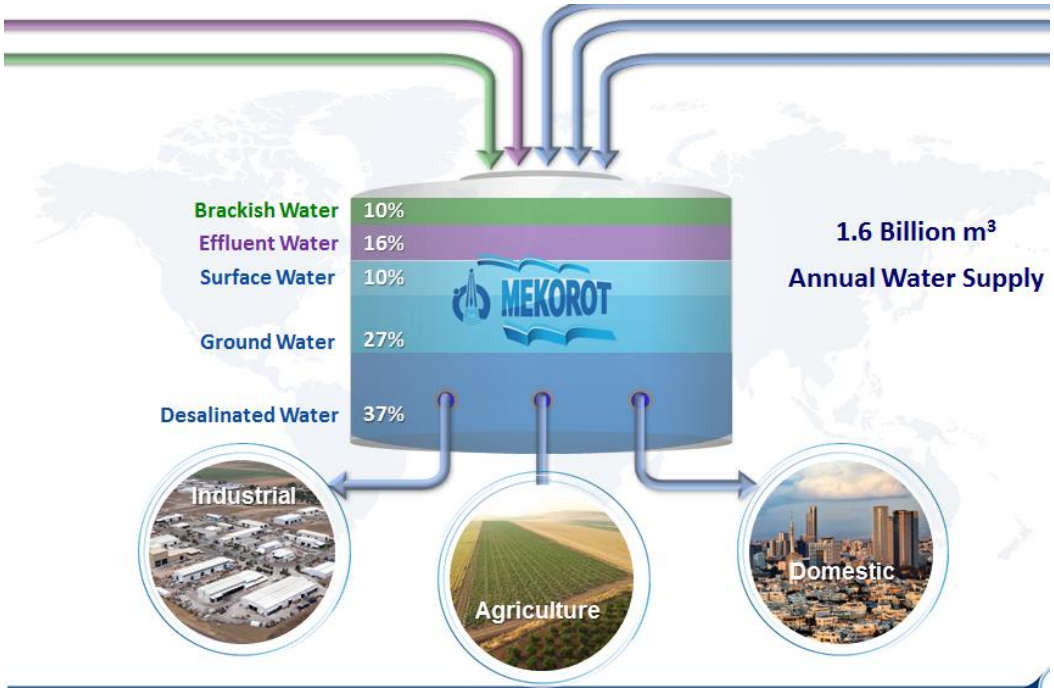
8.14 Mr Moti Shiri, Vice President, Planning and Development described some of the different types of water that Mekorot supplies in Israel:

> In Israel, we need to do everything, because we do not have water. After many years, we are doing everything. In Israel, we supply five different types of water. There is desalinated water, which is huge in Israel today—it is 600 million cubic metres per year. It is a lot. Groundwater is coming from the wells and provides 27 per cent. Surface water is from the Sea of Galilee. Today it is a little less as we have a problem there. Effluent water is 16 per cent—it is a lot. And we supply a lot of brackish water with the wells in the Arava. A lot of that goes to agriculture.[960]

8.15 Mekorot, on behalf of Israel, desalinates sea water and brackish water, locates new water sources at great depth, catches flood water and treats wastewater to reclaim it for agricultural uses.[961]

8.16 The following two figures show the amount supplied of these different types of water, where the waters originate from and in what sectors the water is used:

Figure 16 Water management by Mekorot[962]

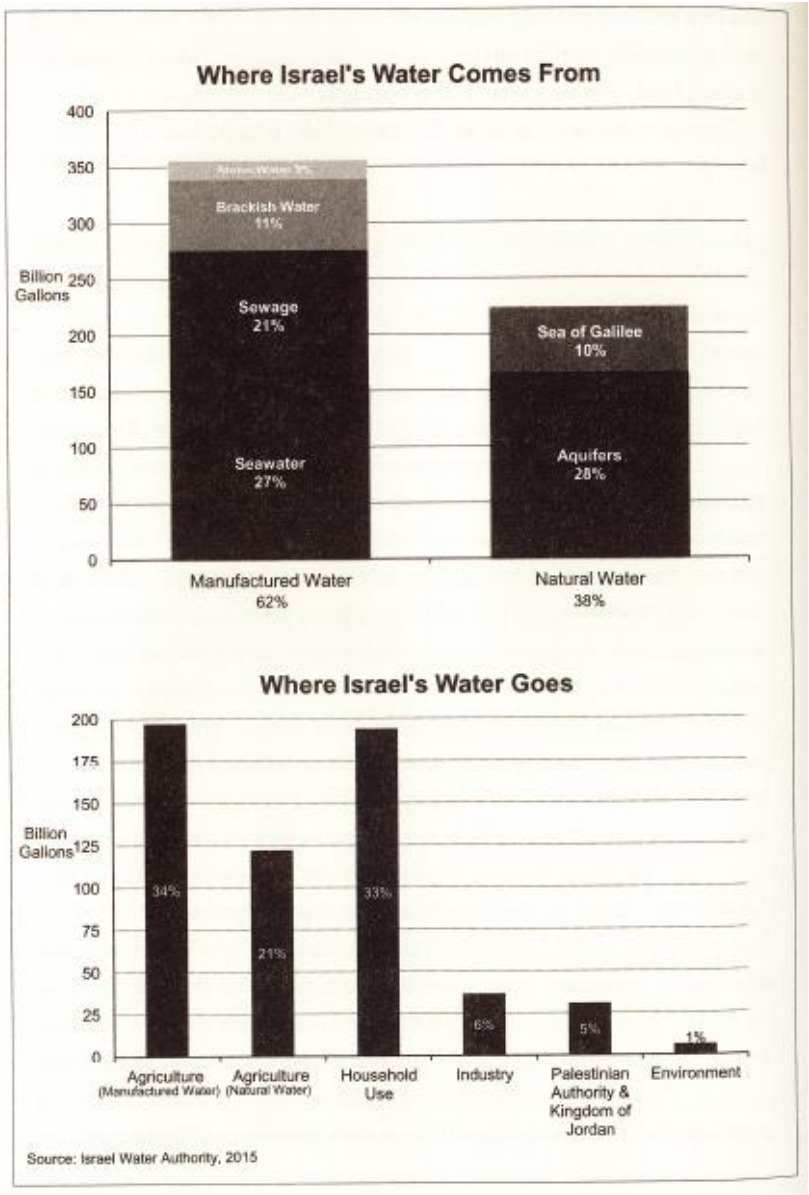


960 Evidence from private briefing, Mr Shiri, 6 November 2017, p 3, published by resolution of the committee on 6 March 2017.

961 PowerPoint presentation, Mekorot, 6 November 2017, p 6.

962 PowerPoint presentation, Mekorot, 6 November 2017, p 6.

Figure 17 Sources and use of Israel's water[963]



8.17 Mr Shiri noted that until 2005 all the water in Israel was from the Sea of Galilee in the north and would be distributed to the south. The Sea of Galilee is the only surface water source in Israel. As the population grew and more water was required, five desalination plants have been constructed in the south; which supply 600 million cubic metres per year. This means that most water in Israel now comes from desalinated water instead of the Sea of Galilee:

> And now the water goes in the opposite direction—we now supply water to the north. Today most people in Israel are drinking desalinated water. In the past we supplied water from the Sea of Galilee and it would take seven days to supply the water. Today we need to supply water within three hours, so we changed our position. Desalinated water is created by a private company and they want to sell water, so we need to take

963 Siegel, S. M., 'Let there be water: Israel's Solution for a water-starved world', *Thomas Dunn Books*, 2015, p 252.

> the water until it is raining and nobody needs the water. We need to take the water … [and] have more than 1,000 wells. One of the deepest is 1.5 kilometres.[964]

8.18 Mr Zaide also discussed how water is now distributed from south to north, noting that the national water carrier changed the direction of water supply following a sequence of drought in the north of Israel:

> … the north of Israel used to be one of our main sources of water and now we are thinking of how to convey water to the north of Israel and to change the direction of the national carrier in order to supply water from the centre of Israel from desalination plants all the way to the north of Israel. This is quite a challenge.[965]

8.19 The five big desalination plants along the coast of Israel now provide approximately 75 per cent of the whole domestic water use in Israel (see figure 18). Because of a recent drought, Mr Zaide informed that Israel will need to build another three desalination plants by the year 2030.[966]

Figure 18 Desalinated water in Israel[967]

8.20 Mr Shiri indicated that desalinated water is inexpensive in Israel and was unsure why it might be expensive in Australia:

> In Israel it is not very expensive. I have heard that it is expensive here. I do not know why. In Israel the amount of cubic water, after desalination, is at a cost of something like 70¢. … When it is not for that it is 50¢. That is why, if we do not need the plants,

964 Evidence from private briefing, Mr Shiri, 6 November 2017, p 3, published by resolution of the committee on 6 March 2017.

965 Evidence from private briefing, Mr Zaide, 20 November 2017, p 3, published by resolution of the committee on 6 March 2017.

966 Evidence from private briefing, Mr Zaide, 20 November 2017, p 5, published by resolution of the committee on 6 March 2017.

967 PowerPoint presentation, Mekorot, 6 November 2017, p 7.

> they only use 50 per cent. They do not stop. They run all the time—50 per cent minimum.[968]

8.21 He also discussed how Mekorot aims to connect all types of water throughout Israel so that people are able to use any type of water from any area:

> We connected the north. The north is the only good wells. Unfortunately the aquifers in the north have a problem because there is very low rainfall. We now start to connect the north to the desalinated water. We connect all of the areas, but the north is not connected yet. In the last five years we connected the areas, one to the other. Now we need to connect the desalinated water. We need everything to connect so people can use any of the water from every area. That is what we do. More desalination plants will be built in the future. It will be in five or seven years from now they will build between 200 million cubic per year.[969]

8.22 Natural water remains a major contributor to the water supply in Israel. Mekorot pumps water from shallow and deep levels in all types of aquifers, and is one of only a few companies in the world that pumps water from as deep as 1.5 km.

8.23 Mr Zaide stated that Israel are 'pioneers' in recharging and using aquifers:

> We are quite the pioneers in recharging the aquifers and using our aquifers. We did that for few decades with plumbing and for centuries utilising springs and wells. Actually, we overuse our aquifers. Today, since we have desalination plants, we do not recharge the aquifers by putting water in it, but we reduce the pumping from the aquifers and this is how we recharge them. We supply directly from the desalination plant and we would use the pumping.[970]

8.24 Around 50 per cent of Israel's water comes from natural recharge. Israel has a large amount of effluents and saline water, which is partially from aquifer recharge and partially from water that has been there for centuries. The other 50 per cent is termed artificial water which is produced water through effluents and desalination.[971]

8.25 Today Israel has around 450 million cubic litres per year of effluents that are supplied mainly for agriculture. With the rise in the population more effluent water will be required in the future.[972]

8.26 Israel uses 85 per cent of sewage water after treatment, which is much higher than other countries in the world, including Australia which uses around 15 per cent (see figure 19).[973]

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968 Evidence from private briefing, Mr Shiri, 6 November 2017, p 9, published by resolution of the committee on 6 March 2017.

969 Evidence from private briefing, Mr Shiri, 6 November 2017, p 13, published by resolution of the committee on 6 March 2017.

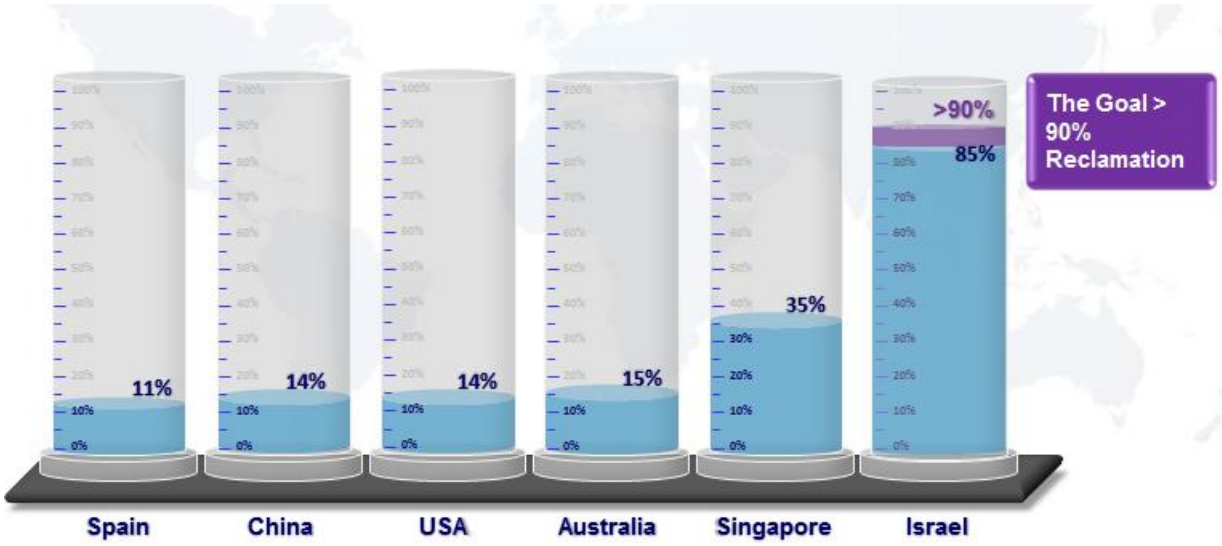
970 Evidence from private briefing, Mr Zaide, 20 November 2017, p 3, published by resolution of the committee on 6 March 2017.

971 Evidence from private briefing, Mr Zaide, 20 November 2017, p 3, published by resolution of the committee on 6 March 2017.

972 Evidence from private briefing, Mr Zaide, 20 November 2017, p 5, published by resolution of the committee on 6 March 2017.

973 Evidence from private briefing, Mr Shiri, 6 November 2017, p 7, published by resolution of the committee on 6 March 2017.

Figure 19 Effluent reclamation[974]



8.27 Israel's main effluent facility is the Shafdan site near Tel-Aviv. It is the largest wastewater treatment plant in Israel which supplies 185 million m^2 of reclaimed water per year for unrestricted irrigation. Much of this is supplied to the Negrev in the south which is a semi-arid area and often referred to as a desert.[975] Mekorot indicated that 30 per cent of Israel's agricultural crops now come from the Negev Desert. Mr Shiri commented: 'Today, if you go to the Negev, you see everything is green. It was a desert, but everything is green today'.[976]

8.28 At the Shafdan site, nitrification is removed from the wastewater. The water is treated for a second time and placed in the ground in a closed aquifer. The water takes 90 days to filter. The Shafdan site is unique as a process called Soil Aquifer Treatment is utilised (see figure 20). The effluent enters the site through underground layers, which is a confined area of the aquifer. During the recharge process, the treated wastewater significantly improves in quality. Water is stored in wells in the winter and supplied in the summer.[977]

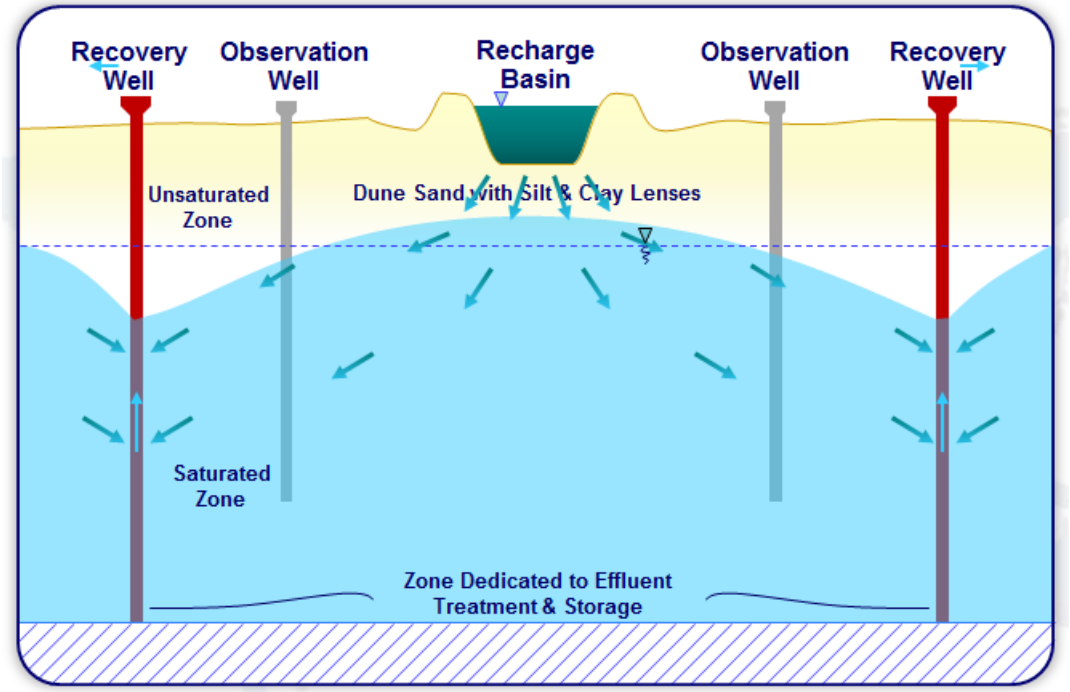
974 PowerPoint presentation, Mekorot, 6 November 2017, p 33.

975 PowerPoint presentation, Mekorot, 6 November 2017, p 37.

976 PowerPoint presentation, Mekorot, 6 November 2017, p 41.

977 Evidence from private briefing, Mr Shiri, 6 November 2017, pp 7-8, published by resolution of the committee on 6 March 2017.

Figure 20 Soil Aquifer Treatment at Shafdan[978]



8.29 The water is then pumped out of the aquifer and there are many pipes connecting to other parts of Israel, including a large pipeline to the Negev in the south. There are many open reservoirs in the south which are covered by plastic so that the water does not evaporate. This process reduces evaporation by approximately 80 per cent.[979]

8.30 The price of irrigation water is very low because it is subsidised. For agricultural water, sewage after treatment is between 30¢ and 60¢ a cubic metre. Fresh water costs approximately $1 a cubic metre.[980]

8.31 Mr Zaide explained that the use of effluent water will continue to increase in Israel:

> … agriculture will increase the amount of water that it is going to use from 1.2 billion cubic litres today to around 1.8 in the future. The increase is going to be just in effluents. I do not know exactly how much effluents are going to be. We have the scenario of population that we are going to have and the scenario of consumption per capita, so the increase is going to be only with effluents.[981]

978 PowerPoint presentation, Mekorot, 6 November 2017, p 40.

979 Evidence from private briefing, Mr Shiri, 6 November 2017, pp 7-8, published by resolution of the committee on 6 March 2017.

980 Evidence from private briefing, Mr Shiri, 6 November 2017, p 8, published by resolution of the committee on 6 March 2017.

981 Evidence from private briefing, Mr Zaide, 20 November 2017, p 2, published by resolution of the committee on 6 March 2017.

Water monitoring in Israel

8.32 Measuring and monitoring the quality and quantity of water is also very important in Israel and is seen as a key part of effectively managing water and planning for the future.[982] Mr Zaide noted that the Sea of Galilee is one of the most monitored lakes in the world.[983]

8.33 Research and development is also important to Mekorot, which invests in monitoring systems and models to measure water quality. This is one of the reasons why water loss through evaporation is very low in Israel. Mekorot operated facilities experience around 3 per cent loss, while Israel as a whole has 10 per cent loss water. This compares to an average of 15 per cent loss water in other developed countries.[984]

8.34 Mekorot ensures there is 'high-technology attention to water' and operates 10 command and control centers which monitor 3,000 nationwide facilities in real-time by remote control. These advanced operational systems enable Mekorot to promise reliable and efficient water supply while saving energy.[985]

8.35 Israel does not have formal water trading like Australia (see chapter 4 for a discussion of water trading in New South Wales). The Water Authority does however allocate water to farmers' corporations which then trade this water between farmers. Formal trading had been discussed with the Minister of Agriculture, but there were concerns that larger farmers may take water from smaller farmers.[986]

8.36 Israel has also just finished a large reform in water pricing for agriculture. For many years pricing was based on region, however now there is uniform pricing based on whether a user is or is not connected to the national carrier:

> Since the year 2007, actually we can set up prices for agriculture. But the farmers, because of the strong lobby they have, they signed an agreement in 2007 with the Ministry of Finance and the Water Authority, and they had a formula for the pricing of water around Israel. It was not uniform between the regions. Some regions paid more and some regions paid less. Just in the last few months a new reform was made, which is called amendment 27. From now on we have two prices: one for regions that are connected to the national carrier and the other price is for areas are not connected to the national carrier.[987]

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982 Siegel, S. M., 'Let there be water: Israel's Solution for a water-starved world', *Thomas Dunn Books*, 2015, p 246.

983 Evidence from private briefing, Mr Zaide, 20 November 2017, p 3, published by resolution of the committee on 6 March 2017.

984 PowerPoint presentation, Mekerot, 6 November 2017, p 14; Evidence from private briefing, Mr Shiri, 6 November 2017, p 4, published by resolution of the committee on 6 March 2017.

985 PowerPoint presentation, Mekerot, 6 November 2017, p 29.

986 Evidence from private briefing, Mr Zaide, 20 November 2017, p 4, published by resolution of the committee on 6 March 2017.

987 Evidence from private briefing, Mr Zaide, 20 November 2017, p 4, published by resolution of the committee on 6 March 2017.

8.37 There are two block tariffs in Israel for water costs: around $A2.46 for low tariff costs; and $A4.64 for the higher block.[988]

8.38 Water is also one of the biggest industry consumers of energy. In the Israeli water sector, energy consumption is around 6 to 8 per cent of the total energy used. More energy will be required in the future as more desalination plants are built. However, as Israel has found a number of sources of natural gas along its coast in the last decade, electricity prices are likely to be stable or even become lower.[989]

8.39 Further, Israel indicated that it has agreements with both the Palestinian National Authority and the Jordanian Kingdom to supply water. Each are supplied approximately 60 million cubic per year.[990] Mr Zaide confirmed that currently Israel is supplying more water than planned. However, by 2050, 30 per cent of the total increase in water will be to provide desalinated water to its neighbours.[991]

California

8.40 Inquiry participants discussed the strategic management of water in California in the United States as well as its use of recycled water as a safe drinking water supply.

8.41 Mr Peter Layton, Research Engineer, Australian Water Exploration Co advised that he had spent time in California to view its water management practices, as it has a similar problem to New South Wales in that 'they have abundant water but they do not have it where they want it'.[992] For example, California has 40 to 50 inch rainfall in the north, while the Los Angeles Basin, where over 20 million people live, has 12-inch rainfall. Mr Layton advised that to combat this, water has been successfully transferred from catchment to catchment.[993]

8.42 Mr Layton explained that long term strategic planning and effective water systems have resulted in California successfully managing water with a balance between economic and environmental considerations:

> The problem was seen early. The first movements for a State water plan there were in 1919. There was a plan produced in 1931, a proposal to start in 1933, which was crippled by the Depression, but the Federal Government took over and there was substantial work done by the end of the war. And it was needed, because the population nearly doubled during the war. But then they produced a State water plan.

988 Evidence from private briefing, Mr Zaide, 20 November 2017, p 4, published by resolution of the committee on 6 March 2017.

989 Evidence from private briefing, Mr Zaide, 20 November 2017, p 5, published by resolution of the committee on 6 March 2017.

990 Evidence from private briefing, Mr Shiri, p 10, published by resolution of the committee on 6 March 2017.

991 Evidence from private briefing, Mr Zaide, 20 November 2017, p 2, published by resolution of the committee on 6 March 2017.

992 Evidence, Mr Peter Layton, Research Engineer, Australian Water Exploration Co, 2 June 2017, p 10.

993 Evidence, Mr Layton, 2 June 2017, p 10.

> The water comes from the north. There are two very substantial reservoirs there…. The water is then transferred down the Sacramento River and into a system of aqueducts that takes it through the whole of the Central Valley and over the mountains at the end and down into Los Angeles. It is an absolute engineering marvel, but it shows what can be done. It is marvellous in the sense that every sector of the community has been looked at and provided for so that the fish do not suffer—the economics of that are looked at. They have reservoirs so that, during the month when the fish run, they do not draw from the river. There is sufficient storage to cover that.[994]

8.43 California is able to provide water supply for 20 million people in the Los Angeles Basin and irrigate 600,000 acres of land so that the Central Valley of California has the ability to produce 10 per cent of the agricultural production of the United States.[995]

8.44 Mr Layton described the Central Valley as an 'absolute garden', that is only possible because of the 'marvellous scheme' in California. The scheme includes the minimisation of evaporation to allow accurate control of water quantities, and to allow water trading so that drier areas can buy from wetter areas. Water at the southern end of the valley is pumped 670 metres vertically through 14 pumps with 80,000 horsepower. This provides approximately 30 per cent of the total water needs for the Los Angeles Basin.[996]

8.45 Mr Layton argued that 'abundant storage' is also required for effective water management. California has 2½ years of water in reserve to ensure reliability and sustainability of water supplies. He argued that Australia should consider these principles, as we also need to take water from areas of high precipitation to areas of low precipitation.[997]

8.46 Dr Stuart Khan, Associate Professor, School of Civil and Environmental Engineering, University of New South Wales discussed work that he has conducted through the Australian Academy of Technological Sciences and Engineering (ATSE). He was the lead researcher in a project to examine opportunities for Australia from potential use of recycled water for direct reuse as a safe drinking water supply.[998]

8.47 The approach is practiced in a number of United States cities, such as Big Spring in Texas, which has many characteristics in common with Broken Hill. Furthermore, California is currently undertaking major legislative steps toward a large scale implementation of direct potable reuse.[999]

8.48 Dr Khan explained that there is a scheme in Orange County, California where they take recycled water and store it underground in aquifers prior to reuse and the regulatory agencies treat the water to remove potential pathogenic organisms, viruses, bacteria, protozoa. Chemical improvement can also be achieved by infiltrating water through soil, which cleans water and provides additional treatment benefits. Depending on the dimensions of an aquifer,

994 Evidence, Mr Layton, 2 June 2017, pp 10-11.

995 Evidence, Mr Layton, 2 June 2017, p 11.

996 Evidence, Mr Layton, 2 June 2017, p 11.

997 Evidence, Mr Layton, 2 June 2017, p 11.

998 Evidence, Dr Stuart Khan, Associate Professor, School of Civil and Environmental Engineering, University of New South Wales, 7 November 2016, pp 20-21.

