Chapter 3

Ground water

3.1 Like its approach to surface water, the Murray-Darling Basin Authority (MDBA) has developed Sustainable Diversion Limits (SDLs) and Baseline Diversion Limits (BDLs) for ground water as part of the Basin Plan. The MDBA has determined ground water SDLs and BDLs for different resource units and aggregated these to provide a total for the basin system.

3.2 The proposed total SDL can be compared to a basin-wide (BDL) which represents the MDBA's determination of the limits on ground water use under state-based water management arrangements in 2009.

3.3 However, these numbers have changed dramatically across the various iterations of the Basin Plan. The total ground water SDL went from 1601 gigalitres per year (GL/y) in the Guide (October 2010), to 4340 GL/y in the Basin Plan (November 2011), to 3184 GL/y in the Basin Plan (May 2012), and finally to 3324 GL/y in the Basin Plan (August 2012). The BDL on the other hand has changed from 1786 GL/y in the Guide, to 2352 GL/y in the Basin Plan (November 2011) and 2373 GL/y in the Basin Plan (May 2012).[1,2] There were also significant changes for the SDLs in a number of different resource units and the changes were not uniform across the Basin.[3]

Surface and ground water connectivity

3.4 The committee heard evidence that surface water and ground water are strongly connected water resources and therefore they should be jointly managed. For example, the Conservation Council of South Australia stated 'by default, these systems should be treated as connected'.[4]

3.5 This supports information from bodies such as National Water Commission (NWC) which has stated that surface and ground water resources are 'intimately linked' and should be managed together.[5] The committee has also previously

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1 MDBA, *Addendum to the proposed Groundwater Baseline and Sustainable Diversion Limits Method Report*, July 2012, p. 21.

2 *Note*: the basin-wide groundwater BDL was not set out in the Addendum Report, the ground water BDLs are set out in the August Altered Proposed Plan according to each ground water SDL resource unit.

3 A breakdown of the changes is provided by Friends of the Earth, *Basin Plan Groundwater Diversion Limits: Comparing the "Guide" and the Proposed Basin Plan*, document tabled at committee hearing, 24 April 2012.

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

5 NWC, *Groundwater-Surface Water Connectivity*, 13 December 2011, http://nwc.gov.au/groundwater/connectivity, (accessed 14 September 2012).

addressed this connectivity concern in its earlier interim report for this inquiry regarding coal seam gas.[6]

3.6 That said, the committee notes that connectivity between ground water and surface water is not uniform. Some aquifers in deep ground water systems have little or no connection with surface water. The CSIRO has estimated that around one quarter of current ground water extraction is believed to be reducing surface water availability, amounting to just four per cent of the Basin's surface water use.[7]

3.7 The committee also notes that this figure doesn't include the Basin Plan's proposed additional extraction and the associated potential impact on surface water.

Ground water extraction and limited information

3.8 Stakeholders in the Basin are well aware of the connectivity between water systems and they voiced concerns regarding the limited knowledge and scientific understanding of the impact of ground water extractions. As Ms Smiles from the Inland Rivers Network explained:

> Those of us who have been following water for a long time know that the knowledge and science around groundwater is relatively new compared to what we know about what is in front of our faces on a regular basis with surface flow.[8]

3.9 The NWC identified the Murray-Darling Basin as an area of 'particular concern' in managing the interconnectedness of the resources because of the increases in ground water extraction following the surface water diversion cap introduced in 1997.[9] The MDBA initially estimated that, across the entire basin, the annual extraction level of ground water was approximately 1795 GL.[10]

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

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6 Senate Rural Affairs and Transport Committee, *Management of the Murray Darling Basin Interim report: the impact of mining coal seam gas on the management of the Murray Darling Basin*, 30 November 2011, pp 17–37.

7 CSIRO, *Water Availability in the Murray-Darling Basin, A report to the Australian Government from the CSIRO Murray-Darling Sustainable Yields Project*, October 2008, p. 47.

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

9 NWC, *Groundwater-Surface Water Connectivity*, 13 December 2011, http://nwc.gov.au/groundwater/connectivity, (accessed 14 September 2012).

10 MDBA, *The Proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, 2012, p. 1.

> The failure to adequately analyse the impacts of increasing ground water extractions on surface water means the draft basin Plan will not adequately protect environmental assets, particularly those dependent on low flows.[11]

3.11 There is very little scientific understanding of the impacts (especially on surface water) of increasing ground water extraction. As the CSIRO told the committee:

> The surface water impacts from the ground water take...will take a long time to emerge. There is a review process that has been put in place. There may be no demand for that increase in groundwater use to happen in a hurry, but that does not necessarily mean it is scientifically defensible.[12]

3.12 The MDBA increased ground water extraction limits from the Guide to Basin Plan November 2011–based on incorporating the work that state governments had done in establishing sustainable groundwater limits, including through the Australian Capital Territory Plan limit, the Achieving Sustainable Groundwater Entitlements program in New South Wales, South Australian natural resource management regulations, and local groundwater management rules in Victoria and Queensland.[13] Some stakeholders have suggested that any increases to ground water extraction from those that were presented in the Guide should be delayed until thorough assessments are completed.[14] The proposed increase in ground water extraction also led to committee concerns about the approach the MDBA is taking to ground and surface water connectivity.

