

Remember the '56 flood?

How much water flows to the environment in the Barwon Darling system?

Amid claims of theft and mismanagement of water in the Barwon Darling River system, politicians have claimed just 6% of water is available for production, leaving 94% of water for downstream users and the environment. These claims are based on flawed analysis, with two large floods in the 1950's skewing the long-term average flow and masking the reality.

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Summary

Controversy is raging around Murray Darling Basin water issues following allegations of large-scale water theft that were aired on Four Corners aired in July 2017. In particular, government and departmental management of the Barwon-Darling river system is under scrutiny.

Defending the management of the Barwon-Darling, current and former NSW Ministers for Water, Niall Blair and Kevin Humphreys have claimed that only 6% of water in the Barwon-Darling is available for production, leaving 94% for the downstream communities, uses and the environment. This claim is deeply flawed as it:

- Appears to be based on flows at Bourke, not Menindee, which are substantially higher.
- Is based on average flows since 1944, of 3,300,000 megalitres (ML). This includes the 1950 and 1956 floods, two years that had flows almost equal to the driest 50 years. Average flows this century average just 1,800,000 ML.
- Ignores that under the Barwon-Darling Water Sharing Plan, producers are allowed to take 300% of a water access licence, in any one year, every year.

In fact, upstream producers can take 41% of the average flows at Menindee¹, based on the average flow this century, leaving just 59% for downstream users and the environment.

Even this is misleading. Discussion of average flows is of only limited use in relation to a river like the Barwon-Darling, one of the most variable in the world. Each year needs to be assessed based on the water available. In the driest year, the amount of water theoretically available for producers is 1,652% of flows, while in the wettest years the environment could theoretically receive 99% of flows.

Water management is complex, and arrangements for the equitable sharing of the water resource are not simple. The challenges in implementing the Basin Plan are not assisted by politicians citing figures that are wildly misleading.

¹ Measured at Wilcannia

Introduction

Controversy has raged around Murray Darling Basin water issues since Four Corners aired allegations of large-scale water theft from the Barwon-Darling River in July 2017.² Subsequent reviews into the allegations have highlighted much broader problems in the implementation of the \$13bn Murray-Darling Basin Plan, including protecting environmental water from extraction by production.³

The Barwon-Darling runs from the Queensland border in the North, along Western NSW into the Menindee Lakes near Broken Hill in south western New South Wales. Broken Hill's water supply is sourced from Menindee Lakes. The Lower Darling River meets the Murray River near the South Australian border. The Barwon-Darling and Lower Darling rivers are the funnel that connects all of the rivers, lakes and wetlands in the Northern Basin to the Southern Basin.

The Barwon-Darling and Lower Darling rivers are under pressure. Recent analysis undertaken by the MDBA supports widespread concerns that there is a significant decline in flows in the Barwon-Darling and Lower-Darling Rivers.⁴

On Lateline (23 November 2017), the Broken Hill Mayor, Darriea Turley said:

How is that Menindee was a thriving business and now it is dead? We believed at the time that it was a millennium drought and that had progressed to a longer drought. Now we are concerned that it was actually a man-made drought. Climate change doesn't dry a river like it has.

² Besser (2017) *Pumped: Who's benefitting from the billions spent on the Murray-Darling?*, <http://www.abc.net.au/4corners/pumped/8727826>

³ Matthews (2017) *Final Report: Independent investigation into NSW water management and compliance*, https://www.industry.nsw.gov.au/_data/assets/pdf_file/0019/131905/Matthews-final-report-NSW-water-management-and-compliance.pdf;

Murray-Darling Basin Authority (2017) *The Murray-Darling Basin Water Compliance Review*, ; <https://www.mdba.gov.au/sites/default/files/pubs/MDB-Compliance-Review-Final-Report.pdf>

NSW Ombudsmen (2017) *Investigation into water compliance and enforcement 2007-17*, <https://www.ombo.nsw.gov.au/news-and-publications/publications/reports/state-and-local-government/investigation-into-water-compliance-and-enforcement-2007-17>

⁴ The Murray-Darling Basin Water Compliance Review: Containing reports by the Murray-Darling Basin Authority and the Independent Review Panel (page 132), <https://www.mdba.gov.au/sites/default/files/pubs/MDB-Compliance-Review-Final-Report.pdf>

In response, NSW Minister for Water, Niall Blair stated:

We have water sharing plans in New South Wales and in the Barwon-Darling, 6 per cent of water is allocated for productive use. That leaves the rest to be able to be used for environmental flows and environmental use of the river systems.⁵

Minister Blair appears to be quoting the 6% statistic from a 'Fact Sheet' produced by the former NSW Water Minister Kevin Humphreys, which stated:

- On average, 3,300,000 megalitres flow past Menindee each year.
- Across the river system, 189,000 megalitres – or 6% of all flows – are dedicated to production.
- The environment and end-of-system flows are allocated 3,111,000 megalitres – or 94% of the flows through the system.⁶

This gives the impression that almost all the water in the Barwon-Darling system is for the environment. Like most statistics around water in the Murray-Darling Basin, and the Barwon-Darling in particular, the reality is much more complicated.

WATER PAST MENINDEE

The 3,300,000ML past Menindee figure that Mr Humphries refers to appears to be based not the flows at Menindee, but on the flows at Bourke. The average annual flow past Bourke for 73 years between 1944 and 2016 is roughly 3.3 million megalitres.⁷

By contrast, the flows past Menindee (measured at Wilcannia) are substantially lower, as the river winds its way slowly through flat, dry country, with substantial water lost en route to seepage and evaporation. Over the same time period, the annual average flow at Menindee (measured at Wilcannia) is approximately 2,400,000 ML.

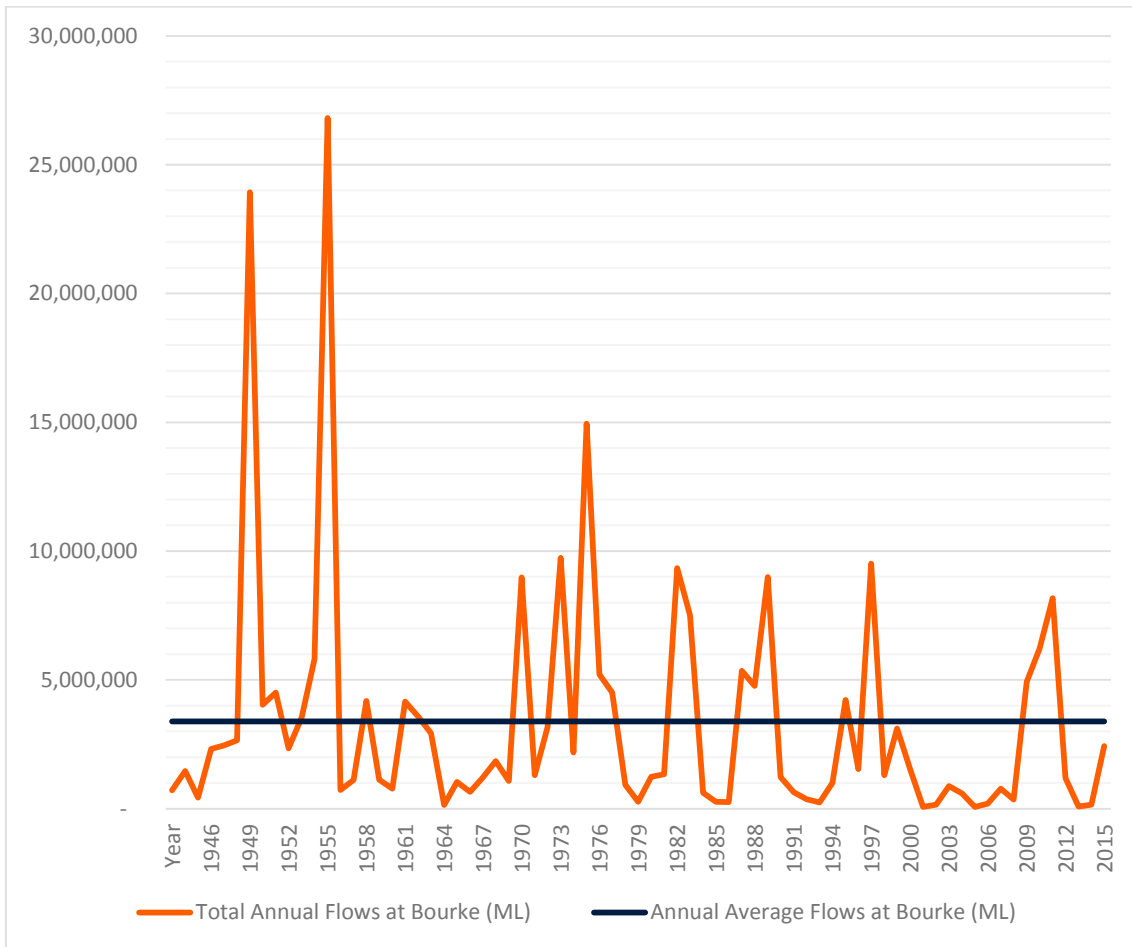
More importantly, the 3,300,000 ML figure is an average figure, and one calculated over 73 years. The Barwon-Darling is one of the most variable rivers in the world, as shown in Figure 1 below:

⁵ ABC (2017) *NSW Regional Water Minister denies wrongdoing in Murray Darling Basin Plan*, <http://www.abc.net.au/lateline/nsw-regional-water-minister-denies-wrongdoing-in/9182116>

⁶ <https://www.kevinhumphries.com.au/sites/default/files/documents/Kevin%20Humphries%20Media%20Fact%20Sheet%20-%20Barwon-Darling%20River%20System.140817.pdf>

⁷ http://realtimedata.water.nsw.gov.au/water.stm?ppbm=SURFACE_WATER&rs&3&rskm_url

Figure 1: Total and average annual flows at Bourke in the Barwon-Darling river

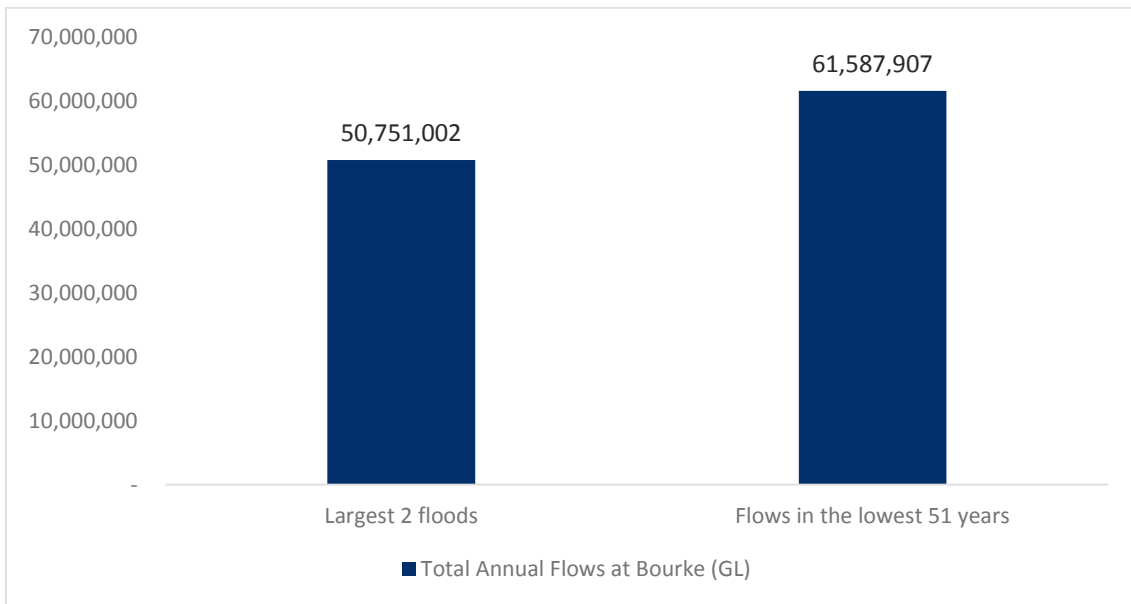


Source: NSW Office of Water (2017) *Continuous water monitoring network*,
http://realtimedata.water.nsw.gov.au/water.stm?ppbm=SURFACE_WATER&rs&3&rskm_url

Figure 1 shows the annual flows in the Barwon-Darling and the average flow cited by Mr Humphries. It is clear that this average is significantly distorted by a small number of wet years, particularly the large floods in 1956 and 1950.