999 Evidence, Dr Khan, 7 November 2016, pp 20-21.

Dr Khan advised that water can be transported at no cost, as the water is stored in one place and drawn out at another location. He explained that the main reason for storing water this way is because water needs are seasonal, 'so by storing water underground you have a good opportunity to be able to carry water over from wet periods and reusing it in dry periods'.[1000]

8.49 Dr Khan read comments to the committee from the ATSE report which indicated that direct potable reuse should be among the range of available water supply options for Australian towns and cities as there are a range of environmental, economic, and community benefits:

> Ultimately, water supply decision-making should be based on an objective assessment of available water supply options to identify the most economically, environmentally and socially sustainable solution. While optimum solutions will continue to be case-specific, ATSE is convinced of the technical feasibility and safety of drinking water supply through direct potable reuse when properly managed. ATSE considers there can be considerable environmental, economic, and community benefits of supplying highly treated recycled water direct to drinking water distribution systems in suitable circumstances. ATSE therefore concludes that direct potable reuse should be considered on its merits—taking all factors into account—among the range of available water supply options for Australian towns and cities. Furthermore, ATSE is concerned that direct potable reuse has been pre-emptively excluded from consideration in some jurisdictions in Australia in the past, and these decisions should be reviewed. Governments, community leaders, water utilities, scientists, engineers and other experts will need to take leadership roles to foster the implementation and acceptance of any direct potable reuse proposal in Australia[1001]

8.50 He argued that there is support for the drinking of recyclable water in Australia, as following the report, a Fairfax media poll titled 'would you drink recycled effluent?' was responded to by 1766 readers, of which 63 per cent voted 'yes'. Dr Khan argued that politicians should be engaging the community in broader discussions about water sustainability and should look for better solutions than 'new rivers to dam and 800-kilometre pipelines to transport the water'.[1002]

8.51 Dr Khan stated that the use of recycled water for a variety of applications, including drinking water, can significantly enhance water supply security. He viewed that governments should support these opportunities in Australia and look towards successful international examples for guidance.[1003]

Germany

8.52 UNSW Law Society provided evidence of successful water management practices in Germany that are based on a comprehensive approach to the development of an environmentally sustainable economy. It argued that the NSW Government should follow the German example and adopt an incentives based approach for both households and local government to encourage a greater appreciation and understanding of effective water management.[1004]

1000 Evidence, Dr Khan, 7 November 2016, pp 22-23.

1001 Evidence, Dr Khan, 7 November 2016, pp 20-21.

1002 Evidence, Dr Khan, 7 November 2016, p 21.

1003 Evidence, Dr Khan, 7 November 2016, p 21.

1004 Submission 80, UNSW Law Society, p 12.

8.53 UNSW Law Society noted that creating a culture of sustainability means that environmental issues can be addressed at a localised level. In the 1970s, German households started being charged for stormwater services depending on an estimation of costs for each household. Stormwater fees were then reduced based on whether households had undertaken sustainability measures such as installing a green roof. While the law society recognised that New South Wales mandates a 40 per cent saving in mains water usage for new dwellings, it viewed that the state should consider the German example and redouble incentives for existing and new dwellings. It stated that this could be done through rewarding households that reduce their reliance on the mains water supply.[1005]

8.54 In Germany local city councils are also called on to experiment with the implementation of sustainable technologies. If implementation is seen to be successful, then it may be more widely adopted. For example a 1996 survey found that through this model, 50 per cent of German cities offered incentives for building owners who installed green roofs.[1006]

Committee comment

8.55 The committee is very grateful to the Israeli water officials for their time in discussing the management of water in Israel. It is clear that the country has undertaken a unified and methodical approach in developing its water management and water security practices.

8.56 The impressive long term strategic planning undertaken by the Israel Water Authority is something that the NSW Government should take particular note of in considering its development of a water equation, according to recommendation 5 earlier in this report.

8.57 The committee is also of the view that the NSW Government has a lot to learn from Israel regarding its cohesive and innovative management of water. Given that Israel's Negev Desert covers more than half of the country's total area and there is only one source of surface water, the Sea of Galilee, it is remarkable that Israel has such a stable water supply. This is largely due to innovations in desalination, aquifers and the use of effluent water, primarily for agriculture.

8.58 We therefore recommend that the NSW Government immediately open a dialogue with Israel to study its water management practices with a view to making recommendations to the Council of Australian Governments regarding the adoption of such practices in New South Wales and Australia.

Recommendation 47

That the NSW Government immediately commence a dialogue with Israel to study its innovative water management practices with a view to making recommendations to the Council of Australian Governments regarding the adoption of such practices in New South Wales and Australia.

1005 Submission 80, UNSW Law Society, pp 11-12.

1006 Submission 80, UNSW Law Society, p 12.

8.59 The committee also considered Germany's incentives based approach to be an interesting strategy to elicit a greater appreciation and understanding of effective water management from both households and local government. New South Wales should consider creating a similar culture of sustainability and the NSW Government should explore such an option.

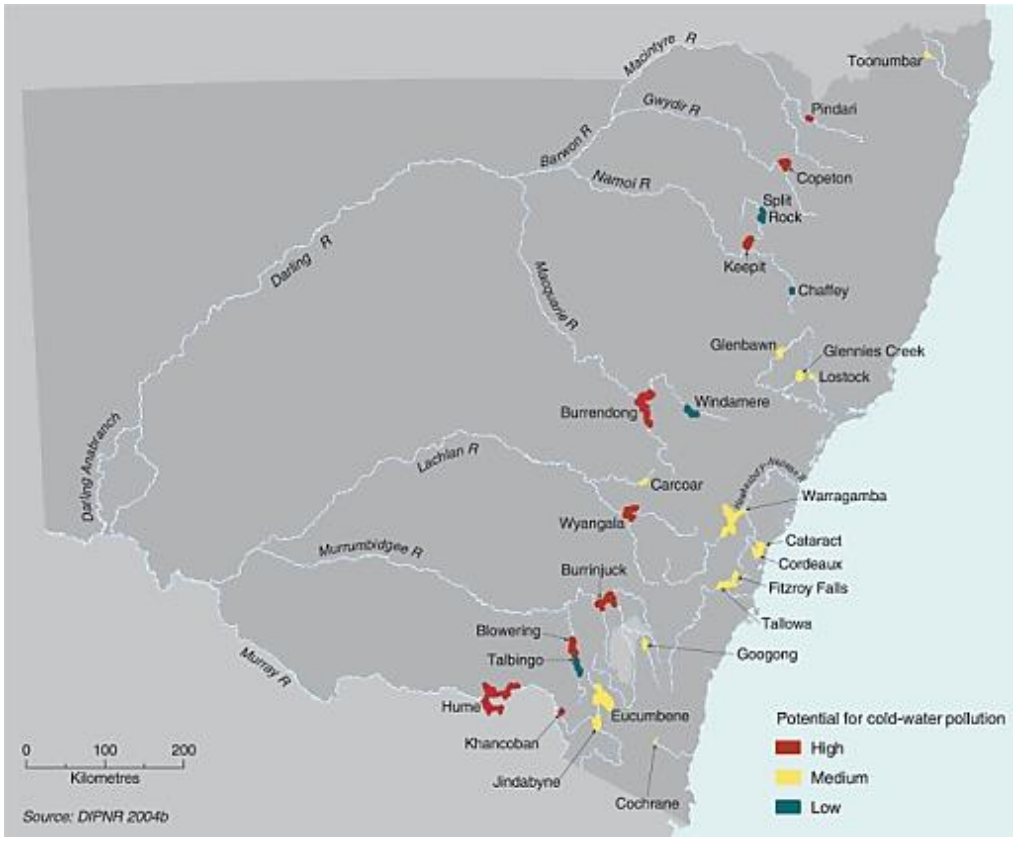
Chapter 9 Environmental impacts

While the management of environmental water has been discussed throughout the report, most notably in chapter 3 during consideration of the Murray-Darling Basin Plan and water sharing plans, and in chapter 4 in relation to water allocation and the water market, this chapter will consider the health of waterways and aquatic life in New South Wales by examining specific environmental impacts such as cold water pollution, blackwater events and bank slumping.

Cold water pollution

9.1 Cold water pollution refers to an artificial lowering of the temperature in a body of water. It is caused by cold water being released into rivers from large dams during warmer months. Between spring and autumn, water stored in large dams can form two layers; a warm surface layer overlying a cold bottom layer. Since many older dams are only equipped to draw water from the bottom of a dam, water that is much colder than the natural river temperature is released downstream, causing cold-water pollution.[1007]

Figure 21 Potential for cold water pollution in dams[1008]



1007 NSW Department of Industry – Water, *Cold Water Pollution*, https://www.dpi.nsw.gov.au/fishing/habitat/threats/cold-water-pollution.

1008 NSW Department of Industry – Water, *Cold Water Pollution*, https://www.dpi.nsw.gov.au/fishing/habitat/threats/cold-water-pollution.

9.2 It is one of the key factors behind the reduction of native freshwater fish species in New South Wales. Twenty-three dams are affected by cold water pollution; 14 of which are moderately affected, while nine are likely to cause severe cold-water impacts, as noted in Figure 21. This pollution affects hundreds of kilometres of downstream flow.[1009]

9.3 Cold water pollution can reduce the growth of fish and their chance of survival. A study by NSW Fisheries at Burrendong Dam compared silver perch survival and growth in cold and warm water releases. Results showed 100 per cent survival in warm channels compared to 25 per cent survival in cold channels.[1010]

9.4 Mr Jim Muirhead, Management Committee Member of the South West Anglers Association, agreed that water temperature has a significant impact on fish:

> I went barramundi fishing for the first time about 10 years ago and I did not see a barramundi, I did not catch one, the reason being the water temperature was wrong. Fish are very affected by water temperature whether it is for feeding or for breeding.[1011]

9.5 He stated that '[h]ealthy fish and waterways go hand-in-hand' and if environmental water management was implemented correctly, fish farmers and the environment would both benefit.[1012]

9.6 The South West Anglers Association believed that releases of cold water from dams and weirs is one of the most important factors impacting native fish. This 'thermal pollution' is not only impacting breeding, growth and development, but also the structure of the food chain. The association indicated that a pilot study of Golden Perch in the Edward-Wakool system suggested that two-thirds of fish in that waterway were born in the Darling River. While more research is required, the association is firmly of the view that the cold temperature of water delivered to that area plays a major part in preventing breeding, upstream of the Edward-Wakool system.[1013]

9.7 Ms Patricia Beatty, Executive Officer, NSW Professional Fishermen's Association identified that water storages and environmental flows have severe impacts on the health of rivers and fish:

> In 2012, 22 species, populations and ecological communities of native freshwater fish and invertebrates were listed as threatened under the provisions of the *Fisheries Management Act 1994*. To date, extensive research has shown that the construction and management of water storages has severe and long-lasting impacts upon river health and fisheries productivity. The primary impact research has fallen into three main categories: the negative impact on the river flow events; cold water pollution from the

1009 Submission 106, Mr Alec Lucke, p 11; Department of Industry - Water, *Cold Water Pollution*, https://www.dpi.nsw.gov.au/fishing/habitat/threats/cold-water-pollution.

1010 NSW Department of Industry - Water, *Cold Water Pollution*, https://www.dpi.nsw.gov.au/fishing/habitat/threats/cold-water-pollution.

1011 Evidence, Mr Jim Muirhead, Management Committee Member, South West Anglers Association, 1 March 2017, p 31.

1012 Evidence, Mr Muirhead, 1 March 2017, p 30.

1013 Submission 82, South West Anglers Association Inc., p 1.

> release of waters from impoundments; and physically obstructing fish movement along the river channel and access to habitats upstream of the dam wall.[1014]

9.8 Inland Rivers Network argued that large dams and weirs have caused significant changes to the health of river systems including loss of native fish passages, cold water pollution, de-oxygenation and changes in natural flow variation.[1015] Changes to water temperature in rivers impacts on fish habitat, for example more than 100 km of the Macquarie River downstream of Burrendong Dam is impacted by thermal pollution. As noted earlier, this has a significant influence on threatened fish populations such as silver perch.[1016]

9.9 Water storages can also produce toxic blue green algae blooms, which is caused by high levels of nutrients and surface water temperature in water storages. Water released from dams can seed downstream rivers with blue green algae outbreaks. These have major health impacts on humans, livestock and wildlife.[1017] Inland Rivers Network indicated that the conflict between releasing cold water and water seeded with blue green algae needs to be carefully managed so that poor quality water is not delivered from water storages into downstream riverine environments.[1018]

9.10 Dr Rex Stanton from the Graham Centre for Agricultural Innovation at Charles Sturt University was of the view that cold water pollution can be caused by releases of environmental flows. He argued that river flows should be managed in a more natural manner to avoid the effects of cold water pollution and recommended using pipelines to deliver a secure and continuous water supply to points at the lower end of the Murray-Darling system:[1019]

> The release of environmental flows is problematic. Cold water released from the bottom of a storage facility can have a detrimental impact on the flora and invertebrate fauna downstream of the release point. Prior to the construction of water regulation facilities (dams, weirs etc), inland rivers and surrounding environments went through a natural cycle of drought and flood. This natural cycle needs to be reflected in the managed system. However, reliance of South Australian residents on the Murray-Darling system for supply of residential water currently needs to be considered in flow management. To allow river flows to be managed in a more natural manner, consideration needs to be given to using pipelines to deliver a secure and continuous water supply to points at the lower end of the system.[1020]

9.11 The irrigation farmers, WJ and Seery Partnership noted that it is well-documented that water released from the bottom of large dams through environmental flows results in significantly lower water temperatures, which has negative effects to downstream aquatic ecosystems. It stated that while the issue has been repeatedly raised, there has been a consistently slow

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1014 Evidence, Ms Patricia Beatty, Executive Officer, NSW Professional Fishermen's Association, 1 August 2017, p 38.

1015 Submission 58, Inland Rivers Network, p 2.

1016 Submission 58, Inland Rivers Network, p 17.

1017 Submission 58, Inland Rivers Network, p 17.

1018 Submission 58, Inland Rivers Network, p 21.

1019 Submission 65, Dr Rex Stanton, Graham Centre for Agricultural Innovation, Charles Sturt University, p 2.

1020 Submission 65, Dr Stanton, p 2.

response from government.[1021] Ms Hayley Greenham, consultant for WJ and Seery Partnership argued that if environmental water was used 'properly', or sold when it is not necessary, the government could fund solutions to environmental problems, such as thermal curtains.[1022]

9.12 Gwydir Valley Irrigators Association noted that governments must recognise that environmental outcomes, through the delivery of environmental water, will continue to be undermined until there is appropriate investment in complementary or non-flow measures to combat cold water pollution and invasive species such as carp.[1023]

9.13 The association argued that the basin plan's original focus on only environmental flow was flawed, and a one-sided attempt at addressing basin-wide objectives to improve environmental outcomes. It considered that this flawed approach is highlighted by the ineffective use of environmental water for native fish recruitment in the Gwydir Valley. Despite the Commonwealth Environmental Water Holder using nearly 40,000 ML since 2013 to meet fish recruitment triggers by mimicking flow-hydrographs, there has been limited evidence of fish response. Gwydir Valley Irrigators Association Inc indicated that for this reason it had invested in a 'Cold Fish' campaign, which intends 'to bring heat to the issue of cold water pollution'. The association advised that the campaign has been very successful in raising community awareness.[1024]

9.14 The Gwydir Valley Irrigators Association also stated that environmental water must be carefully used and its limitations (such as regarding cold water pollution) addressed:

> Water is an extremely valuable resource for everyone and we should not allow environmental water to be wasted (as evidenced in the Gwydir) to achieve outcomes that we know can't be achieved. We must address the limitations to environmental water management like cold water pollution, invasive species like carp, poor fish passage and habitat and riparian land management. Issues that through a modest investment, compared to the $380M in water recovery in our region, can be mitigated or eliminated.[1025]

9.15 A similar argument was made by Lachlan Valley Water which also stated that the Murray-Darling Basin Plan has focused too much on volumes of flow, increasing the environmental share of flow and reducing the productive share. It argued that environmental problems are not going to be solved by simply adding more water. The basin would benefit from a more comprehensive approach through combined land and water management, as well as non-flow measures, for example regarding curtains on dam intakes to reduce cold water pollution, release of the carp herpes virus and the construction of fish ladders. Lachlan Valley Water Inc. recommended that this process takes place along with a comprehensive monitoring and assessment of the effectiveness of water reforms.[1026]

1021 Submission 26, WJ and Seery Partnership, p 6.

1022 Evidence, Ms Hayley Greenham, Consultant, WJ and Seery Partnership, 15 May 2017, p 31.

1023 Submission 109, Gwydir Valley Irrigators Association Inc., p 4.

1024 Submission 109, Gwydir Valley Irrigators Association Inc., p 24.

1025 Submission 109, Gwydir Valley Irrigators Association Inc., p 24.

1026 Submission 114, Lachlan Valley Water Inc, p 7.

9.16 In discussing Burrinjuck Dam, Mr Paul Pierotti, President of the Griffith Business Chamber, suggested that the problem of cold water pollution could be resolved by quadrupling the dam's capacity from 1,028 GL to 4,000 GL, by either creating a new wall or extending the current wall (this is also discussed in Chapter 5).[1027]

9.17 Mr Alec Lucke indicated that Copeton Dam is the second worst cold water pollution dam in New South Wales. The cold water (10-12 degrees Celsius) and sediment loading from the dam sterilises and silts up the Gwydir River. Recreational fish such as the Murray cod, yellowbelly and catfish require temperatures above 20 degrees Celsius to spawn and for their fingerlings to thrive. These temperatures are never met in the region and other aquatic species such as platypus, turtles, shrimp and lobsters are also now much less prevalent.[1028]

9.18 The prime time for environmental flow releases from Copeton Dam coincides with the spawning of native fish in spring and early summer. Because these flows create cold water pollution, the nearby Bingara community and the creatures that inhabit the Gwydir River derive no environmental benefits.[1029] It is only further downstream, once the water has had a chance to warm up, that positive effects from environmental flows can be seen. However, there have been constant negative effects for Bingara ever since the dam was constructed in the 1970s.[1030]

9.19 Mr Alec Lucke described this as a situation of 'institutionalised neglect'[1031] and argued that there is a lack of decision-making from state bodies to address cold water pollution:

> Presently there appears to be political inertia at a state level to deal with cold water pollution as decisions are awaited from within the Murray-Darling Basin Authority on future policy directions and whether a bucket of money may become available for wider purposes. It is also suggested that influential parties may be engaged in horse trading as they jockey for the most advantageous position. On the basis of a public seminar entitled Fish and Flows organised and addressed by Environment NSW, DPI Fisheries, DPI Water at the Bingara Living Classrooms on July 2016, the various agencies appeared dysfunctional and lacking in freedom to openly declare support for community driven initiatives and aspirations.[1032]

9.20 He noted that under its terms of reference, the Murray-Darling Basin Authority is restrained from allocating money to remediate the effects caused by cold water pollution. However, during consultations for the Northern Basin review the authority appeared to accept that cold water pollution may impede the potential environmental benefits of measures undertaken by the authority.[1033]

9.21 Although native fish are struggling, Mr Lucke noted that carp have a much greater adaptability and are ever present in the river.[1034] He explained that federal government planning is

1027 Evidence, Mr Paul Pierotti, President, Griffith Business Chamber, 1 March 2017, p 48.

1028 Submission 106, Mr Alec Lucke, p 9.

1029 Submission 106, Mr Alec Lucke, pp 10-11.

1030 Evidence, Mr Alec Lucke, 15 May 2017, p 20.

1031 Evidence, Mr Alec Lucke, 15 May 2017, p 20.

1032 Submission 106, Mr Alec Lucke, p 10.

1033 Submission 106, Mr Alec Lucke, p 10.

1034 Submission 106, Mr Alec Lucke, p 9.

underway to control carp through the release of a virus.[1035] However, Mr Lucke was of the view that cold water pollution should be addressed before the government releases the carp virus, as the virus will be more effective if native fish are given a chance to thrive:

> When you release the carp virus—the difficulty at the moment is you have got something like possibly 3,000 kilometres of river downstream of dams which is affected by cold water pollution, when the native fish cannot thrive, cannot really effectively breed and fingerlings do not really survive beyond about a 20 per cent survival rate. You are just going to seed up all the Murray-Darling system again because carp is not going to be effected to the same degree. You are not going to kill all the carp. Like the rabbits with the calicivirus you are going to kill maybe most of them but those that survive are going to breed like hell. If these areas of these rivers are not corrected and made more natural you will just seed up the system again. It is a matter of getting the right sequence of events and getting the timing right.[1036]

9.22 In light of this, Mr Lucke put forward the following recommendations:

- that cold water pollution be resolved in all dams in New South Wales before the introduction of the carp virus, or at the very least, that it be remediated in the nine severely affected dams
- that Murray cod and yellowbelly fingerlings be subsequently released below these dams so that carp survivors are subjected to competition.[1037]

Thermal curtain at Burrendong Dam

9.23 Mr Lucke stated that the thermal curtain at Burrendong Dam changed the nature of the debate regarding cold water pollution, as '[i]t was no longer an argument that we cannot do anything because that won an award and it was considered to be an environmental world first'.[1038] The innovative adjustable thermal curtain surrounds the tower and warm surface water flows over the rim of the curtain for controlled release. Its installation improved temperatures downstream of the dam by about 3.5 degrees Celsius. However, a lightning strike, full dam recharge and engineering defects rendered the thermal curtain inoperable. Mr Alec Lucke argued that as ministerial letters state the thermal curtain, if successfully trialled, will have wider applications, the curtain needs to be repaired urgently.[1039]

9.24 Mr Michael Murray, General Manager, Cotton Australia, also stated that there has been a few problems with the thermal curtain at Burrendong Dam; but praised it as world-leading technology and 'a reasonably cost-effective way of retrofitting a solution to thermal water pollution'.[1040]

9.25 South West Anglers Association agreed that the temperature control curtain at Burrendong provided significant improvements in the size and activity of native fish in the areas directly

1035 Submission 106, Mr Alec Lucke, pp 10-11.

1036 Evidence, Mr Alec Lucke, 15 May 2017, pp 21-22.

1037 Submission 106, Mr Alec Lucke, pp 10-11.

1038 Evidence, Mr Alec Lucke, 15 May 2017, pp 20-21.

1039 Submission 106, Mr Alec Lucke, p 9.

1040 Evidence, Mr Michael Murray, General Manager, Cotton Australia, 2 June 2017. p 7.

downstream of the lake. The project cost less than $4 million, which is a relatively small investment for the health of the river. The association stated that this should be considered in all major dams in New South Wales.[1041]

9.26 Mr Andrew George, Executive Manager, Assets Solutions and Delivery at WaterNSW described the Burrendong cold water pollution curtain, as 'probably the first of its kind' and an experiment to see if it could achieve environmental benefits. WaterNSW is still recording and measuring results from that project in order to understand fully its benefits and apply those learnings to any future infrastructure solutions around New South Wales.[1042]

9.27 Mr George indicated that the Burrendong temperature control curtain was damaged during flooding at the end of 2016. When water in the storage rose rapidly, it became obvious there was a structural defect. This has been difficult to rectify as the dam is very deep and cold. Specialist divers are required, who can only work for very short periods of time.[1043]

9.28 The WaterNSW website confirms that the Burrendong temperature control curtain continues to not be operational due to critical component failures. WaterNSW is assessing possible repair options, noting that repair work will be difficult to complete.[1044]

9.29 Mr George noted that the NSW Government is taking a broad statewide strategic approach to cold water pollution, rather than looking at individual solutions in isolation. WaterNSW is developing a cold water pollution strategy which has synergies with work being led by the Department of Primary Industries – Office of Water.[1045]

9.30 Mr Mark Taylor, Assistant Secretary, Commonwealth Environmental Water Office, indicated that cold water pollution is a serious issue and that the water holder tries to release water from dams at times when natural flows are present in order to mitigate the effects.[1046]

Committee comment

9.31 Cold water pollution is a problem affecting many dams in New South Wales and is causing the reduction of native freshwater fish species. While the committee commends the government for installing an innovative temperature control curtain in Burrendong Dam to remediate cold water pollution, we note that the curtain has not been operational for some time.

9.32 In order to ensure that cold water pollution is eradicated in the area and also to ensure that the NSW Government can investigate its effectiveness we recommend that repair of the Burrendong Dam temperature control curtain be expedited and for the government to report

1041 Submission 82, South West Anglers Association Inc., p 1.

1042 Evidence, Mr Andrew George, Executive Manager, Assets Solutions and Delivery, WaterNSW, 5 June 2017, p 36.

1043 Evidence, Mr George, 5 June 2017, p 37.

1044 WaterNSW, *Burrendong temperature control structure*, http://www.waternsw.com.au/projects/environmental/burrendong.

1045 Evidence, Mr George, 5 June 2017, p 36.

1046 Evidence, Mr Mark Taylor, Assistant Secretary, Commonwealth Environmental Water Office, 19 September 2017, p 10.

on the curtain's suitability in remediating cold water pollution. The government should then consider installing effective solutions in other severely affected New South Wales dams.

9.33 The committee also heard evidence that the effects of cold water pollution are being exacerbated by poorly timed environmental flows during periods when native fish are spawning. Further, we note evidence that the Murray-Darling Basin Authority is aware that cold water pollution may impede the potential environmental benefits of measures it undertakes. Therefore, in order to limit the negative effects of cold water pollution we recommend that the Murray-Darling Basin Authority provides funding to remediate cold water pollution in New South Wales dams. It is further recommended that the NSW Government work with the Commonwealth Environmental Water Holder to prevent the cold water pollution during environmental flows.

Recommendation 48

That the NSW Government:

- as a matter of priority, expedite the repair of the Burrendong Dam temperature control curtain
- then report on the suitability of the Burrendong Dam temperature control curtain in remediating cold water pollution with a view to installing effective solutions to cold water pollution in other severely affected New South Wales dams.

Recommendation 49

That the NSW Government:

- request funding from the federal government to remediate cold water pollution in New South Wales dams
- work with the Commonwealth Environmental Water Holder to limit the effects of cold water pollution during environmental flows.