The MDBA's modelling and assumptions

3.13 Despite the apparent need to consider the connectivity of the two resources, the MDBA's treatment of connectivity is limited. Although MDBA documentation released in July 2012 did reflect some consideration of ground water and surface water connectivity in its revision to the ground water SDLs and BDLs, this connectivity is only considered in the ground water modelling, not for surface water modelling.[15]

3.14 The committee is not surprised, therefore, that the CSIRO called for more science to be undertaken on ground water extraction and the impact on surface water:

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

12 Dr Bill Young, Director, Water for a Healthy Country Flagship, CSIRO, *Committee Hansard*, 23 April 2012, p. 62

13 MDBA, *Delivering a Healthy Working Basin: about the draft Basin Plan*, November 2011, p. 33.

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

15 MDBA, *Addendum to the proposed Groundwater Baseline and Sustainable Diversion Limits: Methods Report*, July 2012, p. 5.

> **Dr Young**: There are a number of areas around the ground water parts of the proposed plan where we believe that there is a more robust evidence base that could be assembled to try and support the proposed position.
>
> **CHAIR**: Is that code for, 'We need a little more time to sort this out to make sure the science is right?'
>
> **Dr Young**: No. We have undertaken a lot of the science, as you referred to, and I think not all of that science has necessarily been taken into full account.[16]

3.15 The CSIRO went on to say that:

> …the evidence base that has been presented by the authority to date to support the plan has not demonstrated that it has undertaken a rigorous assessment of the surface water impacts of the proposed levels of ground water take. The only caveat I would put on that is that on the last day of the consultation period they released another 100-page report supporting the ground water information. I have not had the opportunity yet to review that information.[17]

3.16 In contrast the NSW Office of Water argued that the MDBA was still being too conservative in its setting of ground water limits:

> The most recent altered plan sets out sustainable diversion limits for four New South Wales aquifers. These are deep aquifer that contain water that is brackish or saline at best. We believe that the sustainable diversion limits established by the Murray-Darling Basin are overly conservative and not based on the best available science. The four aquifers in particular have no or minimal connectivity to surface water and the sustainable diversion limits developed in New South Wales are already extremely conservative without another layer of conservation put over the top of them.[18]

3.17 Even though the MDBA has made several adjustments to the ground water SDLs from the Guide and through the various iterations of the Basin Plan, the Wentworth Group claimed there was no new modelling undertaken which would explain these changes:

> In the 12 months since [the release of the Guide in October 2010], there has not been any new science done—let us make that clear—but there has been a change of 2,600 gigalitres. We have increased the amount of ground water we can take by 2,600 gigalitres. I am a little bit shocked at that without new science to back that up.[19]

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16 Dr Bill Young, Director, Water for a Healthy Country Flagship, CSIRO, *Committee Hansard*, 23 April 2012, p. 60.

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

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

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

3.18 Furthermore, the Wentworth Group has strongly criticised the assumptions used to calculate the diversion limits and stated that the assumptions used 'ignore the long-term connectivity of surface and ground water' resources.[20] It explained how connectivity may operate in this situation:

> …documentation supporting the draft Basin Plan [Basin Plan (November 2011] the Authority states that for the purpose of determining Sustainable Diversion Limits, rivers that are classified as losing streams...can be treated as unconnected systems. This is then used to justify the assumption that drawing these aquifers down further will not increase the loss of water from the overlying rivers.
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> However, this assumption is incorrect. The aquifers that receive water from losing river reaches will provide water to these rivers further upstream or downstream; i.e. there are gaining reaches elsewhere. Allowing additional extractions from these aquifers simply means that the level of the watertable will drop, and the extent of the losing stream will increase into areas that are currently gaining streams. Reducing the length of these gaining streams will affect river flows, including important base flows.[21]

3.19 The committee considers that in the absence of firm science and research as outlined above, the MDBA should provide more information in regard to its assumptions on surface and ground water connectivity.

Ground water advisory group

3.20 The committee welcomes the consideration by the MDBA to establish a ground water advisory group.[22]

3.21 Given the significant gaps in scientific information that exist, the committee considers this to be positive step (provided it is implemented properly) towards addressing some of the committee's concerns regarding the state of knowledge about ground water extractions in the Basin. However, it is essential that such a move be combined with significant changes to the MDBA's approach to ground water and the open and transparent provision of information to stakeholders and Parliament to ensure that informed decisions can be made about the Basin Plan.

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

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

22 http://download.mdba.gov.au/revised-BP/Addendum-to-Groundwater-Methods.pdf, p. 30.