Because of this variability averages are not a good way to represent flows or how water is shared in the Barwon-Darling. Figure 2 below shows that the 1956 and 1950 floods account for almost as much water as the flows in the lowest 51 years since 1944. These two floods contribute nearly 21% of total flows over this period, while the 51 driest years make up only 25% of the total flow:

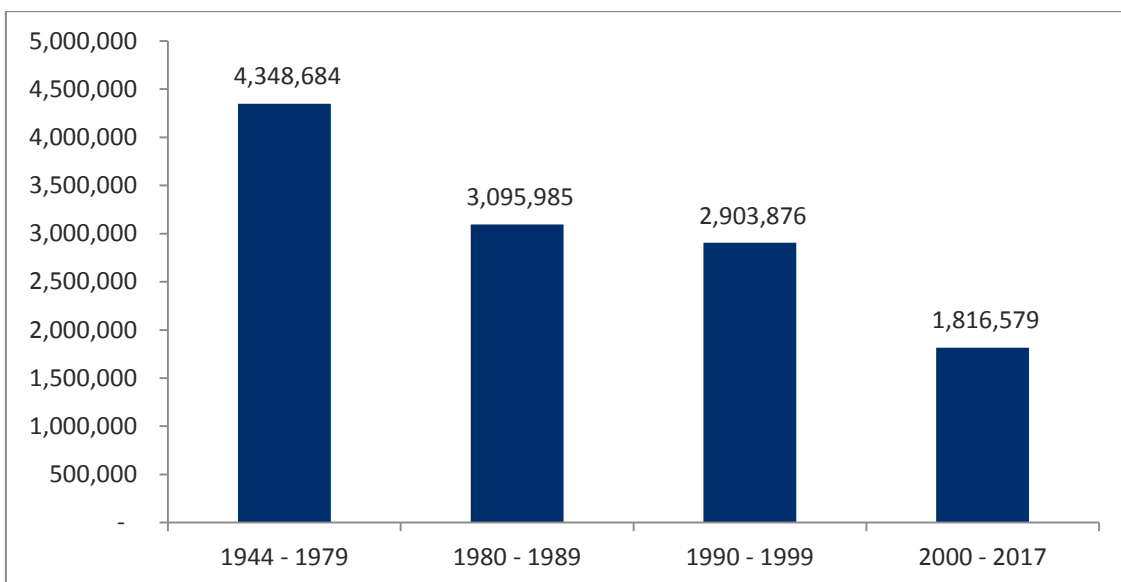
Figure 2: Comparison of years with large floods and low flows in the Barwon-Darling at Bourke



Source: NSW Office of Water (2017) Continuous water monitoring network

This shows that when talking about the average flow past Menindee⁸ (or Bourke as the case may be), it is important to state what year the average starts in. The average flow in the Barwon-Darling River at Bourke has been decreasing steadily, as shown in Figure 3:

Figure 3: Declining Average Flows in the Barwon-Darling at Bourke (ML)



Source: NSW Office of Water (2017) Continuous water monitoring network

⁸ Measured at Wilcannia

As shown in Figure 3 above, the average flow at Bourke in the middle of last century was substantially higher than it has been this century. Between 1944-1979, average flow was over 4,300 GL per year, substantially higher than Mr Humphries claimed 3,300 GL average. However, the 1980s average is less than the Minister's figure and the 1990s were lower still. This century, average flows past Bourke are just 1,800 GL, almost half of Mr Humphries claim.

However, it could be misleading to infer that these trends will continue. 1944-73 was a very wet period and 2000-17 includes the infamous millennium drought. Notably, 14 of the 17 years this century occurred within the lowest 22% of the total flow at Bourke. Rather, the point is that averages are misleading in a highly variable river system like the Barwon-Darling and are therefore not a useful basis on which to explain how water is shared.

WATER AVAILABLE FOR PRODUCTION

Mr Humphries claims that in the Barwon-Darling system, 189,000 megalitres is "dedicated to production". This is also misleading.

The Barwon-Darling Water Sharing Plan quoted by Minister Blair, provides for 189,000 megalitres of water access licences.⁹ However, under this Plan, irrigators are allowed to take 300% of a water access licence, in any one year.¹⁰ That is, 567,000 megalitres and not 189,000 is available for production in any given year.

The Lateline program that Minister Blair was responding to investigated why an embargo on irrigation extraction was not put in place to meet critical water supply for Broken Hill in late 2014 and early 2015. In fact, using the same methodology applied by Mr Humphreys, irrigators were theoretically permitted to take 676% and 360% of the total flows at Bourke in 2014 and 2013, the two years prior to the embargo being put in place as Broken Hill and other Lower Darling communities ran short of water.