Blackwater events and bank slumping

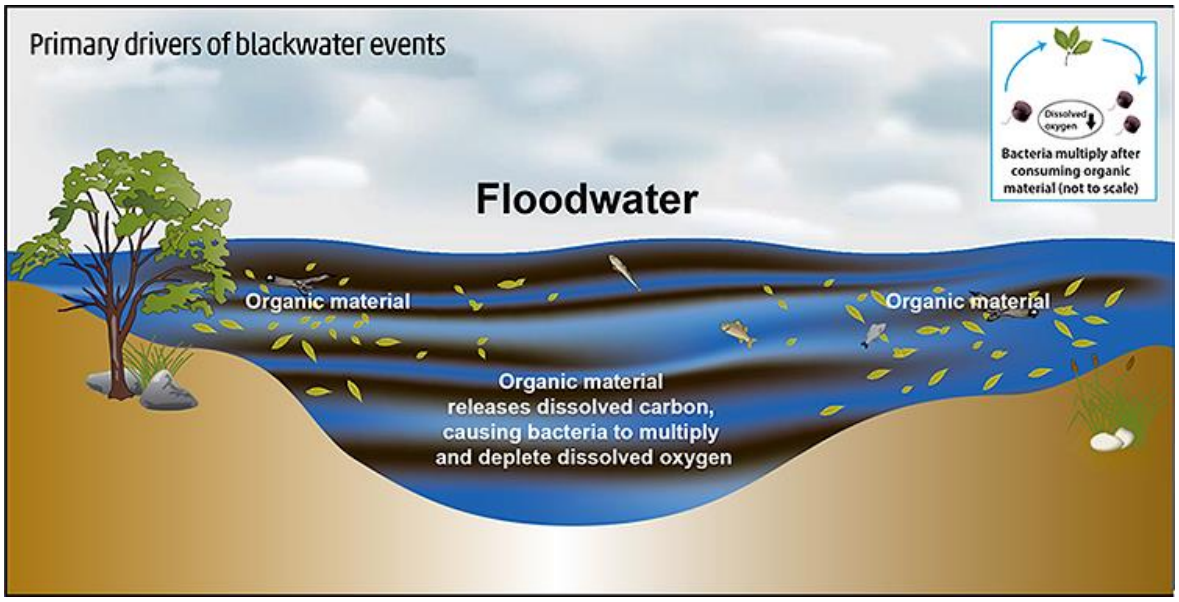
9.34 Blackwater forms when flooding occurs after prolonged dry periods with warm temperatures and there has been an extensive build-up of organic material such as leaf litter. Less frequent flooding allows large quantities of organic material to accumulate on river banks and floodplains. When this material is washed into waterways in times of flood, increased bacterial activity can result in deoxygenation of the floodwater.[1047]

9.35 Hypoxic blackwater usually has short-term harmful impacts on the environment and can lead to the death of aquatic organisms. Native fish and crustaceans are especially vulnerable. Despite short-term effects on aquatic organisms, the floods which lead to blackwater are an essential part of the long-term health of river, floodplain and wetland ecosystems, particularly after prolonged drought. Risks to human health are low if direct contact with blackwater is

[1047] Australian Department of Environment and Energy, *Hypoxic blackwater events and water quality*, http://www.environment.gov.au/water/cewo/publications/factsheet-hypoxic-blackwater-events-and-water-quality.

avoided. However, blackwater may have social and economic impacts related to the higher costs of treating water for consumption and short-term loss of amenity and recreation opportunities.[1048]

Figure 22 Drivers of blackwater[1049]



9.36 Inland Rivers Network advised that deoxygenation of water is caused by the trapping of nutrient-laden sediments behind the dam. This reduces the storage volume and increases the cycle of oxygen depletion. This results in increased plant and algal growth, bacterial decomposition and the release of phosphorous which also nourishes algal growth. Deoxygenated water releases from water storages have a major impact on downstream ecosystems and fish habitat.[1050]

9.37 Mr Jim Muirhead, Management Committee Member of the South West Anglers Association, was critical of the management of forests and national parks where ground debris added to blackwater events. He noted how 'crazy' it was that hundreds of fishing competitions have raised money for fish restocking only for the fish to then be killed by blackwater events.[1051] The South West Anglers Association also noted that fish kills in recent years have been due to blackwater events that were the result of poorly managed water releases.[1052]

9.38 Mr Neil Gorey stated that blackwater, which can lead to the death of fish, is an issue which needs greater consideration and understanding. With the management of state forests and

1048 Australian Department of Environment and Energy, *Hypoxic blackwater events and water quality*, http://www.environment.gov.au/water/cewo/publications/factsheet-hypoxic-blackwater-events-and-water-quality.

1049 Australian Department of Environment and Energy, *Hypoxic blackwater events and water quality*, http://www.environment.gov.au/water/cewo/publications/factsheet-hypoxic-blackwater-events-and-water-quality.

1050 Submission 58, Inland Rivers Network, p 17.

1051 Evidence, Mr Muirhead, 1 March 2017, pp 30-31.

1052 Submission 82, South West Anglers Association Inc., p 2.

National Parks favouring a higher mass per hectare of both trees and dry matter, this has created a situation where flooding is likely to create a blackwater event. This has occurred recently where fish kills have been observed in the Wakool River following flooding. Mr Gorey indicated that NSW Government agencies need to be more attuned to local experience and knowledge in dealing with this issue, as 'Citizen Science' has a lot to offer.[1053]

9.39 Mr Simon Rowe, Project Manager, OceanWatch Australia, noted that the Department of Industries – Water has designed floodgates that have flow mechanisms to facilitate fish passage from one side of the gate to the other. He noted that initially floodgates hold back water; however through a combination of factors, blackwater events can occur when water seeps out and there is low oxygen.[1054]

9.40 Mr Ross Farlow, President of the New South Wales Cane Growers Association, stated that his members are very proactive in getting rid of floodwater as quickly as possible, as 'the sooner we can get rid of it, the fewer blackwater events will occur, with fewer things like mosquito problems'.[1055]

9.41 Griffith City Council asserted that the efficiency and sustainability of environmental water management by the NSW and federal government is highly questionable, as evidenced by blackwater events along with a range of other issues such as river bank erosion, blue green algae events and the proliferation of carp and mosquito fish.[1056]

9.42 NSW Farmers Griffith Branch questioned whether the environment in New South Wales is being overwatered as there 'have been numerous reports of drowning gums, river bank erosion, black water events, poor water quality, pest species, carp proliferation and overly waterlogged wetlands'.[1057]

9.43 Mr Mark Dalzell, Director, Technical Services for Edward River Council, stated that bank slumping has an effect not only on river health, but also on tourism and community activities. He explained that usually water sits in the river for a long period of time and there is 'equilibrium between what is in the river and what is in the bank'.[1058] Bank slumping occurs when water levels in the river drop very quickly; the water stays in the sandy banks, and there is a surcharge. Large trees by the riverbanks are lost as slumping undermines the root systems. Although water sharing plans have mechanisms to handle this, Edward River Council considered these to be ineffective.[1059]

1053 Submission 99, Mr Neil Gorey, p 1.

1054 Evidence, Mr Simon Rowe, Project Manager, OceanWatch Australia, 1 August 2017, p 40.

1055 Evidence, Mr Ross Farlow, President, New South Wales Cane Growers Association, 1 August 2017, p 52.

1056 Supplementary submission 17a, Griffith City Council, p 19.

1057 Submission 29, NSW Farmers Griffith Branch, p 13.

1058 Evidence, Mr Mark Dalzell, Director, Technical Services, Edward River Council, 28 February 2017, p 18.

1059 Evidence, Mr Dalzell, 28 February 2017, p 18.

9.44 While slumping is natural to a certain extent, Edward River Council considered that the practice of managing rivers by dropping water levels must be investigated, as fewer areas of the riverbank are accessible. This is impacting on tourist and community activities.[1060]

9.45 Mr Mark Taylor, Assistant Secretary, Commonwealth Environmental Water Office, stated that his office is very interested in the issue of bank slumping and its causes as 'it is a bad outcome for everybody' and not good for the office's reputation if its actions are a part of the cause. He noted that the water holder is contantly looking to change its practices in order to mitigate any negative effects of its work.[1061]

9.46 The Commonwealth Environmental Water Holder also informed the committee it has investigated the impacts of environmental flows on bank erosion in the Goulburn River and found the effects to be minimal:

> The Commonwealth Environmental Water Holder, in partnership with the Goulburn-Broken Catchment Management Authority and the University of Melbourne, recently investigated the impacts of environmental flows on bank erosion in the Goulburn River. It was found that the effect of environmental flows on bank condition is very minor compared to changes that occur under the remainder of the regulated flow regime. In fact, the investigation found that managed recession of environmental flow events allows the formation of sediment drapes, which reduces bank erosion.[1062]

Committee comment

9.47 The committee notes the concerns of some inquiry participants that the management of ground debris in national parks and state forests is a major cause of blackwater events during flooding. We therefore recommend that the NSW Government review this impact, as these serious blackwater events are responsible for fish kills.

9.48 The committee acknowledges concerns raised by stakeholders regarding bank slumping. We note that the Commonwealth Environmental Water Holder has recently completed a study into this area showing that environmental flows have only a minor negative effect on bank conditions. However, the committee considers that regulated flows should be reviewed to ascertain their impact on riverbank slumping, and we recommend accordingly.

Recommendation 50

That the NSW Government review the impact of ground debris in national parks and state forests on blackwater events that cause fish kills.

Recommendation 51

That the NSW Government review the effects of regulated flows on riverbank slumping.

1060 Evidence, Mr Dalzell, 28 February 2017, p 18.

1061 Evidence, Mr Taylor, 19 September 2017, p 10.

1062 Answers to questions on notice, Commonwealth Environmental Water Holder, received 24 October 2017, p 3.

Appendix 1 Recommendations of the Standing Committee on State Development report on the adequacy of water storages in New South Wales

Summary of recommendations

Recommendation 1 *Page 32*

That the NSW Government clearly communicate to stakeholders the purpose of all major water storages in New South Wales.

Recommendation 2 *Page 33*

That the NSW Government publish the outcomes of its review of the potential role for Warragamba Dam in flood mitigation.

Recommendation 3 *Page 51*

That the NSW Government and local councils continue to support and promote demand management practices and urban water conservation measures such as stormwater harvesting and recycling waste water.

Recommendation 4 *Page 61*

That the NSW Government:

- financially support the agriculture sector to use more efficient water practices and encourage contributions from industry and the Commonwealth Government to support research and development in this area, and
- ensure that after the 2,750 gigalitres in sustainable diversion limits for the Murray Darling Basin Plan objective has been met, any further funding for on-farm efficiency savings should be provided based on:
  1. State funded projects returning 100 per cent of water savings back to the irrigator, and
  2. any State participation in federally funded programs for on-farm water savings be based on irrigators retaining at least 50 per cent of the savings.

Recommendation 5 *Page 62*

That the NSW Government develop a statewide policy of waiving fixed water charges during exceptional drought conditions.

Recommendation 6 *Page 75*

That the NSW Government review the management and impact of water releases from Blowering Dam on the Tumut River.

Recommendation 7 *Page 81*

That the NSW Government review the environmental flow allocations for all valleys in New South Wales and make representations to the Commonwealth Government for it to review the environmental flow allocations for New South Wales valleys in relation to the Murray Darling Basin Plan.

Recommendation 8 *Page 82*

That the NSW Government amend the principles of the *Water Management Act 2000* to ensure that the commercial water supply for towns and utilities and high security needs in regulated rivers are prioritised above environmental needs.

Recommendation 9 *Page 82*

That the NSW Government clarify with the Commonwealth Government the NSW Government's liability for environmental water releases made under the Murray Darling Basin Plan that inundate private land, in time to feed into the process of developing the water sharing plans that must comply with the Plan and be enacted by 2019.

Recommendation 10 *Page 100*

That the NSW Government fund and implement the Computer Aided River Management system across all New South Wales river systems.

Recommendation 11 *Page 100*

That the NSW Government implement the water metering project across New South Wales, to support the statewide implementation of the Computer Aided River Management system

Recommendation 12 *Page 109*

That the NSW Government:

- make representations to the Commonwealth Government to resolve who will provide funding for the augmentation works at the Menindee Lakes, and
- reaffirm and complete plans to enable construction to commence as soon as practicable.

Recommendation 13 *Page 111*

That the NSW Government make representations to the Commonwealth and South Australian Governments to initiate a review of the current management of the lower lakes of the Murray Darling Basin. This review should focus on returning the lakes to an estuarine system by building barrages upstream rather than at the mouth, thereby reducing the volume of water currently required and improving the productive and environmental outcomes for New South Wales.

Recommendation 14 *Page 120*

That the NSW Government, in undertaking the review of the New South Wales Dam Safety Committee and its relevant legislation, take into consideration the concerns raised in this inquiry and that the outcomes of the review be made public.

Recommendation 15 *Page 148*

That the NSW Government investigate the potential of strategically placed en-route storages to extend water use and provide flexibility in water delivery in some river systems, particularly in the Murray Darling Basin.

Recommendation 16 *Page 153*

That the NSW Government commit to continuing an integrated water management and conservation policy, and that it foster responsible use of water in urban, industrial and agricultural settings.

Recommendation 17 *Page 154*

That the NSW Government ensure that new storage proposals are comprehensively assessed in terms of costs, benefits, storage efficiency, geological suitability of the site, environmental considerations, community expectations and other factors as appropriate.

Recommendation 18 *Page 154*

That the NSW Government establish an Integrated Water Management Taskforce comprised of representatives of each of the key water user groups and government, with the following roles:

- to drive innovation in responsible water conservation, use and management, and
- to build collaborative relationships and promote the sharing of knowledge and expertise between and within water user groups across New South Wales.

Recommendation 19 *Page 154*

That the NSW Government commit to investing in water efficiency research and development, to inform an integrated, best practice approach to water management, and to further advances in this area.

Appendix 2 Updated Government response to the report of the Legislative Council Standing Committee on State Development on the adequacy of waters storages in NSW

Attachment A – Updated Government response to the report of the Legislative Council Standing Committee on State Development on the adequacy of water storages in NSW

The table below either provides additional information about the implementation of the Committee's recommendations (marked as update) or indicates that the previous response stands (maintain previous response).

Recommendation	NSW Government Response
1: *That the NSW Government clearly communicate to stakeholders the purpose of all major water storages in NSW.*	**Update** Major water storages in NSW are managed by WaterNSW. Information about the purpose of major storages is available on WaterNSW website - NSW Major Dams.
2: *That the NSW Government report on the outcomes of its review of the potential role for Warragamba Dam in flood mitigation.*	**Update** The Hawkesbury-Nepean Valley Flood Management 2013 Review (Stage One) was completed in early 2014 with the reports published on the DPI Water's website (http://www.water.nsw.gov.au/water-management/water-availability/flood-management/hawkesbury-nepean-valley-flood-management-review). In response to the Stage-One recommendations the NSW Government established the Hawkesbury-Nepean Valley Flood Risk Management Taskforce, headed by an Independent Chair in 2014 to develop a comprehensive regional Hawkesbury-Nepean Flood Risk Management Strategy to significantly reduce the potential economic and social impact of flooding in the Valley. The Strategy comprises a mix of infrastructure, non-infrastructure and improved flood risk management measures that contribute to preventing or mitigating the flood, more coordinated and strategic planning and preparing for floods including increasing ability to evacuate as well as responding to and recovering from floods in the Valley. In June 2016, NSW Government announced that it plans to raise the wall of Sydney's Warragamba Dam to significantly reduce the flood risk in the

Recommendation	NSW Government Response
	Hawkesbury-Nepean Valley with $58 million in funding allocated for detailed concept designs and environmental assessments. The funding package will also be used to increase community flood risk awareness, create evacuation signage, improve flood forecasting and integrate the flood risk management with regional planning. Final approval of the project will be subject to the preparation of a business case.
3: *That the NSW Government and local councils continue to support and promote demand management practices and urban water conservation measures such as stormwater harvesting and recycling waste water.*	**Update** In relation to stormwater harvesting, the NSW Government is currently progressing the development of an Urban Stormwater Harvesting Policy in consultation with Local Government. In relation to water recycling, the Best Practice Management (BPM) Framework was streamlined in 2014 reducing the regulatory burden and compliance costs without diminishing the effectiveness or efficiency in achieving the outcomes of the BPM Framework. The BPM Framework addresses the 10 key national requirements for urban water supply and sewerage. Water planning for the metropolitan areas of greater Sydney and the lower Hunter aims to achieve an optimal mix of demand and supply measures to secure drinking water supplies for over five million people in NSW. Demand management measures are an integral part of both the Metropolitan Water Plan for Sydney and the Lower Hunter Water Plan. Strategies to reduce potable water demand include water recycling and reuse for a range of non-drinking purposes, permanent Water Wise Rules, and other water efficiency initiatives. In addition, the *Water Industry Competition Act 2006* enables private sector involvement in the water industry, supporting additional opportunities for water recycling and stormwater harvesting.
4(i): *That the NSW Government:* • *financially support the agriculture sector to use more efficient water practices and encourage contributions from industry and*	**Maintain previous response** The NSW Government has continued to have a strong focus on water efficiency, particularly in the Murray-Darling Basin. The NSW Government has supported

Recommendation	NSW Government Response
the Commonwealth Government to support research and development in this area	substantial Commonwealth funding into on-farm efficiency and water delivery efficiency programs to recover the water required under the Basin Plan.
4(ii): *ensure that after the 2,750 gigalitres in sustainable diversion limits for the Murray-Darling Basin Plan objective has been met, any further funding for on-farm efficiency savings should be provided based on:* *1. State funded projects returning 100 per cent of water savings back to the irrigator, and* *2. any State participation in federally funded programs for on-farm water savings be based on irrigators retaining at least 50 per cent of the savings.*	**Update** The Basin Plan sets a sustainable diversion limit (SDL) for each catchment and aquifer in the Basin, as well as an overall limit for the Basin as a whole. In order to meet the new limits, 2,750 GL of water needs to be recovered Basin-wide; NSW's share of this "SDL gap" is 1,312 GL. Approximately 870 GL of water recovered up till May 2016. On 22 April 2016, Ministers agreed to a Sustainable Diversion Limit Adjustment Mechanism (SDLAM) package of supply, efficiency and constraints measures. Ministerial Council has also requested that the Commonwealth amend the Basin Plan to provide for a second SDL adjustment step by 30 June 2017. This would allow for a second tranche of projects to be developed to further improve the outcomes of the Basin Plan. An overview of the SDL adjustment mechanism and inter-jurisdiction review process was provided in the first Stakeholder Update made available in January. The outcomes of prefeasibility assessment of potential projects were summarised in the January and June 2015 Stakeholder Updates. Both of these updates are available on the DPI Water website - www.water.nsw.gov.au. Jurisdictions are now considering phase 2 proposals against the guidelines endorsed by the Basin Officials Committee.
5: *That the NSW Government develop a state-wide policy of waiving fixed water charges during exceptional drought conditions.*	**Maintain previous response** The NSW government will continue to assess the effects of exceptional drought conditions as and when those conditions occur. At times of exceptional drought, the NSW Government will consider the appropriate measure in response to drought conditions.
6: *That the NSW Government review the management and impact of water releases*	**Update** The management of the Tumut River has been reviwed many times since the

Recommendation	NSW Government Response
from Blowering Dam on the Tumut River.	construction of the Snowy Hydro Scheme. DPI Water manages an annual program works and measures designed to maintain the river, prevent erosion and unplanned inundation. Since 2013/14, DPI Water has spent approximately $2 million on an annual program of works and measures designed to manage and maintain the Dam and River.
7: *That the NSW Government review the environmental flow allocations for all valleys in NSW and make representations to the Commonwealth Government for it to review the environmental flow allocations for NSW valleys in relation to the Murray-Darling Basin Plan.*	**Update** Environmental flow provisions in NSW's existing water sharing plans were developed in consultation with local communities. The Basin Plan was developed on the basis that the water committed to the environment under the water sharing plans would not be reduced, with additional environmental water to be recovered. The environmental water provisions in NSW water sharing plans in the Basin will be reviewed as part of the development of the water resource plans. More specifically, it has recently been announced that that a review of the translucent flow rules will be undertaken by DPI Water to determine whether the intended environmental outcomes can be achieved with a more flexible approach. NSW has developed strategies for improving the efficiency and effectiveness of licensed environmental water delivery while maintaining the same reliability of supply of water to consumptive users as at the establishment of the Basin Plan. These prerequisite policy measures, set out in the Basin Plan and required to maximise the SDL adjustment for NSW, will provide the ability to use environmental flows at multiple sites (environmental flow reuse) and the ability to allow the call of held environmental water from a storage during an unregulated flow event (piggybacking).
8: *That the NSW Government amend the principles of the Water Management Act 2000 to ensure that the commercial water supply for towns and utilities and high security needs in regulated rivers are prioritised above*	**Maintain previous response** The NSW Government does not propose to amend the water management principles set out in the *Water Management Act 2000*.

Recommendation	NSW Government Response
environmental needs.	
9: *That the NSW Government clarify with the Commonwealth Government the NSW Government's liability for environmental water releases made under the Murray-Darling Basin Plan that inundate private land, in time to feed into the process of developing the water sharing plans that must comply with the Plan and be enacted by 2019.*	**Update** This issue is being determined as part of the constraints management strategy under the Basin Plan, which is reviewing the impacts of increased environmental releases.
10 & 11: *That the NSW Government:* • *fund and implement the Computer Aided River Management (CARM) system across all NSW river systems.* • *implement the water-metering project across NSW, to support the state-wide implementation of the Computer Aided River Management system.*	**Update** The CARM project was run by WaterNSW and has been implemented in the Murrumbidgee. Recognition of the operational efficiencies anticipated from CARM is being sought via the SDL adjustment mechanism in the Murrumbidgee. WaterNSW is also assessing the feasibility of a Northern Rivers' Computer Aided River Management project. The proposition is to deliver a staged system to maximise river operational efficiency benefits therefore underpinning river system reliability, security and water recovery. Successful application of the CARM hydrodynamic operating system requires more than an operational perspective; each river system is different with differing community, environmental and economic demands. This necessitates a whole-of-valley perspective before and during the application of CARM which is unique to each river valley. The metering projects in the Southern valleys of Murray, Murrumbidgee and Lower Darling are underway. An alternative approach to monitoring in the norther valleys was agreed, and as a result, these remaining valleys which were not part of the metering project will be required to provide accurate meters on an individual basis to comply with metering standards.

Recommendation	NSW Government Response
12: *That the NSW Government:* • *make representations to the Commonwealth Government to resolve who will provide funding for the augmentation works at the Menindee Lakes; and* • *re-affirm and complete plans to enable construction to commence as soon as practicable*	**Update** Securing Broken Hill's water supply is now backed by almost $500 million investment package – consisting of a range of short term water projects – such as a new reverse osmosis plant – and a long term solution of a pipeline from the Murray River. This investment will address decades-long supply issues that continue to hold back the city from reaching its full potential. It will also bring significant catchment-wide benefits for the northern and southern irrigation industries – and sit at the heart of NSW commitments under the Murray-Darling Basin Plan. The pipeline project helps NSW meet its targets under the Murray-Darling Basin Plan – reducing our need to take further productive water to meet recovery targets and helps our northern and southern irrigation industries. The NSW and Commonwealth governments have been involved in negotiations for a number of years over proposed changes for improved management arrangements and infrastructure for Menindee Lakes to achieve water savings. With the long term solution for Broken Hill now resolved, DPI Water is developing the concept designs for potential new infrastructure and management arrangements that would improve the management and efficiency of the Menindee Lakes system.
13: *That the NSW Government make representations to the Commonwealth and South Australian Governments to initiate a review of the current management of the lower lakes of the Murray-Darling Basin. This review should focus on returning the lakes to an estuarine system by building barrages upstream rather than at the mouth, thereby reducing the volume of water currently required and improving the productive and*	**Maintain previous response** The NSW government raised these issues during the development of the Murray-Darling Basin Plan, where there was considerable debate around the management of the Lower Lakes and barrages.

Recommendation	NSW Government Response
environmental outcomes for NSW.	
14: *That the NSW Government, in undertaking the review of the NSW Dam Safety Committee and its relevant legislation, take into consideration the concerns raised in this inquiry and that the outcomes of the review be made public.*	**Update** The Dam Safety Review was undertaken in 2013 and the *Dams Safety Act 2015* was passed by Parliament in September 2015. The new legislation sets out a best practice framework for dams in NSW. It establishes a new Dams Safety Committee which has membership from a broad range of expertise and qualifications including dam engineering, operations and management, mine engineering, emergency management, and public safety risk analysis and best practice regulation. The Act gives Dams Safety NSW clear powers to regulate and gives dam owners clear responsibilities for dam safety. An Interim Dams Safety Advisory Committee is currently being established and will work to establish criteria for declaring dams as well as dam safety standards. These dam safety standards will provide a framework for a broad range of options to be applied to achieve safe dams. A key aspect of the standards will be to ensure risk and cost benefit analysis are incorporated into decisions about dam safety. Once the dam safety standards are in place Dams Safety NSW will be established. It is anticipated this will be in mid-2017.
15: *That the NSW Government investigate the potential of strategically placed en-route storages to extend water use and provide flexibility in water delivery in some river systems, particularly in the Murray-Darling Basin.*	**Maintain previous response** One of the SDL adjustment proposals in the Murrumbidgee involves changes to the Yanco Weir and regulator. This proposal would improve operational flexibility while also enhancing environmental outcomes for the mid Murrumbidgee wetlands.
16: *That the NSW Government commit to continuing an integrated water management and conservation policy, and that it foster*	**Maintain previous response** The Best Practice Management Framework operates in parallel with Council's Integrated Planning and Reporting (IPR) Framework, to ensure that long-term

Recommendation	NSW Government Response
responsible use of water in urban, industrial and agricultural settings.	community planning includes appropriate management of the urban water cycle.
17: *That the NSW Government ensure that new storage proposals are comprehensively assessed in terms of costs, benefits, storage efficiency, geological suitability of the site, environmental considerations, community expectations and other factors as appropriate.*	**Update** Refer to response under Terms of reference 1b) of this submission for NSW Government's action to ensure new storage proposals are assessed appropriately.
18: *That the NSW Government establish an Integrated Water Management Taskforce comprised of representatives of each of the key water user groups and government, with the following roles:* • *to drive innovation in responsible water conservation, use and management; and* • *to build collaborative relationships and promote the sharing of knowledge and expertise between and within water user groups across NSW.*	**Maintain previous response** The NSW government maintains that while there is benefit in an integrated approach to water management, there are numerous existing stakeholder and industry groups already operating in this regard.
19: *That the NSW Government commit to investing in water efficiency research and development, to inform an integrated, best practice approach to water management, and to further advances in this area.*	**Update** The NSW Water Supply and Sewerage Performance Monitoring Report 2014-15 disclosed performance indicators for all NSW water utilities including 105 regional utilities and four metropolitan utilities. The report demonstrated that pricing was a strong signal to encourage efficient water use. Pricing reform has assisted the NSW utilities to achieve a 50% reduction in residential water supplied per property since 1991 (from 330 to 166 kL/property). This equates to a saving of over 95 billion litres per year and over $1 billion in capital expenditure savings over the past decade for augmenting headworks and treatment capacity.

Recommendation	NSW Government Response
	Additionally, the NSW Government manages Sustaining the Basin Projects which includes the Southern Metering Project, Health Floodplains Project and Basin Pipe Project. These alongside Irrigated Farm Modernisation Project, managed by NSW Agriculture are funded under the Commonwealth's Sustainable Rural Water Use and Infrastructure Program.

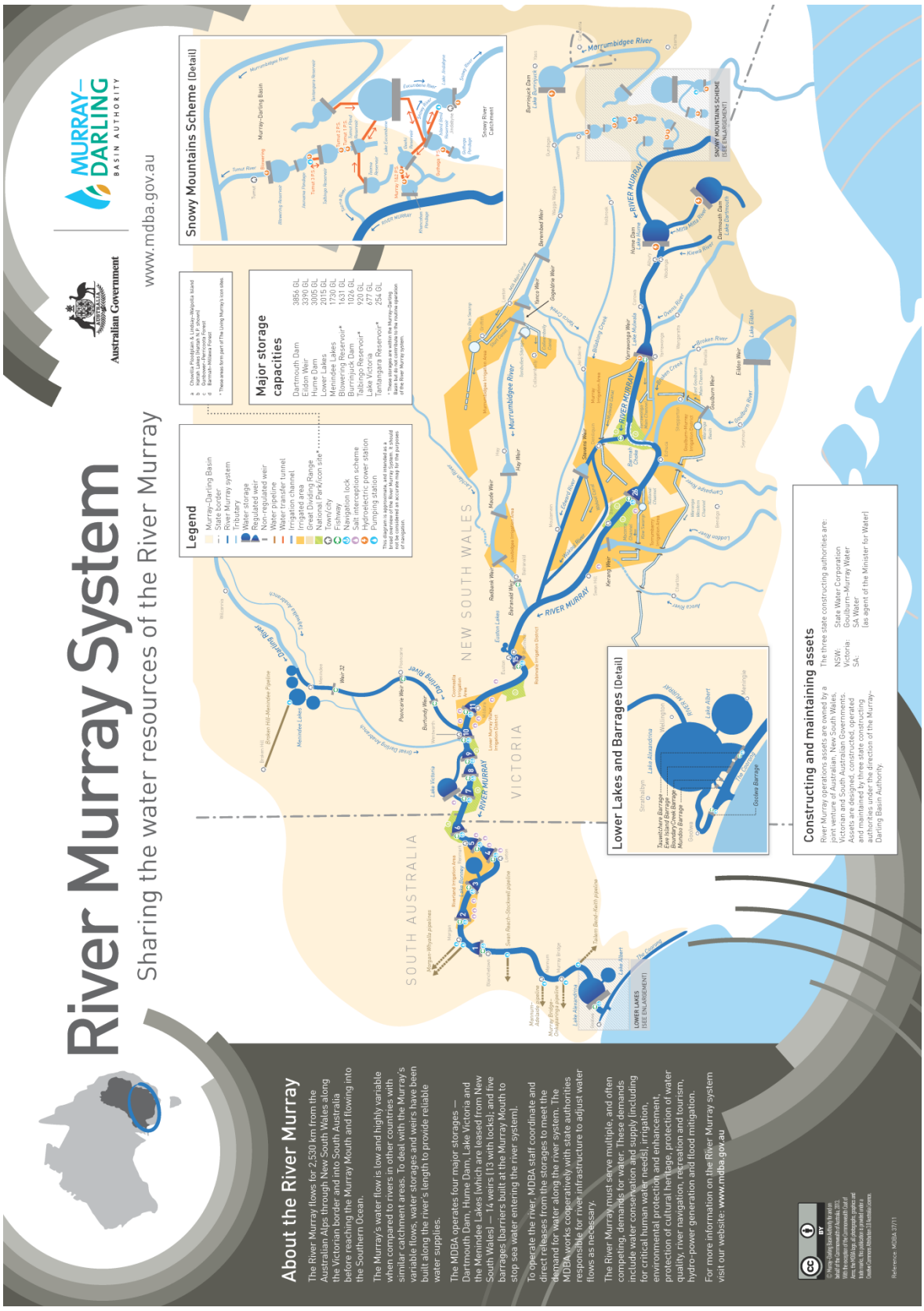
Source: Submission 48, NSW Government, pp 30- 38.

Appendix 3 Major dams in rural and regional New South Wales operated by WaterNSW

Name	Location	Capacity (GL)	River Valley
Blowering Dam	Tumut	1,628	Murrumbidgee
Brogo Dam	Bega	8.9	Coastal
Burrendong Dam	Wellington	1,188	Macquarie Cudgegong
Burrinjuck Dam	Yass	1,028	Murrumbidgee
Carcoar Dam	Carcoar	35.8	Lachlan
Chaffey Dam	Tamworth	100.5	Namoi
Copeton Dam	Inverell	1,364	Gwydir
Glenbawn Dam	Scone	749.84	Hunter
Glennies Creek Dam	Singleton	283	Hunter
Hume Dam	Albury	3,005	Murray
Keepit Dam	Gunnedah	425.51	Namoi
Lostock Dam	Gresford	20.2	Hunter
Menindee Lakes	Broken Hill	1,731	Lower Darling
Oberon Dam	Oberon	45	Macquarie Cudgegong
Pindari Dam	Inverell	312	Border Rivers
Split Rock Dam	Manilla	397.37	Namoi
Toonumbar Dam	Kyogle	11	Coastal
Windamere Dam	Mudgee	368.12	Macquarie Cudgegong
Wyangala Dam	Cowra	1,217	Lachlan

Source: Water NSW, *Our dams*, http://www.waternsw.com.au/supply/visit; Standing Committee on State Development, Legislative Council, *Adequacy of water storages in New South Wales* (2013), p 168.

Appendix 4 Sharing water resources of the Murray



Appendix 5 Submissions

No	Author
1	Mr Stephen Pitt
2	Ms Cheryl Yow
3	Broken Hill Darling River Action Group/Broken Hill Menindee lakes We Want Action Facebook Group
4	Mrs Daniela Ruegg
5	Mr James Saffioti
6	Mr David Wiggan
7	Mr Stephen Olive
8	Lower Darling Horticulture Group
9	Ms Jim Patterson
10	Mr Frederik Sehlmeier
11	Mr Brian Gillespie
12	Mr Michael McKay
13	Dr Peter Main
13a	Dr Peter Main
13b	Dr Peter Main
13c	Dr Peter Main
14	Mr EJ (Tim) Minty
15	Mr Peter Millington
16	Name suppressed
17	Griffith City Council
17a	Griffith City Council
18	Mr Wayne Chaffey
19	Ms Roslyn Cragg
20	Shoalhaven City Council
21	Peel Valley Water Users
22	Lower Darling Residents
23	-
24	Tamworth Regional Council
25	Riverina and Murray Regional Organisation of Councils (RAMROC)
26	WJ & A Seery Partnership
27	International Association of Hydrogeologists
28	Mr and Mrs Glen and Jacqueline de Brenni (partially confidential)
29	NSW Farmers Griffith Branch
30	Peter Thompson
31	Mrs Caroline Goosen
32	Anabranch Water
33	Name suppressed
34	Ms Margaret Hilder
35	Mr Anthony Pickard
36	Yenda Flood Victims Association Inc.
37	Murrumbidgee Valley Food and Fibre Association
38	Coonabarabran residents Against CSG

39	Daroo Orange Urban Landcare Group
40	Griffith Business Chamber
41	Ms Keelah Lam
42	Ms Judith Melville
43	Mr Yoav Bar-Ness
44	Southern Riverina Irrigators
45	Mid-Western Regional Council
46	Lock the Gate Alliance
47	Macquarie River Food & Fibre
48	NSW Government
49	Commonwealth Environmental Water Holder
50	The National Trust of Australia (NSW)
51	Broken Hill Chamber of Commerce
52	NSW Farmers Association
53	Central West Environment Council
54	Waterfind
55	Edward River Council
56	Ms Jeanine Bird
57	Ricegrowers Association of Australia
58	Inland Rivers Network
59	Sydney University Speleological Society (SUSS)
60	AWEC
60a	AWEC
61	Broken Hill City Council
62	IPWEA
63	Environmentally Concerned Citizens of Orange
64	Ms Karen Taylor
65	Dr Rex Stanton
66	Central NSW Councils
67	Innovyze
68	Armidale Action on Coal Seam Gas and Mining and 3 others
69	Wakool Landholders Association
70	Confidential
71	West Berriquin Irrigators Inc
71a	West Berriquin Irrigators Inc
72	The Wilderness Society Newcastle
73	Orange Speleological Society
74	Dr Stuart Khan
75	Mr Philip Jeffreys
76	Murray Valley Private Diverters
77	Save Cliefden Caves Association
78	Mr Greg Sandford
79	Ms Noeline Franklin
79a	Ms Noeline Franklin
79b	Ms Noeline Franklin
80	UNSW Law Society
81	Local Government NSW

82	South West Anglers Association Inc.
83	Mr Cyril Smith
84	NTSCORP
85	NSW Irrigators' Council
86	Clarence Valley Council
87	Spring Hill & Surrounding District Consultative Committee Inc.
87a	Spring Hill & Surrounding District Consultative Committee Inc.
88	Murrumbidgee Council
89	Ms Barbara Webster
90	Clarence Environment Centre
91	Leeton Shire Council
92	Australian Speleological Federation
93	Murray Irrigation
94	Cotton Australia
95	Mr William G. Masman
97	NSW Business Chamber
98	Mr Anthony Nicholls
99	Mr Neil Gorey
100	Name suppressed
101	Name suppressed
102	Ms Barb Webster
103	Mr Robert Mortlock
104	Barham Irrigation Dairy Farmer
105	The Macquarie Marshes Environmental Landholders Association
106	Mr Alec Lucke
106a	Mr Alec Lucke
107	Mr Rhys Glenn
108	Mr Ray Johnston
109	Gwydir Valley Irrigators Association Inc.
110	Namoi Water
111	Mr Joe Curran
112	Mr Michael O'Connor
113	Mr Dugald Bucknell
114	Lachlan Valley Water Inc
115	Ballina Fishermen's Co-operative Ltd
116	Tweed Shire Council
117	Mr Chris Magner
118	Pastoralists Association of West Darling Inc

Appendix 6 Witnesses

Date	Name	Position and Organisation
26 October 2016 **Broken Hill City Council Chambers, Broken Hill**	Mr William Bates	Director, Barkandji Native Title Group Aboriginal Corporation
	Mr Gerald Quayle	Director, Barkandji Native Title Group Aboriginal Corporation
	Mr Kevin Knight	Director, Barkandji Native Title Group Aboriginal Corporation
	Mr Neville Kim	Manager, Community Facilitation, NTSCORP
	Ms Hema Hariharan	Manager, Strategic Development Unit, NTSCORP
	Ms Rachel Strachan	Lower Darling Horticultural Group
	Mr Alan Whyte	Lower Darling Horticultural Group
	Mr Dennis Roach	Public Officer, Broken Hill Chamber of Commerce
	Ms Marion Browne	Councillor, Broken Hill City Council
	Mr David Harris	Chief Executive Officer, WaterNSW
	Mr Adrian Langdon	Executive Manager, Systems Operations and Asset
	Mr Dan Berry	Manager, Water Systems Operations, WaterNSW
	Mr John Coffey	Acting Manager Water Operations, Essential Water
	Mr Mark Hutton	Treasurer, The Broken Hill and Darling River Action
	Mr Tom Kennedy	President, The Broken Hill and Darling River Action
7 November 2016 **Macquarie Room, Parliament House**	Mr Shaun McBride	Senior Strategy Manager, Local Government NSW
	Mr Sascha Moege	Senior Policy Officer, Local Government NSW
	Mr Hugo Harmstorf	Chief Executive Officer, Independent Pricing and Regulatory Tribunal
	Mr Rob O'Neill	General Manager Licensing and Compliance, Independent Pricing and Regulatory Tribunal
	Mr Matthew Edgerton	Executive Director, Water Pricing, Independent Pricing and Regulatory Tribunal
	Dr Stuart Khan	Associate Professor, UNSW Water Research Centre and School of Civil and Environmental Engineering, University of NSW

Date	Name	Position and Organisation
	Mr Derek Schoen	President, NSW Farmer's Association
28 February 2017	Ms Rachel Kelly	Policy Manager, Ricegrower's Association of Australia
Deniliquin RSL, Deniliquin	Mr Mark Dalzell	Director, Technical Services, Edward River Council
	Mr Austin Evans	Administrator, Murrumbidgee Council
	Mr Craig Moffat	General Manager, Murrumbidgee Council
	Mr David Tamlyn	Director of Technical Services, Murrumbidgee Council
	Mr Mark Robertson	Chairman, Murray Irrigation
	Mr Michael Renehan	Chief Executive Officer, Murray Irrigation
	Ms Perin Davey	Executive Manager Corporate Affairs and Stakeholder Engagement, Murray Irrigation
	Councillor Kevin Mack	Chair, Riverina and Murray Organisation of Councils
	Mr Ray Stubbs	Executive Officer, Riverina and Murray Organisation of Councils
	Mr David May	Chair, Wakool Landholders Association
	Mr Greg Sandford	Community member
	Mr Alan Mathers	Local Representation Committee member, New Murray River Council and Chair, Eagle Creek Pumping Syndicate Inc.
1 March 2017	Mayor John Dal Broi	Griffith City Council
Griffith City Council Chamber, Griffith	Mr Brett Stone	General Manager, Griffith City Council
	Mr Graham Gordon	Director of Utilities, Griffith City Council
	Mayor Cr Paul Maytom	Leeton Shire Council
	Ms Helen Dalton	Board member, Executive Council, NSW Farmer's Association, Griffith Branch
	Ms Debbie Buller	President, Murrumbidgee Valley Food and Fibre Association
	Mr Chris Beale	Vice President, South West Angler's Association
	Mr Jim Muirhead	Management Committee Member, South West Angler's Association
	Mr Paul Rossetto	President, Yenda Flood Victim's Association
	Mr Paul Pierotti	President , Griffith Business Chamber
15 May 2017	Ms Zara Lowien	Executive Officer, Gwydir Valley Irrigators Association
Moree Plains Shire Council,		

Date	Name	Position and Organisation
Moree	Mr Mark Winter	Vice-Chair, Gwydir Valley Irrigators Association, Inglewood Pastoral Co
	Mr Nicholas Gillingham	Treasurer, Gwydir Valley Irrigators Association and General Farm Manager, Sundown Pastoral Co
	Ms Lila-Jane Fisher	Project and Development Manager, Moree Plains Shire Council
	Mr David Wolfenden	Group Manager, Waste and Water, Moree Plains Shire Council
	Mr Alec Lucke	Bingara resident
	Mr Michael Seery	Partner, WJ & Seery Partnerships
	Ms Hayley Greenham	Consultant, WJ & Seery Partnerships
	Mr Kerry Watts	Managing Director, Growth Agriculture
16 May 2017	Mr Daniel Kahl	Local farmer
Best Western Sanctuary Inn	Mr Wayne Chaffey	Irrigation farmer
Tamworth	Mr Ildu Monticone	Member, Peel Valley Water Users Association
	Mr David Gowing	Member, Peel Valley Water Users Association
	Ms Jannine Miles	President Peel Valley Water Users Association
	Clr Col Murray	Chairperson, Namoi Councils Joint Organisation, and Mayor, Tamworth Regional Council
	Mr Mark Hamblin	Chairman, Namoi Water
	Mr Steve Carolan	Vice Chairman, Namoi Water
17 May 2017	Ms Jon-maree Baker	Executive Officer, Namoi Water
Orange Ex-Service's Club	Mr Garry Styles	Board Member, Centroc and General Manager, Orange City Council
Orange	Mr Wayne Beatty	Deputy Chair, Water Utilities Alliance, Centroc
	Ms Meredith Macpherson	Water Utilities Alliance Program Manager, Centroc
	Cr John Medcalf	Acting Chair Centroc and Mayor, Lachlan Shire Council
	Cr David Somervaille	Board Member, Centroc and Chair, Central Tablelands Water
	Cr Bill West	Board Member, Centroc and Mayor, Cowra Shire Council
	Mr Kent Boyd	Board Member, Centroc and General Manager, Parkes Shire Council
	Ms Jane Paul	Project Manager, Daroo Orange Urban Landcare Group
	Mr Ian Curtis	President, Orange Speleological Society

Date	Name	Position and Organisation
	Mr Cyril Smith	Coordinator, Orange and Region Water Security Alliance
	Mr Harrison Burkitt	Secretary, Save Cliefden Caves Association
	Mr Mark McKenzie	Chief Executive Officer, NSW Irrigators Council
	Ms Stefanie Schulte	Policy Manager, NSW Irrigators Council
	Mr Michael Payten	Chairman, Belubula Landholders Association
	Mr Joe Curran	Primary Producer
2 June 2017	Mr Michael Murray	General Manager, Cotton Australia
Macquarie Room, Parliament House	Mr Chris Shore	Research Officer, Australian Water Exploration Co
	Mr Roger Shore	Representative, Australian Water Exploration Co
	Mr Col Joyce	Research Officer, Australian Water Exploration Co
	Mr James Lindsay	Research Officer, Australian Water Exploration Co
	Mr Peter Layton	Research Engineer, Australian Water Exploration Co
	Dr Declan Page	Group Leader - Groundwater Contamination And Remediation Technologies, CSIRO
	Mr Warwick MacDonald	Research Director of the CSIRO Water Resource Management Program
	Dr Peter Main	Private researcher
	Mr Scott Fidler	Regional Manager, Queensland, Golder Associates
	Mr Doug Brown	Water Management Specialist and Hydrogeologist, Golder Associates (New Zealand)
	Mr Tom Rooney	Chief Executive Officer, Waterfind Group
5 June 2017	Mr Simo Tervonen	Manager – Trade, Policy and Market Operations, Waterfind Group
Macquarie Room, Parliament House	Mr Hugo Harmstorf	Chief Executive Officer, IPART
	Mr Rob O'Neill	General Manager Licensing and Compliance, IPART
	Mr Matthew Edgerton	Executive Director Water, IPART
	Mr David Dreverman	Executive Director, River Management, Murray Darling Basin Authority
	Mr Gavin Hanlon	Deputy Director General, Department of Primary Industries
	Mr David Harris	Chief Executive Officer, Water NSW
	Mr Andrew George	Executive Manager, Assets Solutions & Delivery, Water NSW

Date	Name	Position and Organisation
	Mr Adrian Langdon	Executive Manager, Systems Operations & Asset Maintenance, Water NSW
1 August 2017	Mr Rod Haig	Strategic Engineer (Water and Waste Water), Lismore Council
Lismore City Hall, Lismore	Mr Michael McKenzie	Manager Planning and Delivery, Rous Water, Rous County Council
	Mr David Oxenham	Director Engineering, Tweed Shire Council
	Mr Anthony Burnham	Manager Water & Wastewater, Tweed Shire Council
	Mr Peter Rees	Manager, Utilities, Byron Shire Council
	Mr Andrew Leach	Manager, Asset Planning, Richmond Valley Council
	Mr Graham Kennett	General Manager, Kyogle Council
	Mr Troy Anderson	Director, Water and Civil, Clarence Valley Council
	Mr Greg Mashiah	Manager, Water Cycle, Clarence Valley Council
	Mr Phil Hilliard	Chief Executive Officer, Ballina Fisherman's Cooperative Limited
	Mr Mario Puglisi	Chairman, Ballina Fisherman's Cooperative Limited
	Ms Tricia Beatty	Executive Officer, NSW Professional Fishermen's Association
	Mr Simon Rowe	Project Manager, Oceanwatch Australia
	Mr Greg McNamara	Chairman, Norco
	Dr Bill Fulkerson	Field Advisor, Norco
	Mr Ian McBean	General Manager, Sunshine Sugar
	Mr Ross Farlow	President, NSW Cane Growers Association
	Mr Pat Battersby	Executive Officer, NSW Cane Growers Association
	Mr John Edwards	Honorary Secretary, Clarence Environment Centre
	Mr Jim Morrison	Member, Clarence Environment Centre
19 September 2017	Dr Peter Dillon	Co-Chair, International Association of Hydrogeologists Commission on Managing Aquifer Recharge
Macquarie Room, Parliament House	Dr Wendy Timms	Vice-President, International Association of Hydrogeologists, Australasia
	Mr Mark Taylor	Assistant Secretary, Commonwealth Environment Water Office

Appendix 7 Minutes

Minutes no. 8
Tuesday 22 March 2016
General Purpose Standing Committee No. 5
Members' Lounge, Parliament House, Sydney at 2 pm

1. Members present
Mr Brown, *Chair*
Mr Veitch, *Deputy Chair*
Mr Buckingham
Mr Colless
Mr MacDonald
Mr Mason-Cox (participating)
Mr Pearce
Ms Sharpe

2. Previous minutes
Resolved, on the motion of Mr Veitch: That draft minutes no. 7 be confirmed.

3. Correspondence
The Committee noted the following item of correspondence:

Received:

- 21 March 2016 – Letter from Mr Brown, Mr MacDonald and Mr Veitch requesting a meeting of GPSC No. 5 to consider a proposed self-reference into the augmentation of water supply for rural and regional New South Wales.

4. Consideration of terms of reference
The Chair tabled a letter proposing the following self-reference:

1. That General Purpose Standing Committee No. 5 inquire into and report on the performance or effectiveness of the NSW government agencies that are responsible for the augmentation of water supply for rural and regional New South Wales, and in particular:
    a) investigate the requirement for a water equation (demand and supply out to the middle of this century) for rural and regional New South Wales
    b) examine the suitability of existing New South Wales water storages and any future schemes for augmentation of water supply for New South Wales, including the potential for aquifer recharge
    c) review the NSW Government's response to the recommendations of the June 2013 report by the Standing Committee on State Development on the adequacy of water storages in New South Wales
    d) examine the 50 year flood history in New South Wales, particularly in northern coastal New South Wales, including the financial and human cost
    e) examine technologies available to mitigate flood damage, including diversion systems, and the scope of infrastructure needed to support water augmentation, by diversion, for rural and regional New South Wales
    f) examine social, economic and environmental aspects of water management practices in New South Wales and international jurisdictions, including the following case studies:
        i. Broken Hill town water supply/Menindee Lakes system
        ii. South Western NSW water management practices
        iii. North Western NSW water management practices

g) the efficiency and sustainability of environmental water being managed by different State and Federal Government departments and agencies
h) the management, appropriateness, efficiency and reporting of:
    i. inter-valley transfers
    ii. conveyance and loss water
    iii. carryover
    iv. the management and reporting of the water market, and
j) any other related matter.

2. That the committee report by 27 October 2017.

Mr MacDonald moved: That the committee adopt the terms of reference.

Mr Buckingham moved: That the motion of Mr MacDonald be amended by inserting two new terms of reference after point (f):
(g) examine the impact of climate change on water availability, including rainfall events, evaporation rates, soil moisture and run-off
(h) examine the impact of mining and gas extraction on water availability, quality and quantity

Amendment of Mr Buckingham put.

The committee divided.

Ayes: Mr Buckingham, Ms Sharpe, Mr Veitch
Noes: Mr Brown, Mr Colless, Mr Pearce, Mr MacDonald

Amendment of Mr Buckingham resolved in the negative.

Original question of Mr MacDonald put and passed.

5. Conduct of the inquiry into the augmentation of water supply for rural and regional New South Wales

5.1 Closing date for submissions

Resolved, on the motion of Mr Pearce: That the closing date for submissions be Sunday 19 June 2016.

5.2 Stakeholder list

Resolved, on the motion of Mr MacDonald: That:

- the secretariat circulate to members the Chair's proposed list of stakeholders to provide them with the opportunity to amend the list or nominate additional stakeholders
- members have two weeks to provide comments on the stakeholder list
- the committee agree to the stakeholder list by email, unless a meeting of the committee is required to resolve any disagreement.

5.3 Advertising

The committee noted that the standard practice is for all inquiries to be advertised via twitter, stakeholder letters and a media release distributed to all media outlets in New South Wales.

Resolved, on the motion of Mr MacDonald: That the committee spend up to $22,000 on print advertising, including advertising in the Sydney Morning Herald, Daily Telegraph, The Land and Weekly Times, with members to be provided with the opportunity to nominate additional regional publications.

5.4 Hearing dates

Resolved, on the motion of Mr Colless: That the timeline for hearings and site visits be considered by the committee following the receipt of submissions. Further, that hearing dates be determined by the Chair after consultation with members regarding their availability.

6. Adjournment
The committee adjourned at 2.15 pm *sine die*.

Madeleine Foley
Clerk to the Committee

Minutes no. 9

Wednesday 4 May 2016
General Purpose Standing Committee No. 5
Room 814/815, Parliament House, Sydney at 1.15 pm

1. Members present
Mr Brown, *Chair*
Mr Veitch, *Deputy Chair*
Mr Colless
Dr Faruqi (substituting for Mr Buckingham)
Mr MacDonald
Mr Pearce
Ms Sharpe

2. Previous minutes
Resolved, on the motion of Mr Veitch: That draft minutes no. 8 be confirmed.

3. Correspondence
The committee noted the following items of correspondence:

Received:

- 20 April 2016 – Email from Stephen Barlett, Executive Officer, Namoi Council to secretariat, requesting a hearing be held in Tamworth for the inquiry into water augmentation
- 19 April 2016 – Email from David Swan, Project Officer, Lower Macquarie Utility Alliance, to Chair, offering to assist the inquiry into water augmentation
- 1 April 2016 – Email to the Committee Director from Hon Shaoquett Moselmane MLC, Opposition Whip to Chair, advising that Hon Daniel Mookhey MLC will be a participating member for the duration of the inquiry into water augmentation
- 23 March 2016 – Letter from Hon Greg Pearce MLC to Chair drawing attention to the State Development Committee's 2013 report entitled 'Adequacy of water storages in NSW'
- 22 March 2016 – Letter to secretariat from Hon Dr Phelps MLC, Government Whip advising that Hon Matthew Mason-Cox MLC will substitute for Hon Greg Pearce MLC for the duration of the inquiry into water augmentation
- 8 March 2016 – Letter from Mr X to Chair regarding the evidence from witnesses representing the Office of Environment and Heritage to the inquiry into the Wambelong Fire.