We are not suggesting that irrigators did extract the full amount they were entitled to take under the plan - water cannot be extracted from a river if it's not there. The above example demonstrates how misleading a 6% average is over a long term in a variable system.

⁹ A water access licence is a right to extract a volume of water. See NSW Government (2012) *Water Sharing Plan for the Barwon-Darling Unregulated and Alluvial Water Sources 2012*, <https://legislation.nsw.gov.au/#/view/subordleg/2012/488>

¹⁰ The annual take limit is restricted by an annual Cap target, plus any accumulated Cap credit. The long term average Cap limit is 189,000ML and the accumulated credit at 30 June 2016 is 594,000ML.

That is, water for production is a fixed share (and not an annual percentage) and water for the environment is the residual. As a consequence, apart from small volumes reserved for base flows, the water available for production has priority over flows available for downstream communities and the environment. Water reserved for production is taken first (subject to pumping threshold conditions). This means that downstream communities and the environment are subject to the extreme variability of the system and rely on more floods like that of 1956 to fulfil their quota.

DIFFERENT WAYS TO MEASURE HOW WATER IS SHARED

Mr Humphries and Minister Blair claim that only 6% of the Barwon Darling system's water is available for irrigators, while 94% is reserved for the environment based on the 189,000 ML of access licences divided by the 3,300,000 ML annual average flow at Bourke since 1944. 189,000 divided by 3,300,000 ML is just under 6% (Method 1).

However, as discussed, these figures are skewed to misrepresent the share between production and communities and the environment. There are several ways that share could be measured and some alternatives could be:

- using the 300% of water access licences permitted to be taken under the water sharing plan over the average annual flows at Bourke since 1944 (Method 2);
- using the 300% of water access licences permitted to be taken under the water sharing plan over the average annual flows at Menindee¹¹ since 1944 (Method 3);
- 300% of water access licences permitted to be taken under the water sharing plan over the average annual flows at Menindee¹² this century (Method 4).

A comparison of the share of water attributed to production and communities and the environment is shown in Table 1:

¹¹ Measured at Wilcannia

¹² Measured at Wilcannia

Table 1: Different methods to measure how water is shared in the Barwon-Darling

	Method 1: 100% of WAL as a % of Bourke flows	Method 2: 300% of WAL as a % of Bourke Flows	Method 3: 300% of WAL as a % of Menindee ¹³Flows	Method 4: 300% of WAL as a % of Menindee ¹⁴flows this century
Amount available for production	189,000	567,000	567,000	567,000
Average annual flow	3,300,000	3,300,000	2,400,000	1,369,155
Percentage for production (on average)	6%	17%	24%	41%
Percentage for environment and downstream users (on average)	94%	83%	76%	59%

As shown in Table 1, the percentage of water available for the environment can vary between 59% and 94%, based on averages, depending on the method used.

Still more extreme amounts available to production or downstream communities and the environment are demonstrated if the wettest and driest individual years are chosen instead of longer term averages. Table 2 below, shows the amount available for production and downstream communities and the environment, as a percentage of total flows using four different methods to measure how water is shared in the Barwon-Darling.

¹³ Measured at Wilcannia

¹⁴ Measured at Wilcannia

Table 2: Percentage of water available to production and the environment in extreme years

	Method 1: 100% of WAL as a % of Bourke flows	Method 2: 300% of WAL as a % of Bourke Flows	Method 3: 300% of WAL as a % of Menindee Flows	Method 4: 300% of WAL as a % of Menindee flows this century
Highest amount available for production	279%	834%	1652%	1652%
Highest amount available for environment	99%	98%	96%	88%

The amount available for production can be as high as 1,652% of total flows; and the amount available for the environment can be as high as 99%.

Conclusion

There is no doubt that there are significant challenges in implementing the Murray-Darling Basin Plan which are manifesting in the Barwon-Darling system, in particular.

The Murray-Darling Basin Plan is a policy framework to balance economic, social and environmental water needs. Water management is complex, understanding water availability is complex, and so arrangements for the equitable sharing of the water resource are not simple.

The challenges in implementing the Basin Plan are not assisted by politicians citing figures that are wildly misleading. Australia's water management issues need transparency and meaningful analysis, not spin for political gain.