Sent:

- 20 April 2016 – Email from Chair to stakeholders inviting them to make a submission to the inquiry into water augmentation.

4. Inquiry into water augmentation

4.1 Communication update
Members were asked to retweet to assist with raising awareness and interest in the inquiry. The committee noted that there will be a further update on the communications strategy at the next committee meeting.

4.2 Closing date for submissions

The committee noted that the closing date for submissions was extended to 14 August 2016, following agreement via email.

5. Inquiry into Wambelong fire – evidence from Office of Environment and Heritage

The committee considered the correspondence dated 8 March 2016 regarding the evidence from the Office of Environment and Heritage to the inquiry into the Wambelong fire.

Resolved, on the motion of Mr Colless: That the committee:

- accept the material provided in correspondence from Mr X dated 8 March 2016 concerning the evidence given by the Office of Environment and Heritage to the Wambelong fire inquiry, including the 27 page document and video files provided on USB
- keep the material confidential
- keep the author's name confidential, including in the minutes of proceedings.

Resolved, on the motion of Dr Faruqi: That the committee write to Mr X to inform him that:

- the committee has resolved to accept the material provided in correspondence dated 8 March 2016, including the 27 page document and video files provided on USB, and has resolved to keep the material confidential
- the matters he raises are under consideration.

Resolved, on the motion of Dr Faruqi: That the committee write to Mr Terry Bailey, Chief Executive, Office of Environment and Heritage, in the terms of the draft letter circulated by the secretariat at the meeting, as amended, and request that he respond by Wednesday 25 May 2016.

Resolved, on the motion of Dr Faruqi: That the committee meet in the sitting week of 31 May-2 June 2016 after receiving a response from Mr Bailey, Office of Environment and Heritage, to consider whether to take further action in relation to this matter.

6. Adjournment

The committee adjourned at 2.00 pm until the sitting week 31 May-2 June 2016, on a date to be confirmed.

Madeleine Foley
Clerk to the Committee

Minutes no. 20

Monday 17 October 2016
General Purpose Standing Committee No. 5
Waratah Room, Parliament House, Sydney at 1.35 pm

1. Members present

Mr Brown, *Chair*
Mr Veitch, *Deputy Chair*
Mr Colless
Mr Buckingham
Mr Mason-Cox
Ms Sharpe

2. Apologies

Mr MacDonald
Mr Mookhey
Mr Green

3. Correspondence

The committee noted the following items of correspondence:

Received:

- 18 August 2016 – Letter from the Hon. Niall Blair MLC to the Clerk of the Parliament, attaching the Government's submission to the water augmentation inquiry
- 12 August 2016 – Letter from Mr David Harris, Chief Executive Officer of WaterNSW to secretariat, offering assistance to the committee with the water augmentation inquiry
- 10 June 2016 – Letter from Mr Peter Thomas McLellan, Ms Jennifer Mavis McLellan and Ms Rhonda Mae McLellan to the secretariat regarding the water augmentation inquiry and inviting the committee to visit the sites of various water licences in the Barwon-Darling river system area
- 26 May 2016 – Letter from Cr Bill West Chair, Central NSW Councils (Centroc) to the Chair, inviting the committee on a site visit to the Central NSW region to hear about the work being undertaken on strategic regional water planning
- 20 April 2016 – Email from Namoi Councils Joint Organisation regarding the Water augmentation inquiry and requesting the committee to consider holding a public hearing in Tamworth
- April 14 2016 – Letter from Mr Keith Lathan to Chair, regarding the Water augmentation inquiry and issues relating to dams, water licences and fees.

4. Inquiry into water augmentation

4.1 Public submissions

The committee noted that the following submissions were published by the committee clerk under the authorisation of the resolution appointing the committee: submission nos. 1-15, 17-22, 24-27, 29-32, 34-69 and 71-95.

4.2 Partially confidential submissions

Resolved, on the motion of Mr Colless:

- That the committee keep the following information confidential, as per the request of the author: names and/or identifying and sensitive information in submissions nos. 16 and 33.
- That the committee keep the following information confidential, as per the recommendation of the secretariat: identifying information in submission no. 28.

4.3 Confidential submissions

Resolved, on the motion of Ms Sharpe: That the committee keep submission no. 70 confidential, as per the recommendation of the secretariat, as it contains identifying and/or sensitive information.

4.4 Site visit and hearing in Broken Hill and Menindee Lakes

The secretariat briefed the committee on arrangements for the Broken Hill/Menindee Lakes site visit and hearings.

4.5 Expert briefing

Resolved, on the motion of Mr Veitch: That Mr Chris Sullivan, Mr Scot MacDonald's advisor, be authorised to attend the expert briefing on 17 October, given Mr MacDonald is unable to attend himself.

The committee was briefed by two water experts:

- Mr David Harris, Former Executive Director of Water Resources Management and Deputy Commissioner, Murray-Darling Basin Commission
- Dr Greg Leslie, Professor of Chemical Engineering and Director, UNESCO Centre Membrane Science and Technology, and water infrastructure auditor for NSW IPART.

5. Adjournment

The committee adjourned at 3.35 pm, until 5.45 am, Tuesday 25 October 2016, Sydney Terminal 2 of the Sydney Domestic Airport (*Site visit to Menindee Lakes and public hearing in Broken Hill*).

Tina Higgins
Clerk to the Committee

Minutes no. 21
Tuesday 25 October 2016
General Purpose Standing Committee No. 5
Sydney Airport, Sydney at 6.00 am

1. Members present

Mr Brown, *Chair*
Mr Veitch, *Deputy Chair*
Mr Colless
Mr Buckingham
Mr Green
Mr MacDonald
Mr Mason-Cox
Mr Mookhey
Ms Sharpe

2. Inquiry into the augmentation of water supply for rural and regional New South Wales

2.1 Site visit

The committee visited various sites in the Menindee Lakes area, accompanied by representatives from WaterNSW, Department of Primary Industries (Water) and Essential Water.

3. Adjournment

The committee adjourned at 4.30 pm, until 8.10 am, Wednesday 26 October 2016 (public hearing).

Tina Higgins
Clerk to the Committee

Minutes no. 22
Wednesday 26 October 2016
General Purpose Standing Committee No. 5
Broken Hill City Council Chamber, Broken Hill at 8.17 am

1. Members present

Mr Brown, *Chair*
Mr Veitch, *Deputy Chair*
Mr Colless
Mr Buckingham
Mr Green
Mr MacDonald
Mr Mason-Cox
Mr Mookhey
Ms Sharpe

2. Draft minutes

Resolved on the motion of Mr Veitch: That draft minutes no. 18, 19 and 20 be confirmed.

3. Correspondence

The committee noted the following items of correspondence:

Received:

- 14 October 2016 – Email from Mr Ross Tout, Unit Controller – Gundagai, State Emergency Service (SES) to secretariat, responding to a submission invitation.

4. Inquiry into the augmentation of water supply for rural and regional New South Wales

4.1 Public hearing

Witnesses, the public and the media were admitted.

The Chair made an opening statement regarding the broadcasting of proceedings, adverse mention and other matters.

The following witnesses were sworn and examined:

- Mr William Brian "Badger" Bates, Director, Barkandji Native Title Group Aboriginal Corporation
- Mr Gerald Quayle, Director, Barkandji Native Title Group Aboriginal Corporation
- Mr Kevin Charles Knight, Director, Barkandji Native Title Group Aboriginal Corporation
- Mr Neville Kim, Manager, Community Facilitation, NTSCORP
- Ms Hema Hariharan, Manager, Strategic Development Unit, NTSCORP.

Mr Bates tendered the following document:

- Article entitled 'The death of Kaakutja: a case of peri-mortem weapon trauma in an Aboriginal man from north-western New South Wales, Australia', dated 2016.

The evidence concluded and the witnesses withdrew.

The following witnesses were sworn and examined:

- Ms Rachel Ann Strachan, Member, Lower Darling Horticultural Group
- Mr Alan John Whyte, Member, Lower Darling Horticultural Group.

Ms Strachan tendered the following document:

- Information sheet regarding a proposal for the removal of permanent plantings from the Lower Darling River Valley, dated December 2015.

The evidence concluded and the witnesses withdrew.

The following witness was sworn and examined:

- Mr Dennis Michael Roach, Public Officer, Broken Hill Chamber of Commerce.

Mr Roach tendered the following document:

- Broken Hill Chamber of Commerce submission to the Independent Pricing and Regulatory Tribunal regarding the 2014 review of prices for Essential Energy's water and sewerage services in Broken Hill.

The evidence concluded and the witness withdrew.

The following witness was sworn and examined:

- Ms Marion Browne, Councillor, Broken Hill City Council.

The evidence concluded and the witness withdrew.

The following witnesses were sworn and examined:

- Mr David Graham Harris, Chief Executive Officer, WaterNSW
- Mr Adrian Robin Langdon, Executive Manager, Systems Operations and Asset Maintenance, WaterNSW
- Mr Daniel Francis Berry, Manager, Water Systems Operations – WaterNSW.

The evidence concluded and the witnesses withdrew.

The following witness was sworn and examined:

- Mr John Coffey, Public Officer, Acting Manager Water Operations, Essential Water.

The evidence concluded and the witness withdrew.

Mr Coffey tendered the following document:

- System conductivity graphs 2003-2004 and drinking quality reports 2014-2015 for Broken Hill..

The following witnesses were sworn and examined:

- Mr Mark Hutton, Treasurer, The Broken Hill and Darling River Action Group and the Broken Hill Menindee Lakes We Want Action Facebook Group
- Mr Thomas Eric Kennedy, President, The Broken Hill and Darling River Action Group and the Broken Hill Menindee Lakes We Want Action Facebook Group.

The evidence concluded and the witnesses withdrew.

Mr Bates tendered the following document:

- Map of Water Sharing plan for Barwon-Darling Unregulated and Alluvial Water Sources, May 2012, showing Baakandji country.

The public and the media withdrew.

4.2 Tendered documents

Resolved, on the motion of Mr Colless: That the committee accept and publish the following documents tendered the during the public hearing:

- Broken Hill Chamber of Commerce submission to Independent Pricing and Regulatory Tribunal regarding the 2014 review of prices for Essential Energy's water and sewerage services in Broken Hill, tendered by Mr Dennis Roach.
- Article entitled 'The death of Kaakutja: a case of peri-mortem weapon trauma in an Aboriginal man from north-western New South Wales, Australia', dated 2016, tendered by Mr Willam "Badger" Bates.
- Information sheet regarding a proposal for the removal of permanent plantings from the Lower Darling River Valley, dated December 2015, tendered by Ms Rachel Strachan.
- System conductivity graphs 2003-2004 and drinking quality reports 2014-2015 for Broken Hill, tendered by Mr John Coffey.
- Map of Water Sharing plan for Barwon-Darling Unregulated and Alluvial Water Sources, May 2012, showing Baakandji country, tendered by Mr William "Badger" Bates.

5. Adjournment

The committee adjourned until 9.15am, Monday 7 November (public hearing in Sydney).

Tina Higgins
Clerk to the Committee

Minutes no. 23

Monday 7 November 2016
General Purpose Standing Committee No. 5
Macquarie Room, Sydney at 9.21 am

1. Members present
Mr Brown, *Chair*
Mr Veitch, *Deputy Chair*
Mr Colless
Mr MacDonald
Mr Mason-Cox
Ms Sharpe

2. Apologies
Mr Green

3. Draft minutes
Resolved, on the motion of Mr Veitch: That draft minutes nos. 21 and 22 be confirmed.

4. Correspondence
The committee noted the following items of correspondence:

Received:

- 3 November 2016 – Email from Mr David Papps, Commonwealth Environmental Water Holder, to the secretariat, advising that he cannot attend the hearing on 7 November and offering to respond to written questions from the committee.

5. Inquiry into the augmentation of water supply for rural and regional New South Wales

5.1 Future inquiry activity
Resolved, on the motion of Ms Sharpe: That the secretariat canvass members' availability for a:

- site visit/hearing in late February to the Murray/Lower Darling and Central West areas
- a site visit/hearing mid-May in the New England/North West area
- Sydney hearing in early June.

5.2 Further expert briefing

Resolved, on the motion of Mr Mason-Cox: That Ms Hannah Hamling, Golders Associates, be invited to brief the committee on sustainable water management in mid to late February 2017, with the secretariat to canvass members availability.

5.3 Rescheduling of witnesses
The committee noted that the Murray Darling Basin Authority and the Commonwealth Environmental Water Holder are unable to attend the hearing scheduled for today.

Resolved, on the motion of Mr Mason-Cox: That witnesses from DPI Water and WaterNSW, who were scheduled to appear at the hearing on 7 November 2016, be rescheduled to appear at a hearing next year.

5.4 Transcript of hearing on 7 November
The committee noted that the transcript for the hearing on 7 November may be delayed.

5.5 Public hearing

Witnesses, the public and the media were admitted.

The Chair made an opening statement regarding the broadcasting of proceedings, adverse mention and other matters.

The following witnesses were sworn and examined:

- Mr Shaun McBride, Senior Strategy Manager, Local Government NSW
- Mr Sascha Moege, Senior Policy Officer, Local Government NSW

The evidence concluded and the witnesses withdrew.

The following witnesses were sworn and examined:

- Mr Hugo Harmstorf, Chief Executive Officer, Independent Pricing and Regulatory Tribunal
- Mr Rob O'Neill, General Manager, Licensing and Compliance, Independent Pricing and Regulatory Tribunal
- Mr Matthew Edgerton, Executive Director, Water Pricing, Independent Pricing and Regulatory Tribunal

The evidence concluded and the witnesses withdrew.

The following witness was sworn and examined:

- Mr Dr Stuart Khan, Associate Professor UNSW Water Research Centre and School of Environmental Engineering, University of NSW.

Dr Stuart Khan tabled the following document:

- Drinking Water Through Recycling: The benefits and costs of supplying direct to the distribution systems, by Dr Stuart Khan, dated October 2013.

The evidence concluded and the witness withdrew.

The following witness was sworn and examined:

- Mr Derek Schoen, President, NSW Farmer's Association

The evidence concluded and the witnesses withdrew.

The public and media withdrew.

5.6 Tendered documents

Resolved, on the motion of Mr Veitch: That the committee accept and publish the following documents tendered during the public hearing:

- Drinking water through recycling: The benefits and costs of supplying direct to the distribution systems, dated October 2013, tendered by Dr Stuart Khan.

6. Adjournment

The committee adjourned until Thursday 17 November 2016, 12.50 pm, Members' Lounge, Parliament House (report deliberative for the 2015-16 Budget Estimates inquiry).

Ms Tina Higgins
Clerk to the Committee

Minutes no. 29

Friday 24 February 2017
General Purpose Standing Committee No. 5
Room 1136, Parliament House, Sydney, at 9.50 am

1. Members present

Mr Veitch *(Deputy Chair)*
Mr Colless
Mr McDonald
Mr Mookhey
Ms Sharpe (from 10.15 am)

2. Apologies

Mr Brown *(Chair)*
Mr Mason-Cox
Mr Buckingham
Mr Green
Mr Mookhey

3. Draft minutes

Resolved, on the motion of Mr McDonald: That draft minutes no.28 be confirmed.

4. Inquiry into the augmentation of water supply for rural and regional New South Wales

4.1 Public submissions

Resolved, on the motion of Mr Colless: That the committee authorise the publication of submission nos. 13b, 13c, 97-99 and 102-103.

4.2 Partially confidential submissions

Resolved, on the motion of Mr Colless: That the committee authorise the publication of submission nos. 100-101, with the exception of identifying information which is to remain confidential, as per the request of the authors.

4.3 Answers to questions on notice and supplementary questions

The following answers to questions on notice and supplementary questions were published by the committee clerk under the authorisation of the resolution appointing the committee:

- NTSCORP, received 21 December 2016
- IPART, received 2 December 2016
- Local Government NSW, received 13 December 2016
- Lower Darling Horticultural Group, received 1 December 2016
- Essential Energy (Essential Water), received 15 November 2016
- NSW Farmer's Association, received 7 November 2016
- Broken Hill Chamber of Commerce, received 26 October 2016.

Resolved, on the motion of Mr McDonald: That the committee authorise the publication of the answers to questions on notice and supplementary questions from WaterNSW, received 16 February 2017.

The committee noted that the secretariat is still awaiting the return of answers to questions on notice from Broken Hill Council.

4.4 Site visit and hearings in Deniliquin and Griffith 27 February to 1 March 2017

The secretariat briefed the committee on arrangements for the site visit and hearings.

Resolved, on the motion of Mr McDonald: That Mrs Burge (and other individuals) be authorised to travel with the committee on the bus from Deniliquin Airport to the property at Bulltale Creek on 27 February 2017.

The committee noted that the procedural unit will be accompanying the committee on the trip to Deniliquin and Griffith on the 27 February to 1 March, to undertake parliamentary education sessions for groups of school students.

4.5 Computer Aided River Management technology

Resolved, on the motion of Mr Colless: That the committee invite WaterNSW to provide a private briefing to the committee on the use of Computer Aided River Management technology in April/May, on a date to be canvassed with members by the secretariat.

4.6 Expert briefing

The committee was provided with a private briefing by the following experts:

- Ms Hannah Hamling, President Asia Pacific
- Dr Scott Fidler, Principal Hydrogeologist and Engineer
- Mr Roger Cudmore, Principal Environmental Engineer
- Mr Craig Whicenciak, Senior Hydrogeologist.

Resolved, on the motion of Mr McDonald: That the committee authorise the publication of the document entitled 'Managed Aquifer Recharge: Understanding a sustainable, practical approach to Integrated Water Management', provided by Golders Associates at the briefing.

5. Adjournment

The committee adjourned at 11.05 am until 7.00 am Monday 27 February 2017 (site visit to Deniliquin).

Ms Tina Higgins
Clerk to the Committee

Minutes no. 30

Monday 27 February 2017
General Purpose Standing Committee No. 5
Terminal 2, Sydney Airport, at 7.00 am

1. Members

Mr Veitch, *(Acting Chair)*
Mr Colless (joined the committee at Deniliquin)
Mr Green
Mr MacDonald
Mr Mason-Cox
Ms Sharpe

2. Apologies

Mr Brown *(Chair)*
Mr Buckingham
Mr Mookhey

3. Absence of Chair

In the absence of the Chair, the Deputy Chair took the Chair for the purpose of the site visit and hearings in Deniliquin and Griffith.

4. Inquiry into the augmentation of water supply for rural and regional New South Wales - Site visit to Deniliquin

The committee visited a private property at Bullatale Creek and heard from Mr Andrew and Mrs Louise Burge (Submission No.76), Mr Rob Locke and Ms Vicki Myer regarding floodwater issues and the effects of environmental flows.

It also visited a rice farm at Jerilderie and received a briefing and tour by Mr Russell Ford, Manager of Rice Research Australia Pty Ltd (RRAPL) about irrigation efficiency processes and associated technology for rice growing. The committee also met with Ms Suzie Falls, Program Manager of RRAPL and Ms Emily Ford, Seed and Livestock Officer of RRAPL and was also accompanied on the tour by Ms Rachel Kelly, Ricegrower's Association of Australia.

5. Next meeting

The committee adjourned at 3.15 pm until 8.50 am on Tuesday 28 February at Deniliquin RSL, Deniliquin (*public hearing*).

Rebecca Main
Clerk to the Committee

Minutes no. 31
Tuesday 28 February 2017
General Purpose Standing Committee No. 5
Deniliquin RSL, Deniliquin at 8.45 am

1. Members

Mr Veitch, *(Acting Chair*)
Mr Colless, *(Acting Deputy Chair)*
Mr Green
Mr MacDonald
Mr Mason-Cox
Ms Sharpe

2. Apologies

Mr Brown (*Chair*)
Mr Buckingham
Mr Mookhey

3. Election of Deputy Chair

The Acting Chair called for nominations for Deputy Chair.

Resolved, on the motion of Ms Sharpe: That Mr Colless is elected as Deputy Chair for the hearings of the inquiry into the augmentation of water supply for rural and regional New South Wales on 28 February 2017 and 1 March 2017.

4. Inquiry into the augmentation of water supply for rural and regional New South Wales

4.1 Public hearing

Witnesses, the public and the media were admitted.

The following witness was sworn and examined:

- Ms Rachel Kelly, Policy Manager, Ricegrower's Association of Australia

The witness withdrew.

The following witnesses were sworn and examined:

- Mr Mark Dalzell, Director, Technical Services, Edward River Council
- Mr Austin Evans, Administrator, Murrumbidgee Council
- Mr Craig Moffat, General Manager, Murrumbidgee Council
- Mr David Tamlyn, Director of Engineering, Murrumbidgee Council

The witnesses withdrew.

The following witnesses were sworn and examined:

- Mr Mark Robertson, Chairman, Murray Irrigation
- Mr Michael Renehan, Chief Executive Officer, Murray Irrigation
- Ms Perin Davey, Executive Manager, Murray Irrigation

Ms Davey tendered the following documents:

- Copy of WaterNSW Trading Water webpage entitled 'Murrumbidgee IVT Account Status', dated 28 February 2017
- Copy of Victorian Water Register webpage entitled 'Allocation trade opportunity calculations', dated 27 February 2017
- Document entitled, 'Barmah Choke Balance', Murray Darling Basin Authority.
- Copy of Murray Darling Basin Authority webpage entitled, 'State shares in MDBA Storages at end of January 2017, accessed 27 February 2017.
- Copy of Murray Darling Basin Authority document, 'Water in Storage', dated 1 February 2017, p 7.

The witnesses withdrew.

The following witnesses were sworn and examined:

- Ms Louise Burge, Vice Chair and Executive Officer, Murray Valley Private Diverters
- Mr Graeme Pyle, Chairman, Southern Riverina Irrigators
- Ms Shelley Scoullar, West Berriquin Irrigators

Ms Louise Burge tendered the following document:

- Copies of photographs depicting Lake Alexandrina barrages and degradation of the river environment and property development on Hindmarsh Island.

The witnesses withdrew.

The following witnesses were sworn and examined:

- Councillor Kevin Mack, Chair, Riverina and Murray Organisation of Councils
- Mr Ray Stubbs, Executive Officer, Riverina and Murray Organisation of Councils

Mr Ray Stubbs tendered the following document:

- Copy of email from Mr Ken Jury to Mr Ray Stubbs regarding Mr Jury's document 'A Better Way – for the Murray Darling Basin'.

The witnesses withdrew.

The following witnesses were sworn and examined:

- Mr David May, Chair Wakool Landholders Association
- Mr Greg Sandford, Community member
- Mr Alan Mathers, Local Representation Committee Member, New Murray River Council and Chair, Eagle Creek Pumping Syndicate Inc.

Mr Greg Sandford tendered the following document:

- Correspondence from Taylor and Whitty Solicitors to Mr Greg Standford regarding the proceedings of Arnold and Ors v The Minister Responsible for the Water Management Act 2000 and Ors, dated 14 December 2016
- Copy of Department of Primary Industries fact sheet entitled 'Water Resource Plans - Overview'
- Copy of CSIRO report to the Australian Government entitled 'Water Availability in the Murray', dated July 2008.

The witnesses withdrew.

The public hearing concluded at 4.24pm

The public and media withdrew.

4.2 Tendered documents

Resolved on the motion of Mr Colless: That the committee accept and publish the following documents tendered during the public hearing held on 28 February 2017:

- Copy of WaterNSW Trading Water webpage entitled 'Murrumbidgee IVT Account Status', dated 28 February 2017, tendered by Ms Perin Davey
- Copy of Victorian Water Register webpage entitled 'Allocation trade opportunity calculations', dated 27 February 2017, tendered by Ms Perin Davey
- Document entitled, 'Barmah Choke Balance', Murray Darling Basin Authority, tendered by Ms Perin Davey
- Copy of Murray Darling Basin Authority webpage entitled, 'State shares in MDBA Storages at end of January 2017, accessed 27 February 2017, tendered by Ms Perin Davey.
- Copy of Murray Darling Basin Authority document, 'Water in Storage', dated 1 February 2017, p 7, tendered by Ms Perin Davey
- Copies of photographs depicting Lake Alexandrina barrages and degradation of the river environment and property development on Hindmarsh Island, tendered by Ms Louise Burge
- Copy of email from Mr Ken Jury to Mr Ray Stubbs regarding Mr Jury's document 'A Better Way – for the Murray Darling Basin', tendered by Mr Ray Stubbs
- Correspondence from Taylor and Whitty Solicitors to Mr Greg Standford regarding the proceedings of Arnold and Ors v The Minister Responsible for the Water Management Act 2000 and Ors, dated 14 December 2016, tendered by Mr Greg Standford
- Copy of Department of Primary Industries fact sheet entitled 'Water Resource Plans - Overview', tendered by Mr Greg Sandford

- Copy of CSIRO report to the Australian Government entitled 'Water Availability in the Murray', dated July 2008, tendered by Mr Greg Sandford.

5. Next meeting

The committee adjourned at 4.26 pm, until 9.20 am, Wednesday 1 March 2017, public hearing at Griffith City Council Chamber, Griffith.

Rebecca Main
Clerk to the Committee

Minutes no. 32
Wednesday 1 March 2017
General Purpose Standing Committee No.5
Griffith City Council Chamber, at 9.30 am

1. Members

Mr Veitch, *(Acting Chair)*
Mr Colless*(Deputy Chair*)
Mr Green
Mr MacDonald
Mr Mason-Cox
Ms Sharpe

2. Apologies

Mr Brown (*Chair*)
Mr Buckingham
Mr Mookhey

3. Inquiry into the augmentation of water supply for rural and regional New South Wales

3.1 Public hearing

Witnesses, the public and the media were admitted.

The following witnesses were sworn and examined:

- Mayor John Dal Broi, Griffith City Council
- Deputy Mayor Dino Zappacosta, Griffith City Council
- Mr Brett Stonestreet, General Manager, Griffith City Council
- Mr Graham Gordon, Director of Utilities, Griffith City Council
- Mayor Councillor Paul Maytom, Leeton Shire Council

Mr John Dal Broi tendered the following documents:

- Email regarding how Supplementary Flow Events work, tendered by Mayor John Dal Broi, Griffith City Council, dated 11 August 2015
- Map entitled 'Clarence River Diversion Scheme', tendered by Mayor John Dal Broi, Griffith City Council, dated 1 March 2017

- Map entitled 'Clarence River Diversion Scheme map 2', tendered by Mayor John Dal Broi, Griffith City Council, dated 1 March 2017.

The evidence concluded and the witnesses withdrew.

The following witness was sworn and examined:

- Ms Helen Dalton, Board Member, Executive Council, NSW Farmer's Association, Griffith Branch

Ms Helen Dalton tendered the following document:

- Document entitled 'Lake Mejum Storage Proposals', Water Resources Commission of New South Wales', dated December 1980.

The evidence concluded and the witness withdrew.

The following witness was sworn and examined:

- Ms Debbie Buller, President, Murrumbidgee Valley Food and Fibre Association

The evidence concluded and the witness withdrew.

The following witnesses was sworn and examined:

- Mr Chris Beale, Vice President, South West Angler's Association
- Mr Jim Muirhead, Management Committee Member, South West Angler's Association

The evidence concluded and the witnesses withdrew.

The following witness was sworn and examined:

- Mr Paul Rossetto, President, Yenda Flood Victim's Association

Mr Paul Rossetto tendered the following document:

- 'Evidence given by Mr Paul Rossetto (former Griffith City Councillor, 2012-2016), to Inquiry into the augmentation of water supply for rural and regional New South Wales', and attaching an ABC News Article 'GDP forecast: Australia set to dodge recession as current account deficit shrinks to '70s levels', dated 28 February 2017.

The evidence concluded and the witness withdrew.

The following witness was sworn and examined:

- Mr Paul Pierotti, President, Griffith Business Chamber.

Mr Pierotti tendered the following documents:

- Document entitled 'OEH is a water trader'
- Summary document about Burrinjuck Dam and its potential to store more water
- Summary document about Blowering dam
- Document commenting on current water management strategies in the Griffith region
- Weekly Times article entitled 'Water trades raise transparency concerns', dated 1 March 2017.

The evidence concluded and the witness withdrew.

The public hearing concluded at 3.55 pm.

The public and media withdrew.

3.2 Tendered documents

Resolved, on the motion of Mr Colless: That the committee accept and publish the following documents tendered during the public hearing held on 1 March 2017:

- Email regarding how Supplementary Flow Events work, dated 11 August 2015, tendered by Mayor John Dal Broi, Griffith City Council
- Map entitled 'Clarence River Diversion Scheme', dated 1 March 2017, tendered by Mayor John Dal Broi, Griffith City Council
- Map entitled 'Clarence River Diversion Scheme map 2', dated 1 March 2017, tendered by Mayor John Dal Broi, Griffith City Council
- Document entitled 'Lake Mejum Storage Proposals', Water Resources Commission of New South Wales', dated December 1980, tendered by Ms Helen Dalton, NSW Farmer's Griffith branch.
- 'Evidence given by Mr Paul Rossetto (former Griffith City Councillor, 2012-2016), to Inquiry into the augmentation of water supply for rural and regional New South Wales', and attaching an ABC News Article 'GDP forecast: Australia set to dodge recession as current account deficit shrinks to '70s levels', dated 28 February 2017, tendered by Mr Paul Rossetto.
- Document entitled 'OEH is a water trader', tendered by Mr Paul Pierotti, President, Griffith Business Chamber.
- Summary document about Burrinjuck Dam and its potential to store more water, tendered by Mr Paul Pierotti, President, Griffith Business Chamber.
- Summary document about Blowering dam, tendered by Mr Paul Pierotti, President, Griffith Business Chamber.
- Document commenting on current water management strategies in the Griffith region, tendered by Mr Paul Pierotti, President, Griffith Business Chamber.
- Weekly Times article entitled 'Water trades raise transparency concerns', dated 1 March 2017, tendered by Mr Paul Pierotti, President, Griffith Business Chamber.

4. Next meeting

The committee adjourned at 3.56 pm *sine die*.

Rebecca Main
Clerk to the Committee

Minutes no. 33
Thursday 30 March 2017
Portfolio Committee No. 5
Members' Lounge, Parliament House, 12.59 pm

1. Members present

Mr Brown, *Chair*
Mr Veitch, *Deputy Chair*
Mr Green
Mr MacDonald
Mr Mason-Cox

2. Apologies
Mr Buckingham
Mr Colless
Mr Mookhey
Ms Sharpe

3. Previous minutes
Resolved, on the motion of Mr Mason-Cox: That draft minutes nos. 29-32 be confirmed.

4. Inquiry into the augmentation for water supply for rural and regional New South Wales

4.1 Submissions
Resolved, on the motion of Mr Green: That the committee authorise the publication of submission nos. 103 and 104.

4.2 Site visits/hearings in Moree, Tamworth and Orange
Resolved, on the motion of Mr Green: That the committee approve the cost of $20,867 for a charter flight to Moree, Tamworth and Orange for site visits and public hearings on 15, 16 and 17 May 2017.

The committee noted that due to other committee hearings and a sitting week following the committee's travel, the transcripts from the regional hearings may be delayed slightly. It is expected that the transcripts will be received on either Monday 22 or Friday 26 May 2017.

4.3 Witnesses
Resolved, on the motion of Mr Veitch: That the Chair's proposed witness lists for the hearings in Moree, Tamworth and Orange on 15 to 17 May 2017 be approved.

4.4 Itinerary
Resolved, on the motion of Mr MacDonald: That the Chair's proposed itinerary for the trip to Moree, Tamworth and Orange from 15 to 17 May 2017 be approved.

5. Adjournment
The committee adjourned at 1.01 pm, until Monday 15 May 2017.

Emma Rogerson
Clerk to the Committee

Minutes no. 34
Monday 15 May 2017
Portfolio Committee No. 5 – Industry and Transport
Terminal 2, Sydney Domestic Airport, 7.00 am

1. Members present

Mr Brown, *Chair*
Mr Veitch, *Deputy Chair*
Mr Colless
Mr Green (*participating member*)
Mr MacDonald
Ms Sharpe

2. Apologies

Mr Mason-Cox
Mr Mookhey (*participating member*)
Mr Buckingham

3. Previous minutes

Resolved, on the motion of Mr Veitch: That draft minutes no. 33 be confirmed.

4. Correspondence

Committee to note the following items of correspondence:

Received:

- 19 March 2017 – Email from Mr Alex Lucke, to Chair, providing information on cold water pollution and Gwydir Valley Irrigators commitment to the issue
- 21 April 2017 - Email from Mr Wayne Beatty, Water and Sewerage Strategic Manager, Orange City Council to committee, providing business case report on managed aquifer recharge
- 3 May 2017 – Email from Mr Wayne Beatty, Water and Sewerage Strategic Manager, Orange City Council to committee, providing information on Orange to Carcoar Pipeline and a Managed Aquifer Recharge Scheme
- 4 May 2017 – Email from the Hon Matthew Mason-Cox MLC to secretariat, advising that he is unable to attend the committee's trip to Moree, Tamworth and Orange on 15 to 17 May 2017
- 4 May 2017 – Email from Associate Professor Armstrong Osborne, University of Sydney to secretariat, requesting to appear as a witness at the public hearing on 2 June 2017
- 9 May 2017 – Email from Mr David Papps, Commonwealth Environmental Water Holder to secretariat, advising that he cannot attend a public hearing and stating his preference that the committee rely on his submission and would respond in writing to any written questions.

Sent:

- 3 May 2017 – Letter from Chair to Mr Phillip Glyde, Chief Executive Officer, Murray Darling Basin Authority, inviting representatives to the Sydney hearing on 5 June 2017
- 3 May 2017 – Letter from Chair to Mr David Papps, Commonwealth Environmental Water Holder, inviting representatives to the Sydney hearing on 5 June 2017
- 4 May 2017 – Letter from Chair to Mr Adam Marshall, Member for Northern Tablelands, advising of committee visit to Moree on 15 May 2017
- 4 May 2017 – Letter from Chair to Mr Kevin Anderson, Member for Tamworth, advising of committee visit on 16 May 2017
- 4 May 2017 – Letter from Chair to Mr Philip Donato, Member for Orange, advising of committee visit on 17 May 2017
- 5 May 2017 – Letter from Chair to Ms Marion Browne, Councillor, Broken Hill City Council, regarding answers to questions on notice and supplementary questions which have not been received in relation to the Broken Hill hearing.

5. Inquiry into augmentation of water supply

5.1 Public submissions

The following submissions were published by the committee clerk under the authorisation of the resolution appointing the committee: submission nos. 105, 106, 107, 108 and supplementary submissions 79a and 79b.

Resolved, on the motion of Mr MacDonald: That submission no. 109 be published.

5.2 Answers to questions on notice and supplementary questions

The following answers to questions on notice and supplementary questions were published by the committee clerk under the authorisation of the resolution appointing the committee:

- answers to questions on notice and supplementary questions from Ricegrowers Australia, received 30 March 2017
- answers to questions on notice from Ms Debbie Buller, Murrumbidgee Valley Food and Fibre Association received 27 March 2017
- answers to questions on notice from Mr Paul Pierotti, Griffith Business Chamber, received 28 March 2017
- answers to questions on notice from Ms Helen Dalton, NSW Farmer's Association, Griffith Branch, received 21 March 2017
- answers to questions on notice from Murray Irrigation, received 30 March 2017
- answers to questions on notice from Mr Chris Beale, Vice President, South West Anglers Association, received 30 March 2016
- answers to questions on notice from Griffith City Council received 7 April 2017
- answers to questions on notice from Yenda Flood Victims Association received 4 April 2017
- answers to questions on notice from Edward River Council received 31 March 2017
- answers to questions on notice from Mr Ray Stubbs, RAMROC Councils, received 6 April 2017
- further answers to questions on notice from Ms Debbie Buller, Murrumbidgee Valley Food and Fibre Association received 17 April 2017.

5.3 Orange site visit – Stormwater Harvesting Scheme

Resolved, on the motion of Mr Colless: That the committee authorise Mr Wayne Beatty, Water and Sewerage Strategic Manager, Orange City Council and Mr Josh Barnes, Water and Sewer Engineer, Orange City Council to accompany the committee on the bus to the site visit on 16 May 2017.

5.4 Orange site visit – proposed Cranky Rock dam site

Resolved, on the motion of Mr Colless: That the committee authorise Ms Meredith Macpherson, Water Utilities Alliance Program Manager, CENTROC and any other relevant persons to accompany the committee on the bus to the proposed Cranky Rock dam site and to Mr Joe Curran's property on 17 May 2017.

5.5 Site visit to Moree Power Plant

The committee visited the Moree Power Plant, accompanied by representatives from Yellow Dot Energy and Mr John Mulligan.

6. Public hearing

Witnesses, the public and the media were admitted.

The Chair made an opening statement regarding the broadcasting of proceedings and other matters.

The following witnesses were sworn and examined:

- Ms Zara Lowien, Executive Officer, Gwydir Valley Irrigators Association
- Mr Mark Winter, Vice Chair, Gwydir Valley Irrigators Association, Inglewood Pastrol Co
- Mr Nicholas Gillingham, Treasurer, Gwydir Valley Irrigators Association and General Farm Manager, Sundown Pastrol Co.

Ms Lowien tendered the following documents:

- GVIA 2017 Grower-led irrigation research field day

- GVIA System comparison trial 2009-2016
- GVIA Optimised irrigation row configuration
- GVIA Grower investigation of tools to manage soil compaction in irrigated cotton soils in the Gwydir Valley
- How the MDBA Northern review affects you.

The evidence concluded and the witnesses withdrew.

The following witnesses were sworn and examined:

- Ms Lila-Jane Fisher, Project and Development Manager, Moree Plains Shire Council
- Mr David Wolfenden, Group Manager, Waste and Water, Moree Plains Shire Council.

Mr Wolfenden tendered the following document:

- Department of Primary Industries – Gwydir alluvium water resource plan.

The evidence concluded and the witnesses withdrew.

The following witness was sworn and examined:

- Mr Alec Lucke, Bingara resident.

Mr Lucke tendered the following documents:

- Correspondence from Mr Adam Marshall MP
- Correspondence from Mr Niall Blair MLC
- Diagram of water device
- Draft Gwydir river foreshore strategy plan.

The evidence concluded and the witnesses withdrew.

The following witnesses were sworn and examined:

- Mr Michael Seery, Partner, WJ & Seery Partnerships
- Ms Hayley Greenham, Consultant, WJ & Seery Partnerships.

The evidence concluded and the witnesses withdrew.

The following witnesses were sworn and examined:

- Mr Kerry Watts, Managing Director, Growth Agriculture
- Mr Daniel Kahl, Local farmer.

The evidence concluded and the witnesses withdrew.

The public hearing concluded at 5.00 pm.

The public and the media withdrew.

7. Adjournment

The committee adjourned at 5.02 pm, until Tuesday 16 May 2017, 8.30 am, Best Western Sanctuary Inn, Tamworth (public hearing).

Samuel Griffith
Clerk to the Committee

Minutes no. 35
Tuesday 16 May 2017

Portfolio Committee No. 5 – Industry and Transport
Best Western Sanctuary Inn, Tamworth, 8.30 am

1. Members present

Mr Brown, *Chair*
Mr Veitch, *Deputy Chair*
Mr Colless
Mr Green (*participating member*)
Mr MacDonald
Ms Sharpe

2. Apologies

Mr Mason-Cox
Mr Mookhey (*participating member*)
Mr Buckingham

3. Inquiry into augmentation of water supply

3.1 Public hearing – Tamworth

Witnesses, the public and the media were admitted.

The Chair made an opening statement regarding the broadcasting of proceedings and other matters.

The following witness was sworn and examined:

- Mr Wayne Chaffey, Local Farmer

Mr Chaffey tendered the following document:

- Namoi unregulated rivers water sources – Cockburn River Water Source.

The evidence concluded and the witness withdrew.

The following witnesses were sworn and examined:

- Mr Ildu Monticone, President, Peel Valley Water Users Association
- Mr David Gowing, Member, Peel Valley Water Users Association
- Ms Jannine Miles, Member Peel Valley Water Users Association.

Mr Monticone tendered the following document:

- Peel Valley Water Users Association submission to IPART.

The evidence concluded and the witnesses withdrew.

The following witness was sworn and examined:

- Clr Col Murray, Chairperson, Namoi Council Joint Organisation and Mayor, Tamworth Regional Council.

The evidence concluded and the witness withdrew.

The following witnesses were sworn and examined:

- Ms Mark Hamblin, Chairman, Namoi Water
- Mr Steve Carolan, Vice Chairman, Namoi Water
- Ms Jon-maree Baker, Executive Officer, Namoi Water

The evidence concluded and the witnesses withdrew.

The public hearing concluded at 12.09 pm.

The public and the media withdrew.

3.2 Site visit to the Stormwater Harvesting Scheme

The committee visited the Stormwater Harvesting Scheme in Orange. The site visit and briefing were conducted by Wayne Beatty, Water and Sewerage Strategic Manager and Josh Barnes, Water and Sewer Engineer.

4. Adjournment

The committee adjourned at 5.15 pm, until Wednesday 17 May 2017, 7.30 am, Summer Street, Orange (to depart for site visit).

Samuel Griffith
Clerk to the Committee

Minutes no. 36
Wednesday 17 May 2017
Portfolio Committee No. 5 – Industry and Transport
Templers Mill, Orange, 7.30 am

1. Members present

Mr Brown, *Chair*
Mr Veitch, *Deputy Chair*
Mr Colless
Mr Green (*participating member*)
Mr MacDonald
Ms Sharpe

2. Apologies

Mr Buckingham
Mr Mason-Cox
Mr Mookhey (*participating member*)

3. Inquiry into augmentation of water supply

3.1 Site visit to Mr Joe Curran's property

The committee conducted a site visit to Mr Joe Curran's property at Canowindra.

3.2 Site visit to the proposed Cranky Rock dam site

The committee conducted a site visit to the proposed Cranky Rock dam site and was briefed by CENTROC representatives.

3.3 Public hearing in Orange

Witnesses, the public and media were admitted.

The Chair made an opening statement regarding the broadcasting of proceedings and other matters.

The following witnesses were sworn and examined:

- Cr John Medcalf, Acting Chair, CENTROC and Mayor, Lachlan Shire Council
- Cr David Somervaille, Board Member, CENTROC, and Chair, Central Tablelands Water
- Cr Bill West, Board Member, CENTROC, and Mayor, Cowra Shire Council
- Mr Kent Boyd, Board Member, CENTROC and General Manger, Parkes Shire Council
- Ms Meredith Macpherson, Water Utilities Alliance Program Manager, CENTROC
- Mr Wayne Beatty, Deputy Chair, Water Utilities Alliance, CENTROC
- Mr Garry Styles, Board Member, CENTROC and General Manager, Orange City Council.

Mr Beatty tendered the following document:
- Orange City Council Water Management presentation.

The evidence concluded and the witnesses withdrew.

The following witnesses were sworn and examined:
- Ms Jane Paul, Project Manager, Daroo Orange Urban Landcare Group
- Mr Ian Curtis, President, Orange Speleological Society
- Mr Cyril Smith, Coordinator, Orange and Region Water Security Alliance
- Mr Harrison Burkitt, Secretary, Save Cliefden Caves Association.

The evidence concluded and the witnesses withdrew.

The following witnesses were sworn and examined:
- Mr Mark McKenzie, Chief Executive Officer, NSW Irrigators Council
- Ms Stefanie Schulte, Policy Manager, NSW Irrigators Council.

The evidence concluded and the witnesses withdrew.

The following witnesses were sworn and examined:
- Mr Michael Payten, Chairman, Belubula Landholders Association
- Mr Joe Curran, Primary Producer.

Mr Curran tendered the following documents:
- Photographs depicting flood waters.

The evidence concluded and the witnesses withdrew.

The public hearing concluded at 4.39 pm.

The public and the media withdrew.

3.4 Tendered documents from the hearings in Moree, Tamworth and Orange

Resolved, on the motion of Mr Colless: That the committee accept and publish the following documents tendered during the public hearings in Moree, Tamworth and Orange:

- GVIA 2017 Grower-led irrigation research field day, tendered by Ms Zara Lowien, Executive Officer, Gwydir Valley Irrigators Council Association
- GVIA System comparison trial 2009-2016, tendered by Ms Zara Lowien, Executive Officer, Gwydir Valley Irrigators Council Association
- GVIA Optimised irrigation row configuration, tendered by Ms Zara Lowien, Executive Officer, Gwydir Valley Irrigators Council Association
- GVIA Grower investigation of tools to manage soil compaction in irrigated cotton soils in the Gwydir Valley, tendered by Ms Zara Lowien, Executive Officer, Gwydir Valley Irrigators Council Association
- How the MDBA Northern review affects you, tendered by Ms Zara Lowien, Executive Officer, Gwydir Valley Irrigators Council Association
- Department of Primary Industries – Gwydir alluvium water resource plan, tendered by Mr David Wolfenden, Group Manager, Waste and Water, Moree Plains Shire Council
- Correspondence from Mr Adam Marshall MP, tendered by Mr Alec Lucke, Bingara resident
- Correspondence from Mr Niall Blair MLC, tendered by Mr Alec Lucke, Bingara resident
- Diagram of water device, tendered by Mr Alec Lucke, Bingara resident
- Draft Gwydir river foreshore strategy plan, tendered by Mr Alec Lucke, Bingara resident
- Document entitled, Namoi unregulated rivers water sources – Cockburn River Water Source, tendered by Mr Wayne Chaffey, Local Farmer
- Peel Valley Water Users Association submission to IPART, tendered by Mr Ildu Monticone, President, Peel Valley Water Users Association

- Orange City Council Water Management presentation, tendered by Mr Wayne Beatty, Deputy Chair, Water Utilities Alliance, CENTROC
- Photographs depicting flood waters, tendered by Mr Joe Curran, primary producer.

4. Adjournment

The committee adjourned at 4.40 pm, until Friday 2 June 2017, Macquarie Room, NSW Parliament (public hearing).

Samuel Griffith
Clerk to the Committee

Minutes no. 37
Wednesday 31 May 2017
Portfolio Committee No. 5 – Industry and Transport
Members' Lounge, Parliament House, 2.05 pm

1. Members present

Mr Brown, *Chair*
Mr Veitch, *Deputy Chair*
Mr Buckingham
Mr Colless
Mr Green (participating)
Mr MacDonald
Ms Sharpe
Mr Pearce (substituting for Mr Mason-Cox)

2. Previous minutes

Resolved, on the motion of Mr Veitch: That draft minutes nos 34, 35 and 36 be confirmed.

3. Correspondence

The committee noted the following items of correspondence:

Received:

- 24 May 2017 – Email from Dr Peter Main to committee, providing an outline of presentation that will be referred to in evidence on 2 June 2017
- 25 May 2017 – Email from Mr Ildu Monticone, Peel Valley Water Users Association to committee, providing questions for the committee to ask IPART witnesses at the Sydney hearing on 5 June 2017.
- 31 May 2017- Email from the Hon Natasha Maclaren-Jones MLC to secretariat advising that Mr Pearce will be substituting for Mr Mason-Cox for today's deliberative meeting, Wednesday 31 May 2017.

Sent:

- 23 May 2017 – Letter from Chair to Mr Wayne Beatty, Water and Sewerage Strategic Manager, Orange City Council thanking him for hosting the site visit to the Orange Stormwater Harvesting Scheme
- 23 May 2017 – Letter from Chair to Mr Glenn Clark, Director of Operations, YellowDot Energy thanking him for the site visit at the Moree power plant
- 23 May 2017 – Letter from Chair to CENTROC, thanking the organisation for hosting the site visit in Orange

- 23 May 2017 – Letter from Chair to Mr David Papps, Commonwealth Environmental Water Holder, further inviting him to attend and give evidence
- 24 May 2017 – Letter from Chair to Mr Joe Curran, Primary producer thanking him for hosting the visit of his property in Orange.

4. Inquiry into augmentation of water supply

4.1 Proposed site visit to Israel

The committee considered all details of the proposed site visit to Israel and found that the visit was not viable.

The committee noted that it will consider other options to obtain evidence from Israeli experts at its next meeting.

4.2 Extension of reporting date

Resolved, on the motion of Mr MacDonald: That the committee extend the reporting date for the inquiry into the augmentation of water supply for rural and regional New South Wales to Friday 30 March 2018.

5. Adjournment

The committee adjourned at 2.23 pm until 9.30 am Friday 2 June 2017, Macquarie Room, NSW Parliament (public hearing).

Samuel Griffith
Clerk to the Committee

Minutes no. 38
Friday 2 June 2017
Portfolio Committee No. 5 – Industry and Transport
Macquarie Room, Parliament House, 9.32 am

1. Members present

Mr Brown, *Chair*
Mr Veitch, *Deputy Chair*
Mr Colless
Mr MacDonald
Ms Sharpe (left at 12.59 pm)

2. Apologies

Mr Buckingham
Mr Green (participating)
Mr Mason-Cox
Mr Mookhey (participating)

3. Previous minutes

Resolved, on the motion of Mr Veitch: That draft minutes no. 37 be confirmed.

4. Correspondence

The committee noted the following item of correspondence:

Received:

- 29 May 2017 – Email from Dr Mehreen Faruqi to secretariat, advising that Mr Jeremy Buckingham will be substituting for Dr Faruqi for the duration of the water inquiry.

5. Inquiry into augmentation of water supply

5.1 Public submissions

Resolved, on the motion of Mr Colless: That the committee authorise the publication of submission nos 110-115 and supplementary submission nos 87a and 106a.

5.2 Travel to Lismore

Resolved, on the motion of Mr Colless: That the committee approve the cost of $12,476.20 for a charter flight to Lismore for a public hearing on 1 August 2017.

5.3 Evidence from Israeli experts

Resolved, on the motion of Ms Sharpe:

1. That the Chair write to the Premier of New South Wales to determine if the NSW Government will facilitate and fund Israeli water experts to travel to Sydney to give evidence on water conservation and management practices.
2. That, if the NSW Government cannot facilitate and fund Israeli water experts travelling to Sydney, the Chair write to the Australia-Israel Chamber of Commerce NSW to seek assistance in obtaining evidence from Israeli water experts on water conservation and management practices either in Sydney or via Skype or teleconference.
3. That the Chair write to Israeli and other international experts seeking answers to written questions from the committee regarding the inquiry into the augmentation of water supply for rural and regional New South Wales.

5.4 Public hearing

Witnesses, the public and the media were admitted.

The Chair made an opening statement regarding the broadcasting of proceedings and other matters.

The following witness was sworn and examined:

- Mr Michael Murray, General Manager – Operations, Cotton Australia.

The evidence concluded and the witness withdrew.

The following witnesses were sworn and examined:

- Mr Chris Shore, Team Leader, Australian Water Exploration Co
- Mr Roger Shore, Representative, Australian Water Exploration Co
- Mr Col Joyce, Research Officer, Australian Water Exploration Co
- Mr Jim Lindsay, Research Officer, Australian Water Exploration Co
- Mr Peter Layton, Civil Engineer, Australian Water Exploration Co.

Mr Roger Shore tendered the following documents:

- Proposed construction – Clarence Basin/Copeton Dam concept with map.

The evidence concluded and the witnesses withdrew.

The following witnesses were sworn and examined:

- Dr Declan Page, Group Leader – Groundwater Contamination and Remediation Technologies, CSIRO
- Mr Warwick MacDoanld, Research Director of the CSIRO Water Resource Management Program.

The evidence concluded and the witnesses withdrew.

The following witness was sworn and examined:

- Dr Peter Main, Individual.

The evidence concluded and the witness withdrew.

The following witnesses were sworn and examined:

- Mr Scott Fidler, Regional Manager Principal, Golder Associates

- Mr Doug Brown, Water Management Specialist/Hydrogeolist, Golder Associates.

The evidence concluded and the witnesses withdrew.

The public hearing concluded at 2.39 pm. The public and the media withdrew.

5.5 Tendered document

Resolved, on the motion of Mr Colless: That the committee accept and publish the following document tendered during the public hearing:

- Proposed construction – Clarence Basin/Copeton Dam concept with map, tendered by Mr Roger Shore, Representative, Australian Water Exploration Co.

6. Adjournment

The committee adjourned at 2.40 pm, until 10.30 am, Monday 5 June 2017, Macquarie Room, NSW Parliament (public hearing).

Samuel Griffith
Clerk to the Committee

Minutes no. 39
Monday 5 June 2017
Portfolio Committee No.5 – Industry and Transport
Macquarie Room, Parliament House, 10.38 am

1. Members present

Mr Brown, *Chair*
Mr Veitch, *Deputy Chair*
Mr Colless
Mr MacDonald

2. Apologies

Mr Buckingham
Mr Green (participating)
Mr Mason-Cox
Mr Mookhey (participating)
Ms Sharpe

3. Inquiry into augmentation of water supply

3.1 Public hearing

Witnesses, the public and the media were admitted.

The Chair made an opening statement regarding the broadcasting of proceedings and other matters.

The following witnesses were sworn and examined:

- Mr Tom Rooney, Chief Executive Officer, Waterfind Group
- Mr Simo Tervonen, Manager – Trade, Policy and Market Operations, Waterfind Group.

Mr Rooney tendered the following document:

- Waterfind Group's response to article 'Water trades raise transparency concerns' published 28 February 2017.

The evidence concluded and the witnesses withdrew.

The following witnesses were examined on their former oath:
- Mr Hugo Harmstorf, Chief Executive Officer, IPART
- Mr Rob O'Neill, General Manger Licensing and Compliance, IPART
- Mr Matthew Edgerton, Executive Director Water, IPART.

The evidence concluded and the witnesses withdrew.

The following witness was sworn and examined:
- Mr David Dreverman, Executive Director, River Management, Murray Darling Basin Authority.

The evidence concluded and the witness withdrew.

The following witnesses were examined on their former oath:
- Mr David Harris, Chief Executive Officer, WaterNSW
- Mr Adrian Langdon, Executive Manager, Systems Operations and Asset Maintenance, WaterNSW.

The following witnesses were sworn and examined:
- Mr Gavin Hanlon, Deputy Director General, Department of Primary Industries – Water
- Mr Andrew George, Executive Manager, Assets Solutions and Delivery, Water NSW.

The evidence concluded and the witnesses withdrew.

The public hearing adjourned at 4.16 pm. The public and media withdrew.

3.2 Tendered documents
Resolved, on the motion of Mr Veitch: That the committee accept and publish the following document tendered during the public hearing:
- Waterfind Group's response to article 'Water trades raise transparency concerns' published 28 February 2017, tendered by Mr Tom Rooney, Chief Executive Officer, Waterfind Group.

3.3 Commonwealth Environmental Water Holder
The committee deferred consideration of the formal invitation to the Commonwealth Environmental Water Holder inviting him to give evidence until its next meeting.

4. Adjournment
The committee adjourned at 4.21 pm, until 1.15 pm, Wednesday 21 June 2017, McKell Room, NSW Parliament (private briefing by WaterNSW).

Samuel Griffith
Clerk to the Committee

Minutes no. 40
Wednesday 21 June 2017
Portfolio Committee No. 5 – Industry and Transport
McKell Room, Parliament House location, 1.16 pm

1. Members present
Mr Brown, *Chair*
Mr Veitch, *Deputy Chair* (until 2.05 pm)

Mr MacDonald (until 2.06 pm)
Ms Sharpe (from 1.50 pm)
Mr Green (participating) (until 2.10 pm)

2. Apologies
Mr Colless
Mr Mason-Cox

3. Inquiry into augmentation of water supply

3.1 WaterNSW briefing
The committee was briefed by the following WaterNSW representatives regarding the CALM system and the Lachlan – Belubula Water Security Project:

- Mr David Harris, Chief Executive Officer
- Mr Andrew George, Executive Manager, Assets Solutions & Delivery
- Mr Adrian Langdon, Executive Manager, Systems Operations & Asset Maintenance
- Mr Dan Berry, Manager of Water Systems Operations
- Mr Ben Lathwell, Corporate and Regulatory Strategy.

4. Adjournment
The committee adjourned at 2.20 pm, *sine die*.

Samuel Griffith
Clerk to the Committee

Minutes no. 41
Thursday 22 June 2017
Portfolio Committee No. 5 – Industry and Transport
Members' Lounge, Parliament House, 1.25 pm

1. Members present
Mr Brown, *Chair*
Mr Veitch, *Deputy Chair*
Mr Colless
Mr Field (substituting for Dr Faruqi)
Mr MacDonald
Mr Pearce
Ms Sharpe
Mr Graham (participating)

2. Correspondence
The committee noted the following items of correspondence:

Received:

- 20 June 2017 – Mr David Papps, Commonwealth Environment Water Holder, to secretariat, advising his unavailability to attend before the committee and his preference to respond to written questions.
- 21 June 2017 - Letter from Mr Brown, Ms Sharpe, and Mr MacDonald, requesting a meeting to consider a proposed self-reference for an inquiry into the implementation of the recommendations of the inquiry into commercial fishing in New South Wales.

3. Consideration of terms of reference

Mr Brown tabled the letter proposing the following self-reference:

1. That Portfolio Committee No. 5 inquire into and report on the implementation of the recommendations of the inquiry into commercial fishing in New South Wales.

Resolved, on the motion of Mr MacDonald: That the committee adopt the terms of reference.

4. Conduct of the inquiry into the implementation of the recommendations of the inquiry into commercial fishing in New South Wales

Resolved, on the motion of Ms Sharpe: That the committee:

- not open submissions to the inquiry and place an alert on the committees website advising of the purpose of the inquiry
- distribute a brief media release outlining the purpose of the inquiry, with no other advertising being necessary
- table its report by end September 2017.

4.1 Briefing by the Minister

Resolved, on the motion of Mr Colless: That the committee hold an in camera briefing (recorded by Hansard) in July-September 2017, with the Minister for Primary Industries and any departmental staff nominated by the Minister, on a date to be determined by the Chair after consultation with members regarding their availability.

5. Inquiry into the augmentation of water supply

5.1 Letter to the Commonwealth Environment Water Holder

Resolved, on the motion of Mr Colless: That:

(a) the secretariat inform the Commonwealth Environment Water Holder that if he is declining to appear before the committee the Chair will write to the Minister for Environment and Energy and the Secretary of the Department of Environment and Energy to request his attendance

(b) the Chair, on behalf of the committee, write to the Hon Josh Frydenberg MP, Minister for the Environment and Energy, cc'ing the Secretary of the Department of the Environment and Energy, to request that the Commonwealth Environmental Water Holder appear before the committee on 8 August 2017.

6. Adjournment

The committee adjourned at 1.31 pm, until Tuesday 1 August 2017, Lismore (public hearing).

Emma Rogerson
Clerk to the Committee

Minutes no. 42
Tuesday 1 August 2017
Portfolio Committee No. 5 – Industry and Transport
Execujet Flight Lounge, Sydney, 6.27 am

1. Members present
Mr Brown, *Chair*
Mr Veitch, *Deputy Chair*
Mr Green (participating)
Mr Pearce (substituting for Mr MacDonald)
Ms Sharpe (participating) left at 8.30 am, rejoined at 11.40 am

2. Apologies
Mr Buckingham
Mr Colless
Mr Mason-Cox
Mr Mookhey
Ms Walker (substituting for Mr Buckingham)

3. Previous minutes
Resolved, on the motion of Mr Veitch: That draft minutes nos 38 to 41 be confirmed.

4. Correspondence
The committee noted the following items of correspondence:

Received:
- 4 July 2017 – Letter from the Government Whip to Chair advising that Mr Pearce will be substituting for Mr MacDonald for the 1 August 2017 water inquiry hearing and site visit
- 10 July 2017 – Email from Ms Elise Taylor, Executive Officer, Lismore Chamber of Commerce and Industry to secretariat, declining invitation to appear at public hearing on 1 August 2017
- 21 July 2017 – Letter from the Premier to the Chair declining the committee's request for funding assistance for Israeli water experts to travel to Sydney to appear as witnesses and conduct briefings
- 25 July 2017 – Email from the Opposition Whip to Chair advising that Ms Sharpe will be a participating member for the duration of the water augmentation inquiry.
- 28 July 2017 – Email from Mr Jeremy Buckingham MLC to secretariat, advising that Ms Dawn Walker MLC, will be substituting for him at the public hearing in Lismore on 1 August 2017.

Sent:
- 16 June 2017 - Letter from the Chair to the Premier, seeking funding assistance for Israeli water experts to travel to Sydney to appear as witnesses and conduct briefings
- 31 July 2017 – Letter from the Chair to Mr Thomas George MP, Member for Lismore, advising of the committees visit to Lismore on 1 August 2017.

5. Committee membership
The committee noted that Mr Mookhey replaced Ms Sharpe as a member of the committee from 20 July 2017.

6. Inquiry into augmentation of water supply

6.1 Participating member
Resolved, on the motion of Mr Pearce: That Ms Sharpe, who intends to participate for the duration of the inquiry into water augmentation, be provided with copies of meeting papers and unpublished submissions and that all costs associated with her participation in the inquiry be covered by the committee.

6.2 Answers to questions on notice

The committee noted that the following answers to questions on notice and supplementary questions were published by the committee clerk under the authorisation of the resolution appointing the committee:

- answers to supplementary questions from Mr Joe Curran, Canowindra Lucerne, received 6 June 2017
- answers to questions on notice and supplementary questions from Mr Wayne Chaffey, received 13 June 2017
- answers to supplementary questions from Peel Valley Water Users Association received 14 June 2017
- answers to supplementary questions from Cotton Australia received 6 June 2017
- answers to questions on notice from Mr Harrison Burkitt, Secretary, Save Cliefden Caves, received 14 June 2017
- answers to questions on notice and supplementary questions from Ms Jane Paul, Project Manager, Daroo Orange Urban Landcare Group, received 14 June 2017
- answers to questions on notice and supplementary questions from Mr David Kahl, local Farmer, Wee Waa, received 14 June 2017
- answers to questions on notice and supplementary questions from Cr Col Murray, Spokesperson, Namoi Councils Joint Organisation and Mayor, Tamworth Regional Council received 14 June 2017
- answers to supplementary questions from Gwydir Valley Irrigators Association Inc received 16 June 2017
- answers to supplementary questions from WJ&A Seery Partnerships received 19 June 2017
- answers to questions on notice and supplementary questions from CENTROC received 21 June 2017
- answers to supplementary questions from Waterfind Australia received 29 June 2017
- answers to supplementary questions from Australian Water Exploration Company received 30 June 2017
- answers to questions on notice and supplementary questions from IPART received 4 July 2017
- answers to questions on notice and supplementary questions from WaterNSW received 14 July 2017.

6.3 Updated submission

The committee noted that an updated version of submission no. 116 from Tweed Shire Council was published by the committee clerk under the authorisation of the resolution appointing the committee.

6.4 Public hearing, Lismore

Witnesses, the public and the media were admitted.

The Chair made an opening statement regarding the broadcasting of proceedings and other matters.

The following witnesses were sworn and examined:

- Mr Rod Haig, Strategic Engineer (Water and Waste Water), Lismore City Council
- Mr Michael McKenzie, Manager Planning and Delivery, Rous Water.

Mr McKenzie tendered the following document:

- Rous Water Future Water Strategy, June 2014.

The evidence concluded and the witnesses withdrew.

The following witness was examined on his former oath:

- Mr Michael McKenzie, Manager Planning and Delivery, Rous Water.

The following witnesses were sworn and examined:

- Mr David Oxenham, Director Engineering, Tweed Shire Council
- Mr Anthony Burnham, Manager Water and Wastewater, Tweed Shire Council
- Mr Peter Rees, Manager Utilities, Byron Shire Council

- Mr Andrew Leach, Manager Assets, Richmond Valley Council
- Mr Graham Kennett, General Manager, Kyogle Council.

The evidence concluded and the witnesses withdrew.

The following witnesses were sworn and examined:
- Mr Troy Anderson, Director (Water and Civil), Clarence Valley Council
- Mr Greg Mashiah, Manager, Water Cycle, Clarence Valley Council.

The evidence concluded and the witnesses withdrew.

The following witnesses were sworn and examined:
- Mr Phil Hilliard, Chief Executive Officer, Ballina Fisherman's Cooperative
- Mr Mario Puglisi, Chairman, Ballina Fisherman's Cooperative.

The evidence concluded and the witnesses withdrew.

The following witnesses were sworn and examined:
- Ms Tricia Beatty, Executive Officer, NSW Professional Fisherman's Association
- Mr Simon Rowe, Project Manager, Oceanwatch.

The evidence concluded and the witnesses withdrew.

The following witnesses were sworn and examined:
- Mr Greg McNamara, Chairman, Norco
- Dr Bill Fulkerson, North Milk Supply Officer, Norco
- Mr Ian McBean, General Manger, Sunshine Sugar
- Mr Ross Farlow, President, NSW Cane Growers Association
- Mr Pat Battersby, Executive Officer, NSW Cane Growers Association.

Mr McBean tendered the following documents:
- Presentation on drainage issues in the NSW sugar industry, presented to the Department of Primary Industries, 29 April 2016
- Document detailing the planning approval process under various legislation.

Mr Farlow tendered the following document:
- Department of Primary Industries, Natural Disaster Preparedness: Flood Ready Cane Farming Strategic Plan for the North Coast Region of NSW, December 2014.

The evidence concluded and the witnesses withdrew.

The following witnesses were sworn and examined:
- Mr John Edwards, Honorary Secretary, Clarence Environment Centre
- Mr Jim Morrison, Member, Clarence Environment Centre.

Mr Edwards tendered the following document:
- Two graphs from 2016 depicting river levels and discharge of water from the Orara river at Bawden Bridge.

The evidence concluded and the witnesses withdrew.

The public hearing concluded at 3.58 pm. The public and the media withdrew.

6.5 Tabled documents

Resolved, on the motion of Mr Veitch: That the committee accept and publish the following documents tendered during the public hearing:

- Rous Water Future Water Strategy June 2014, tendered by Mr Michael McKenzie, Manager Planning and Delivery, Rous Water.
- Presentation on drainage issues in the NSW sugar industry, presented to Department if Primary Industries, 29 April 2016, tendered by Mr Ian McBean, General Manger, Sunshine Sugar
- Document detailing the planning approval process under various legislation, tendered by Mr Ian McBean, General Manger, Sunshine Sugar
- Department of Primary Industries, Natural Disaster Preparedness: Flood Ready Cane Farming Strategic Plan for the North Coast Region of NSW, tendered by Mr Ross Farlow, President, NSW Cane Growers Association, December 2014
- Two graphs from 2016 depicting river levels and discharge of water from the Orara river at Bawden Bridge, tendered by Mr John Edwards, Honorary Secretary, Clarence Environment Centre.

7. Adjournment

The committee adjourned at 4.00 pm, until 2 August 2017 in the Members' Lounge at 1.00 pm *(Budget Estimates meeting).*

Samuel Griffith
Clerk to the Committee

Minutes no. 51
Tuesday 19 September 2017
Portfolio Committee No. 5 – Industry and Transport
Macquarie Room, Parliament House, 12.00 pm

1. Members present

Mr Brown, *Chair*
Mr Veitch, *Deputy Chair*
Mr Buckingham
Mr Colless
Mr MacDonald
Mr Mason-Cox
Mr Mookhey (until 12.22 pm)
Mr Green (participating)
Ms Sharpe (participating)

2. Correspondence

The committee noted the following item of correspondence:

Received

- 11 September 2017 – Ms Louise O'Connor to secretariat informing the committee that the Commonwealth Environmental Water Holder can no longer attend the water inquiry hearing on 19 September, and that his Assistant Secretary can attend in his place.

3. Inquiry into augmentation of water supply in rural and regional New South Wales

3.1 Answers to questions on notice and supplementary questions

The following answers to questions on notice and supplementary questions were published by the committee clerk under the authorisation of the resolution appointing the committee:

- answers to questions on notice from NSW Irrigators Council, received 4 August 2017
- answers to questions on notice from OceanWatch Australia, received 2 August 2017
- answers to questions on notice from NSW Professional Fisherman's Association, received 2 August 2017
- answers to questions on notice and supplementary questions from Clarence Valley Council, received 31 August 2017.

Resolved, on the motion of Mr Buckingham: That the committee keep confidential additional documents provided by Clarence Valley Council, as requested by the council.

3.2 Non-compliance with New South Wales water laws and writing to the ICAC

Mr Colless moved: That the committee complete its inquiry into the augmentation of water supply in rural and regional New South Wales without amending the terms of reference and, following the tabling of the report, reassess if the committee should conduct an inquiry into non-compliance with New South Wales water laws.

Question put.

The committee divided.

Ayes: Mr Colless, Mr MacDonald, Mr Mason-Cox.

Noes: Mr Brown, Mr Buckingham, Mr Mookhey, Mr Veitch.

Question resolved in the negative.

Mr Buckingham moved: That the committee write to the Commissioner of the ICAC seeking his opinion whether there would be implications on the ICAC's current investigations if the committee expanded its terms of reference to consider allegations raised in the ABC's Four Corners program on 24 July 2017, Mr Ken Matthews's Interim Report entitled *Independent investigation into NSW water management and compliance*, dated 8 September 2017 and any related matters regarding non-compliance with New South Wales water laws.

Mr Colless then moved: That the motion be amended by omitting 'and any related matters'.

Amendment put.

The committee divided.

Ayes: Mr Brown, Mr Colless, Mr MacDonald, Mr Mason-Cox.

Noes: Mr Buckingham, Mr Mookhey, Mr Veitch.

Question resolved in the affirmative.

Original question, as amended, put: That the committee write to the Commissioner of the ICAC seeking his opinion whether there would be implications on the ICAC's current investigations if the committee expanded its terms of reference to consider allegations raised in the ABC's Four Corners program on 24 July 2017 and Mr Ken Matthews's Interim Report entitled *Independent investigation into NSW water management and compliance*, dated 8 September 2017 regarding non-compliance with New South Wales water laws.

The committee divided.

Ayes: Mr Brown, Mr Buckingham, Mr Mookhey, Mr Veitch.

Noes: Mr Colless, Mr MacDonald, Mr Mason-Cox.

Question resolved in the affirmative.

3.3 Public hearing

Witnesses, the public and the media were admitted.

The Chair made an opening statement regarding the broadcasting of proceedings and other matters.

The following witnesses were sworn and examined via teleconference:

- Dr Peter Dillon, Co-chair, International Association of Hydrogeologists Commission on Managing Aquifer Recharge
- Dr Wendy Timms, Vice-President, International Association of Hydrogeologists, Australasia.

The evidence concluded and the witnesses withdrew.

The following witness was sworn and examined:

- Mr Mark Taylor, Assistant Secretary, Commonwealth Environmental Water Office.

The evidence concluded and the witness withdrew.

The public hearing concluded at 1.58 pm. The public and the media withdrew.

4. Inquiry into the implementation of the recommendations of the inquiry into commercial fishing in New South Wales

Resolved, on the motion of Mr Buckingham: That the committee keep confidential answers to questions on notice from the Hon Niall Blair MLC, Minister for Primary Industries, Minister for Regional Water and Minister for Trade and Industry.

5. Adjournment

The committee adjourned at 2.00 pm, until Monday 20 November 2017, 6.00 pm, Macquarie Room, Parliament House (public hearing).

Sam Griffith
Clerk to the Committee

Minutes no. 53
Monday 6 November 2017
Portfolio Committee No. 5 – Industry and Transport
McKell Room, Parliament House, 9.58 am

1. Members present

Mr Brown, *Chair*
Mr Clarke (substituting for Mr MacDonald)
Mr Graham (substituting for Mr Veitch)

2. Apologies

Mr Buckingham
Mr Colless
Mr Green (participating)
Mr Mason-Cox
Mr Mookhey
Ms Sharpe (participating)

3. Correspondence

The committee noted the following items of correspondence:

Received:

- 29 August 2017 – Email from Dr Peter Dillon, Co-Chair International Association of Hydrogeologists Commission on Managed Aquifer Recharge to committee, forwarding media release entitled 'Scientists wade into Murray v Darling pipeline debate', which will be referred to in evidence in on 19 September 2017
- 3 October 2017 – Letter from the Hon Peter Hall QC, Chief Commissioner, ICAC to Chair, advising that the committee should not extend its terms of reference to include allegations referred to in the Four Corners program on 24 July 2017 and also referred to in the Ken Matthew's Interim report as there may be a potential prejudicial overlap
- 17 October 2017 – Hon Niall Blair MLC, Minister for Primary Industries, Regional Water, and Trade and Industry, to Chair advising the determination and publication of commercial fisheries quota shares
- 27 October 2017 – Hon Niall Blair MLC, Minister for Primary Industries, Regional Water, and Trade and Industry, to Chair regarding update of progress of regulatory changes to commercial fisheries reform.

Sent:

- 21 September 2017 – Letter from Chair, to the Hon Peter Hall QC, Chief Commissioner, ICAC, seeking opinion as to whether there would be implications on the ICAC's current investigations if the committee expanded its terms of reference to consider allegations raised in the ABC's Four Corners program on 24 July 2017 and in Mr Matthews's Interim Report entitled Independent investigation into NSW water management and compliance, dated 8 September 2017 regarding non-compliance with New South Wales water laws.

Resolved, on the motion of Mr Graham: That the committee keep the attachment to correspondence from the Hon Peter Hall QC, regarding ICAC's investigations into allegations referred to in the Four Corners program on 24 July 2017 and also referred to in the Ken Matthew's Interim report, dated 3 October 2017, confidential, as per the request of the author as it contains sensitive information.

4. Inquiry into augmentation of water supply in rural and regional New South Wales

4.1 Public submissions

The committee noted that the following submissions were published by the committee clerk under the authorisation of the resolution appointing the committee: submission nos. 117 and 118.

4.2 Answers to questions on notice and supplementary questions

The committee noted that the following answers to questions on notice and supplementary questions were published by the committee clerk under the authorisation of the resolution appointing the committee:

- answers to supplementary questions from International Association of Hydrogeologists, received 11 October 2017
- answers to questions on notice and supplementary questions from Mr Mark Taylor, Assistant Secretary, Commonwealth Environmental Water Office, received 24 October 2017.

4.3 Briefing on 20 November 2017

Resolved, on the motion of Mr Clarke: That the committee hold a closed briefing with an Israeli expert on Monday 20 November 2017.

4.4 Private briefing with Israeli water experts

The Chair made an opening statement regarding the private briefing.

The committee was briefed by the following Mekorot (Israel's National Water Company) representatives:

- Mr Moti Shiri, VP Planning and Development,
- Mr Michael Elisha, Chief Project Manager.

Ms Nitza Lowenstein, Multicultural NSW, was present as an interpreter.

Hansard staff were also present to transcribe the briefing.

5. Adjournment

The committee adjourned at 11.13 am, until Friday 17 November 2017, 10.40 am, Jubilee Room, Parliament House (Budget Estimates supplementary hearing).

Samuel Griffith
Committee Clerk

Minutes no. 56
Monday 20 November 2017
Portfolio Committee No. 5 – Industry and Transport
Macquarie Room, Parliament House, 5.47 pm

1. Members present

Mr Brown, *Chair*
Mr Veitch, *Deputy Chair*
Mr Colless
Mr MacDonald
Mr Mookhey

2. Apologies

Mr Mason-Cox

3. Previous minutes

Resolved, on the motion of Mr Veitch: That draft minutes nos 51 and 53 be confirmed.

4. Correspondence

The committee noted the following item of correspondence:

Sent

- 7 November 2017 – Letter from Chair, to Mekorot – Israel's National Water Company, thanking them for their assistance with the water augmentation inquiry.

5. Inquiry into augmentation of water supply in rural and regional NSW

5.1 Membership

The committee noted that Mr Mason-Cox will be substituting for Mr Fang for the duration of the inquiry.

5.2 Letter from the ICAC

The committee noted the letter from the Commissioner of the ICAC, dated 3 October 2017, responding to the Chair regarding whether there would be implications on the ICAC's current investigations if the committee expanded its terms of reference to consider allegations raised in the ABC's Four Corners program on 24 July 2017 and Mr Ken Matthews's Interim Report entitled *Independent investigation into NSW water management and compliance*, dated 8 September 2017, regarding non-compliance with New South Wales water laws.

5.3 Submissions

The committee noted that the following supplementary submission was published by the committee clerk under the authorisation of the resolution appointing the committee: supplementary submission no. 71a.

5.4 Report deliberative

Resolved, on the motion of Mr Veitch: That the committee hold its report deliberative meeting for the inquiry into the augmentation of water supply in rural and regional NSW on Friday 16 March 2018.

5.5 Private briefing

The Chair made an opening statement regarding the private briefing.

The committee was briefed by the following Israel National Water Authority representative:

- Mr Miki Zaide, Head of Strategic Unit Department.

Ms Nitza Lowenstein, Multicultural NSW, was present as an interpreter.

Hansard staff were also present to transcribe the briefing.

6. Adjournment

The committee adjourned at 6.40 pm *sine die*.

Samuel Griffith
Committee Clerk

Minutes no. 59
Tuesday 6 March 2018
Portfolio Committee No. 5 – Industry and Transport
Members' Lounge, Parliament House, 2.20 pm

1. Members present

Mr Veitch, *A/Chair*
Mr MacDonald
Mr Mason-Cox
Mr Mookhey
Mr Green (participating)
Ms Sharpe (participating)

2. Apologies

Mr Brown, *Chair*

3. Previous minutes

Resolved, on the motion of Mr MacDonald: That draft minutes no. 56 be confirmed.

4. Correspondence

The committee noted the following items of correspondence:

Received:

- 27 October 2017 – Hon Niall Blair MLC, Minister for Primary Industries, Regional Water, and Trade and Industry, to Chair regarding progress of regulatory changes arising from commercial fishing reforms
- 6 December 2017 – Hon Niall Blair MLC, Minister for Primary Industries, Regional Water, and Trade and Industry, to Chair regarding progress of regulatory changes arising from commercial fishing reforms.

Sent:

- 24 November 2017 – Letter from Chair to Mr Miki Zaide, Head of the Strategic Unit Department, Israel Water Authority thanking him for his assistance with the water augmentation inquiry.

5. Inquiry into augmentation of water supply in rural and regional NSW

5.1 Extension of reporting date
Resolved, on the motion of Mr Mason-Cox: That the committee extend the reporting date for the inquiry into the augmentation of water supply for rural and regional New South Wales to Monday 14 May 2018.

5.2 Report deliberative date
Resolved, on the motion of Mr MacDonald: That the committee hold its report deliberative on Friday 4 May 2018.

5.3 Public submission
Resolved, on the motion of Mr Mookhey: That the committee publish supplementary submission no. 60a, including attachment 2.

5.4 Proposed transcript corrections from 20 November 2017 private briefing
Resolved, on the motion of Mr MacDonald: That the committee authorise the corrections made by Mr Miki Zaide, Head of the Strategic Unit Department, Israel Water Authority to the transcript of the private briefing on 20 November 2017.

5.5 Transcripts from 6 and 20 November 2017 private briefings
Resolved, on the motion of Mr Mookhey: That the committee publish the transcripts from the private briefings held on 6 and 20 November 2017 with Israeli water experts, in the form requested by Mekorot and the Israel Water Authority.

6. Adjournment
The committee adjourned at 2.27 pm *sine die*.

Samuel Griffith
Committee Clerk

Draft minutes no. 61
Friday 4 May 2018
Portfolio Committee No. 5 – Industry and Transport
McKell Room, Parliament House, 9.35 am

1. Members present
Mr Brown, *Chair*
Mr Veitch, *Deputy Chair*
Mr Colless
Mr MacDonald
Mr Mason-Cox
Mr Mookhey
Ms Sharpe (participating)

2. Apologies
Mr Buckingham
Mr Green (participating)

3. Previous minutes
Resolved, on the motion of Mr Mookhey: That draft minutes no. 59 be confirmed.

4. Correspondence
The committee noted the following items of correspondence:

Received:

- 11 April 2018 – Email from Mr Wayne Beatty, Water and Sewer Manager (Strategic), Orange City Council to secretariat, providing information on stormwater harvesting as a flood mitigation tool
- 18 April 2018 – Email from Mr Wayne Beatty, Water and Sewer Manager (Strategic), Orange City Council to secretariat, providing clarification about stormwater harvesting as a flood mitigation tool
- 3 May 2018 – Letter from Mr Jeremy Buckingham, noting that he will be an apology for the water augmentation report deliberative and providing proposed amendments to the Chair's draft report.

Resolved, on the motion of Mr Veitch: That the committee authorise the publication of correspondence from Mr Wayne Beatty, Water and Sewer Manager (Strategic), Orange City Council, regarding stormwater harvesting as a flood mitigation tool, dated 11 and 18 April 2018.

5. Inquiry into augmentation of water supply in rural and regional New South Wales

5.1 Circulation of Chair's draft to participating members

Resolved, on the motion of Mr Veitch: That Mr Green and Ms Sharpe, who have been participating members on the inquiry into augmentation of water supply in rural and regional New South Wales, be provided with confidential committee inquiry documents including the Chair's draft report.

5.2 Private briefing presentations

Resolved, on the motion of Mr Colless: That the committee authorise the publication of the following presentations from private briefings:

- Computer Aided River Management (CARM), provided by WaterNSW on 21 June 2017
- Lachlan Valley Priority Catchment Water Security Investigation, provided by WaterNSW on 21 June 2017
- Pages 6, 7, 14, 29, 33, 37, 40 and 41 from Mekorot Israel National Water Company, provided by Mekorot on 6 November 2017.

5.3 Consideration of Chair's draft report

The Chair submitted his draft report entitled '*Augmentation of water supply in rural and regional New South Wales*', which, having been previously circulated, was taken as being read.

Summary of Key Issues

Mr Veitch (on behalf of Mr Buckingham) moved: That the Summary of Key Issues be amended by omitting paragraph 3 on page xiii as follows: 'The committee notes that a sustainable long-term solution to water management issues is required for Broken Hill. Although there is some opposition to the proposed pipeline from the Murray to Broken Hill, we note that a number of stakeholders, including the peak industry body, the NSW Irrigators Council, support the measure.', and inserting instead the following new paragraph:

> 'The committee notes that Broken Hill has historically had a sustainable, affordable water supply from the Menindee Lakes system, but that the impact of climate change, mismanagement of the Menindee Lakes and over extraction of water from the Darling River system means that this water supply is in jeopardy. The committee notes that there is considerable and widespread community opposition to the NSW Government's proposed pipeline from the Murray to Broken Hill, including from water experts, graziers, the Broken Hill Mayor and Council, the Barkindji Traditional Owners, residents of Broken Hill, Pooncarie, Menindee and Wilcannia. We note that the pipeline is enthusiastically supported by the irrigation industry, including the peak industry body, the NSW Irrigators Council.'

Question put and negatived.

Mr Veitch (on behalf of Mr Buckingham) moved: That the Summary of Key Issues be amended by inserting the following new paragraph after paragraph 3 on page xiii:

> 'The Committee is very concerned about the implications of the proposed pipeline for the long term health of the Darling River. Once constructed, the new pipeline will allow the

> Government to approve more water being extracted upstream for irrigation, or to empty the Menindee Lakes faster, without having to worry about the city of Broken Hill running out of water. We therefore recommend that the pipeline construction be immediately halted and that the NSW Government address the issue of a long term sustainable water supply for Broken Hill by returning more water to the Darling River, raising the height of weir 32, improving the connection between Lake Pamamaroo and Copi Hollo and investigating the feasibility of extending the current anabranch pipeline to weir 32. The committee is also concerned that the NSW Government has repeatedly refused to release the business case justifying the decision to build the pipeline. Given this is an expenditure of almost $500 million of taxpayers' money and the high level of community concern about the pipeline the committee recommends that the NSW Government immediately release the business case for the pipeline.'

Question put and negatived.

Mr Mookhey (on behalf of Mr Buckingham) moved: That the following new recommendations be inserted before Recommendation 1:

> '**Recommendation X**
>
> That the NSW Government immediately halt construction of the Broken Hill Pipeline and instead addresses the issue of a long term sustainable water supply for Broken Hill by:
>
> a. returning more water to the Darling River in line with scientific assessments,
> b. raising the height of weir 32,
> c. improving the connection between Lake Pamamaroo and Copi Hollo and
> d. investigating the feasibility of extending the current anabranch pipeline to weir 32.
>
> **Recommendation X**
>
> That the NSW Government immediately releases the business case for the Broken Hill Pipeline.'

Question put.

The committee divided.

Ayes: Mr Mookhey, Mr Veitch.

Noes: Mr Brown, Mr Colless, Mr MacDonald, Mr Mason-Cox.

Question resolved in the negative.

Mr Mookhey (on behalf of Mr Buckingham) moved: That Recommendation 7 be omitted as follows: 'That, if New South Wales does not withdraw from the Murray-Darling Basin Plan, the NSW Government renegotiate the basin plan with the federal government and other basin state governments to develop a more equitable agreement for New South Wales that better balances economic, social and environmental outcomes.', and the following new recommendation be inserted instead:

> 'That the NSW Government remains in the Murray Darling Basin Plan and commits to increasing the amount of water that is returned to the environment in line with scientific assessments of what is needed to restore the health of the system, with buybacks of water restored to at least the original 2750 gigalitres specified in the 2012 Murray Darling Basin Plan.'

Mr Veitch moved: That the motion of Mr Mookhey (on behalf of Mr Buckingham) be amended by omitting ', with buybacks of water restored to at least the original 2750 gigalitres specified in the 2012 Murray Darling Basin Plan'.

Amendment of Mr Veitch put and negatived.

Original question of Mr Mookhey (on behalf of Mr Buckingham), put and negatived.

Mr Mookhey (on behalf of Mr Buckingham) moved: That the following new recommendation be inserted after Recommendation 7:

'**Recommendation X**

That the NSW Government fully cooperate with the South Australian Royal Commission in the administration of the Murray-Darling Basin.'

Question put.

The committee divided.

Ayes: Mr Mookhey, Mr Veitch.

Noes: Mr Brown, Mr Colless, Mr MacDonald, Mr Mason-Cox.

Question resolved in the negative.

Mr Mookhey (on behalf of Mr Buckingham) moved: That the following new recommendation be inserted after Recommendation 7:

'Recommendation X

That the NSW Government support a federal Royal Commission into the administration of the Murray-Darling Basin.'

Question put.

The committee divided.

Ayes: Mr Brown, Mr Mookhey, Mr Veitch.

Noes: Mr Colless, Mr MacDonald, Mr Mason-Cox.

There being an equality of votes, question resolved in the affirmative on the casting vote of the Chair.

Chapter 1

Mr Mookhey moved: That 'independent' be omitted from paragraph 1.81 and the heading before paragraph 1.86.

Question put.

The committee divided.

Ayes: Mr Brown, Mr Mookhey, Mr Veitch.

Noes: Mr Colless, Mr MacDonald, Mr Mason-Cox.

There being an equality of votes, question resolved in the affirmative on the casting vote of the Chair.

Mr Mookhey moved: That the following new committee comment be inserted after paragraph 1.99:

'**Committee comment**

The committee acknowledges Ken Matthew's interim finding 'that water-related compliance and enforcement arrangements in NSW have been ineffectual and require significant and urgent improvement'; 'There is little transparency to members of the public of water regulation arrangements in NSW, including the compliance and enforcement arrangements which should underpin public confidence' and that a "systemic fix" is required. The committee supports the full and urgent initiation of the Water Management Compliance Improvement Package Mr Matthews outlines in his interim report.

> The committee further acknowledges and shares the concerns Mr Matthews expresses in his final report that: 'that work on other elements of the total reform package is at risk of delay'; and 'about the risks of unwarranted "watering down" of the reform measures as implementation proceeds.'

Question put.

The committee divided.

Ayes: Mr Brown, Mr Mookhey, Mr Veitch.

Noes: Mr Colless, Mr Mason-Cox, Mr MacDonald.

There being an equality of votes, question resolved in the affirmative on the casting vote of the Chair.

Resolved, on the motion of Mr Mookhey: That paragraph 1.100 be amended by:
a) inserting 'first' after 'The committee views this as an important'
b) inserting 'universal' before 'monitoring and metering arrangements for water extractions'.

Resolved, on the motion of Mr Mookhey: That the following new recommendation be inserted after paragraph 1.100:

> **'Recommendation X**
>
> That the NSW Government urgently implement the full Water Management Compliance Improvement Package outlined in Mr Ken Matthews' interim report entitled *Independent investigation into NSW water management and compliance*, dated 8 September 2017.'

Mr Mookhey moved: That Recommendation 11 be amended by:
a) inserting 'Notwithstanding the above recommendation' before 'That the NSW Government urgently prioritise'
b) inserting 'universal' before 'monitoring and metering'.

Question put.

The committee divided.

Ayes: Mr Brown, Mr Mookhey, Mr Veitch.

Noes: Mr Colless, Mr Mason-Cox, Mr MacDonald.

There being an equality of votes, question resolved in the affirmative on the casting vote of the Chair.

Resolved, on the motion of Mr Mookhey: That the following new committee comment be inserted after paragraph 1.108:

> **'Committee comment**
>
> The committee is disappointed incorrect data about New South Wales compliance and enforcement was provided to the NSW Ombudsman, and in turn, to the Parliament and public.'

Chapter 2

Resolved, on the motion of Mr MacDonald: That paragraph 2.6 be amended by omitting at the end: 'The area is known for its rice, wheat and other cropping production as well as wine, cotton and cattle' and inserting instead: 'The area is known for its permanent plantings of citrus and wine grapes; its annual crops of rice, wheat and cotton and its wool and cattle enterprises.'

Chapter 3

Resolved, on the motion of Mr MacDonald: That paragraph 3.3 be amended by omitting 'drought scenarios' and inserting instead 'climate conditions'.

Mr MacDonald moved: That Recommendation 5 in the Summary of Key Issues and paragraph 3.64 be omitted as follows:

'Therefore the committee recommended in the summary of key issues at recommendation 5:

- That the NSW Government, as a matter of urgency and in consultation with regional communities, develop a comprehensive water equation for supply and demand in New South Wales by March 2020, for the next 50 years.'

Question put.

The committee divided.

Ayes: Mr Colless, Mr MacDonald.

Noes: Mr Brown, Mr Mason-Cox. Mr Mookhey, Mr Veitch.

Question resolved in the negative.

Resolved, on the motion of Mr Veitch: That recommendation 12 be amended by inserting at the end ', including the examination of cultural flows'.

Resolved, on the motion of Mr MacDonald: That paragraph 3.174 and recommendation 15 be amended by inserting 'for irrigation purposes' after 'exclude licence holders from pumping water'.

Resolved, on the motion of Mr MacDonald: That paragraph 3.178 be amended by inserting 'long term and' after 'Water sharing plans set'.

Resolved, on the motion of Mr MacDonald: That recommendation 17 be amended by inserting at the end ', and that access licenses and fixed charges should reflect this permanent reduction in entitlements'.

Resolved, on the motion of Mr Veitch: That recommendation 17 be amended by omitting 'That the NSW Government publicly report' and inserting instead 'That the NSW Government develop and implement public reporting mechanisms'.

Resolved, on the motion of Mr MacDonald: That paragraph 3.247 and recommendation 20 be amended by inserting at the end ', including the delivery of environmental water'.

Mr Mookhey (on behalf of Mr Buckingham) moved: That the following new recommendation be inserted after recommendation 19:

'Recommendation X:

That the NSW Government boost funding and staff numbers for compliance and enforcement, through a levy on irrigators and other large water users.'

Mr Veitch moved: That the motion of Mr Mookhey (on behalf of Mr Buckingham) be amended by omitting at the end 'through a levy on irrigators and other large water users'.

Amendment of Mr Veitch put and passed.

Original question of Mr Mookhey (on behalf of Mr Buckingham), as amended, put and passed as follows:

'Recommendation X:

That the NSW Government boost funding and staff numbers for compliance and enforcement**.'**

Chapter 4

Resolved, on the motion of Mr MacDonald: That paragraph 4.120 be omitted as follows: 'The committee understands these important concerns and calls on the NSW Government to conduct a review of the water market and inter-valley transfers that considers whether the system is meeting the needs of its key stakeholders and how market manipulation for profit can be reduced.', and the following new paragraph be inserted instead:

> 'The committee understands these important concerns and calls on the NSW Government to request IPART to conduct a review of the water market including considering whether it is operating transparently, efficiently, and fairly so as to eliminate market manipulation'.

Resolved, on the motion of Mr MacDonald: That recommendation 27 be omitted as follows: 'That the NSW Government conduct a review of the water market and inter-valley transfers that considers whether the system is meeting the needs of its key stakeholders and how market manipulation for profit can be reduced.', and the following new recommendation be inserted instead:

> 'That the NSW Government request the Independent Pricing and Regulatory Tribunal to conduct a review of the water market including considering whether it is operating transparently, efficiently, and fairly so as to eliminate market manipulation'.

Resolved, on the motion of Mr MacDonald: That recommendation 31 be amended by omitting 'the NSW Irrigators Council' and inserting instead 'stakeholders'.

Chapter 5

Mr Veitch moved: That Recommendation 33 be omitted as follows: 'That the NSW Government, subject to the findings of the WaterNSW feasibility study, construct a dam at Cranky Rock, or other suitable location on the Belubula River', and the following new recommendation be inserted instead:

> 'That the NSW Government conduct a feasibility study into the augmentation of Wyangala Dam'.

Question put.

The committee divided.

Ayes: Mr Mookhey, Mr Veitch.

Noes: Mr Brown, Mr Colless, Mr Mason-Cox, Mr MacDonald.

Question resolved in the negative.

Mr Colless moved: That Recommendation 33 be omitted as follows: 'That the NSW Government, subject to the findings of the WaterNSW feasibility study, construct a dam at Cranky Rock, or other suitable location on the Belubula River', and the following new recommendation be inserted instead:

> 'That the NSW Government, subject to the findings of the WaterNSW feasibility study, construct a dam at Cranky Rock, or other suitable location within the Lachlan River Valley, including the augmentation of existing water storages.'

Question put.

The committee divided.

Ayes: Mr Brown, Mr Colless, Mr Mason-Cox, Mr MacDonald.

Noes: Mr Mookhey, Mr Veitch.

Question resolved in the affirmative.

Resolved, on the motion of Mr MacDonald: That Recommendation 35 be amended by inserting at the end: 'and ensure this advice is in alignment with the Murray-Darling Basin Plan.'

Chapter 6

Resolved, on the motion of Mr Veitch: That paragraph 6.89 be omitted as follows: 'The committee notes that there may be potential benefits of diverting the Clarence River to the west. There is merit to any strategy that seeks to mitigate floods and flood damage in the Clarence Valley and provide additional water for agriculture in the Barwon region. The committee acknowledges that stakeholders were divided on the issue of water diversion. However, the committee believes that further investigation into water diversion schemes is warranted to consider their feasibility as a strategy to mitigate floods. The committee

therefore recommends that the NSW Government investigate the feasibility of water diversion schemes as a flood mitigation tool', and the following new paragraph be inserted instead:

> 'The committee heard evidence from some inquiry participants that there may be potential benefits of diverting the Clarence River to the west. These inquiry participants were of the view that there is merit to any strategy that seeks to mitigate floods and flood damage in the Clarence Valley and provide additional water for agriculture in the Barwon region. The committee acknowledges that stakeholders were divided on the issue of water diversion. However, some inquiry participants held strong views against diverting waters from the Clarence River to the west'.

Resolved, on the motion of Mr Veitch: That recommendation 38 be omitted as follows: 'That the NSW Government investigate the feasibility of water diversion schemes as a flood mitigation tool'.

Chapter 7

Resolved, on the motion of Mr Mookhey: That paragraph 7.11 be amended by omitting 'investment' and inserting instead 'commitment'.

Resolved, on the motion of Mr Mookhey: That paragraph 7.13 be amended by inserting 'the Government advised' after 'Following the completion of the new pipeline,'.

Resolved, on the motion of Mr Mookhey: That paragraph 7.14 be amended by inserting at the end: 'The then Deputy Premier said 'This historic project will have benefits across the Basin as it reduces the need for further buybacks of productive water.'.

Resolved, on the motion of Mr Veitch: That the quote at paragraph 7.21 be amended by omitting the first sentence as follows: '...there is anxiety about what will happen to the lakes if the pipeline is not built and there is a requirement to sequester the equivalent of two years' supply of water for Broken Hill'.

Resolved, on the motion of Mr Mookhey: That paragraph 7.29 be amended by omitting 'some' before 'controversy for local residents'.

Mr MacDonald moved: That the first dot point at paragraph 7.65 be amended by inserting 'materially' before 'increase the water bills'.

Question put.

The committee divided.

Ayes: Mr Colless, Mr Mason-Cox, Mr MacDonald.

Noes: Mr Brown, Mr Mookhey, Mr Veitch.

There being an equality of votes, question resolved in the negative on the casting vote of the Chair.

Mr Mookhey moved: That paragraph 7.65 be amended by inserting the following new dot point at the end and to include this as a new recommendation in the Summary of Key Issues:

- 'That the NSW Government immediately release the full business case for the Broken Hill Long-Term Water Supply Solution.'

Question put.

The committee divided.

Ayes: Mr Mookhey, Mr Veitch.

Noes: Mr Brown, Mr Colless, Mr MacDonald, Mr Mason-Cox.

Question resolved in the negative.

Mr Mookhey moved: That Recommendation 3 in the Summary of Key Issues and the dot point at paragraph 7.67 be amended by inserting 'binding' after 'That the NSW Government make a'.

Question put.

The committee divided.

Ayes: Mr Mookhey, Mr Veitch.

Noes: Mr Brown, Mr Colless, Mr MacDonald, Mr Mason-Cox.

Question resolved in the negative.

Resolved, on the motion of Mr Colless: That Recommendation 3 in the Summary of Key Issues and the dot point at paragraph 7.67 be amended by omitting 'maintain the Menindee Lakes following the construction of the Broken Hill pipeline', and inserting instead: 'maintaining and improving the operation of the Menindee Lakes following the construction of the Broken Hill pipeline'.

Resolved, on the motion of Mr Mookhey: That:

- The draft report, as amended, be the report of the committee and that the committee present the report to the House
- The transcripts of evidence, submissions, tabled documents, answers to questions on notice and supplementary questions, and correspondence relating to the inquiry be tabled in the House with the report
- Upon tabling, all unpublished attachments to submissions be kept confidential by the committee
- Upon tabling, all unpublished transcripts of evidence, submissions, tabled documents, answers to questions on notice and supplementary questions, and correspondence relating to the inquiry, be published by the committee, except for those documents kept confidential by resolution of the committee
- The committee secretariat correct any typographical, grammatical and formatting errors prior to tabling
- The committee secretariat be authorised to update any committee comments where necessary to reflect changes to recommendations or new recommendations resolved by the committee
- Dissenting statements be provided to the secretariat within 24 hours after receipt of the draft minutes of the meeting
- That the report be tabled on 14 May 2018.

6. Adjournment

The committee adjourned at 11.29 am, until Monday 7 May 2018, Macquarie Room, Parliament House (Windsor Bridge public hearing).

Samuel Griffith
Committee Clerk

Appendix 8 Dissenting statements

From Mr Scot MacDonald MLC, Liberal Party

The purpose of this dissenting report is to highlight my objection to Recommendation 5;

"That the NSW Government, as a matter of urgency and in consultation with regional communities, develop a comprehensive water equation for supply and demand in New South Wales by March 2020, for the next 50 years."

While understandable in its motivation, this approach risks a distraction and undermining of the Murray Darling Basin Plan.

The Murray Darling Basin Plan commenced in 2012 after nearly two decades of contentious debate and finally a negotiated compromise between Basin States and the Commonwealth. The Howard and subsequent Governments committed $13 billion in funding to progress its goals.

The Commonwealth Water Act 2007 objects include:

A. to enable the Commonwealth, in conjunction with the Basin States, to manage the Basin water resources in the national interest; and

C. in giving effect to those agreements, to promote the use and management of the Basin water resources in a way that optimises economic, social and environmental outcomes; and

D. without limiting paragraph (b) or (c):
   I. to ensure the return to environmentally sustainable levels of extraction for water resources that are over allocated or overused; and
   II. to protect, restore and provide for the ecological values and ecosystem services of the Murray-Darling Basin (taking into account, in particular, the impact that the taking of water has on the watercourses, lakes, wetlands, ground water and water-dependent ecosystems that are part of the Basin water resources and on associated biodiversity); and
   III. subject to subparagraphs (i) and (ii)—to maximise the net economic returns to the Australian community from the use and management of the Basin water resources; and

E. to improve water security for all uses of Basin water resources; and

F. to ensure that the management of the Basin water resources takes into account the broader management of natural resources in the Murray-Darling Basin; and

G. to achieve efficient and cost effective water management and administrative practices in relation to Basin water resources"

Whereas these objects have been criticised for giving emphasis to the environmental condition of the Basin, I believe the aims strike the right balance of a healthy system and economic imperatives.

We should not retreat to a unilateral State regulation of the Basin unless the Greens Party and Federal Australian Labor Party recklessly undermine the Basin Plan with its incorporated capacity for adjustments that requires extensive community consultations.

The agreed Sustainable Diversion Limits with reviews and modifications is the soundest mechanism for cross border and Basin management.

If the aim of a 'NSW water equation' is to strike the right long term balance between supply and demand, then the current policy of the primacy of a Basin wide plan with underlying Water Sharing/Resource Plans should be adhered to.

The current opportunistic debates on the Murray Darling Basin Plan regulation Disallowance motions in the Australian Parliament demonstrates the dangers of moving back to a state versus state, political approach to Basin management.

From Mr Jeremy Buckingham MLC, The Greens

I am very concerned that the report, as agreed to by the committee, does not address many of the significant issues regarding water management in NSW and the parlous state of the Murray-Darling Basin due to climate change, over-extraction and mismanagement. I believe that the report too closely resembles a wish list of irrigators' demands and neglects the serious reform needed to save our mighty inland rivers from terminal decline.

The Darling River is dying and must be saved

The Darling River is dying as small to medium flows have been dramatically reduced in recent years with devastating consequences for the unique environment and the towns, farmers and Traditional Owners who rely on the river. While climate change is exacerbating the issue, the death of the Darling is not a natural phenomenon. The problem is that huge amounts of cotton is grown in Queensland and Northern NSW with irrigated water, taken from the tributaries of the Darling. Successive state and federal governments have also been party to mismanagement, potential corruption and woefully inadequate enforcement of water laws.

To address this issue I recommend that, as a start, the NSW Government:

1. *Commits to remaining in the Murray Darling Basin Plan and commits to increasing the amount of water that is returned to the environment in line with scientific assessments of what is needed to restore the health of the system, with buybacks of water restored to at least the original 2750 gigalitres specified in the 2012 Murray Darling Basin Plan*
2. *Combines the Water portfolio with the Environment portfolio and ensures it is no longer combined with Primary Industries*
3. *Boosts funding and staff numbers for compliance and enforcement, through a levy on irrigators and other large water users*
4. *Amends water sharing plans to support progressive reductions in water availability for extraction which reflect climate change impacts*
5. *Introduces an immediate no metre, no pump rule for irrigators and other large water users in NSW*
6. *Investigates the scale of illegal earthworks in NSW and reverses rules which allow illegal earthworks to be retrospectively legalised*

Halt construction of the Broken Hill Pipeline

While the committee did receive evidence that the long term sustainability of Broken Hill's water is at risk, I do not believe that the evidence suggested that the pipeline from Wentworth to Broken Hill is the answer to this problem. We received evidence that the pipeline is enthusiastically supported by the irrigation industry, including the peak industry body the NSW Irrigators Council, but we also received evidence that there is considerable and widespread community opposition to the pipeline, including from water experts, graziers, the Broken Hill Mayor and Council, the Barkindji Traditional Owners and residents of Broken Hill, Pooncarie, Menindee and Wilcannia.

I am very concerned about the implications of the proposed pipeline for the long term health of the Darling River. Once constructed, the new pipeline will allow the Government to approve more water being extracted upstream for irrigation, or to empty the Menindee Lakes faster, without having to worry about the city of Broken Hill running out of water. I therefore believe that the committee should have supported the following recommendation:

> *That the NSW Government immediately halt construction of the Broken Hill Pipeline and instead addresses the issue of a long term sustainable water supply for Broken Hill by:*

e. returning more water to the Darling River in line with scientific assessments,
f. raising the height of weir 32,
g. improving the connection between Lake Pamamaroo and Copi Hollo and investigating the feasibility of extending the current anabranch pipeline to weir 32.

I am also concerned that the NSW Government has repeatedly refused to release the business case justifying the decision to build the pipeline. Given this is an expenditure of almost $500 million of taxpayers' money and the high level of community concern about the pipeline it is disappointing that the committee failed to accept the following recommendation:

That the NSW Government immediately releases the business case for the Broken Hill Pipeline.

Royal Commission into the Murray-Darling Basin

I am pleased that the committee accepted my amendment and recommended that the NSW Government support a federal Royal Commission into the administration of the Murray-Basin, however it is disappointing that the committee did not accept my amendment and give a strong direction to the NSW Government to fully cooperate with the South Australian Royal Commission into the administration of the Murray-Darling Basin.

Oppose the construction of new dams, including the Cranky Rock Dam

The Greens oppose the construction of any new large dams on our inland rivers and thus we do not support the committee's recommendations that the NSW Government construct a dam at Cranky Rock, or any location on the Belubula River. There are no identified water users for the proposed Cranky Rocky Dam, it is on one of the most heavily dammed and regulated river systems in the state and would destroy the heritage listed Cliefden Caves. NSW does not need new dams, we need smart local water solutions such as storm water harvesting, increasing efficiency and recycling.