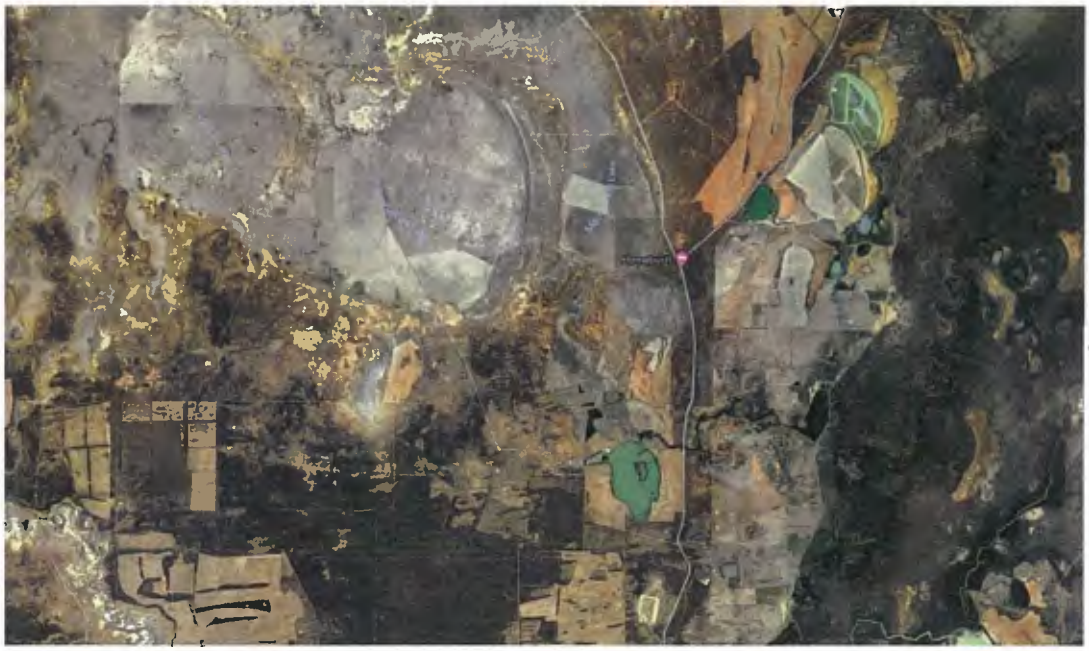
…couldn't organise water in a dunny

Submission of Narwie Partners

To

Productivity Commission

Murray Darling Basin Plan: Five-year assessment – Draft Report 30 August 2018.



Google map showing the Murrumbidgee River and part of the Lowbidgee Redbank North floodplain, Narwie and southern end of Geraki, and the series of lakes, Macommon, Dundomallee, Pitarpunga and Tin Tin lakes, rendered as dry lakes by the building of dams and other structures between 1890 and 1920 for the development of irrigation on the Murrumbidgee River 300 kilometres to the east.

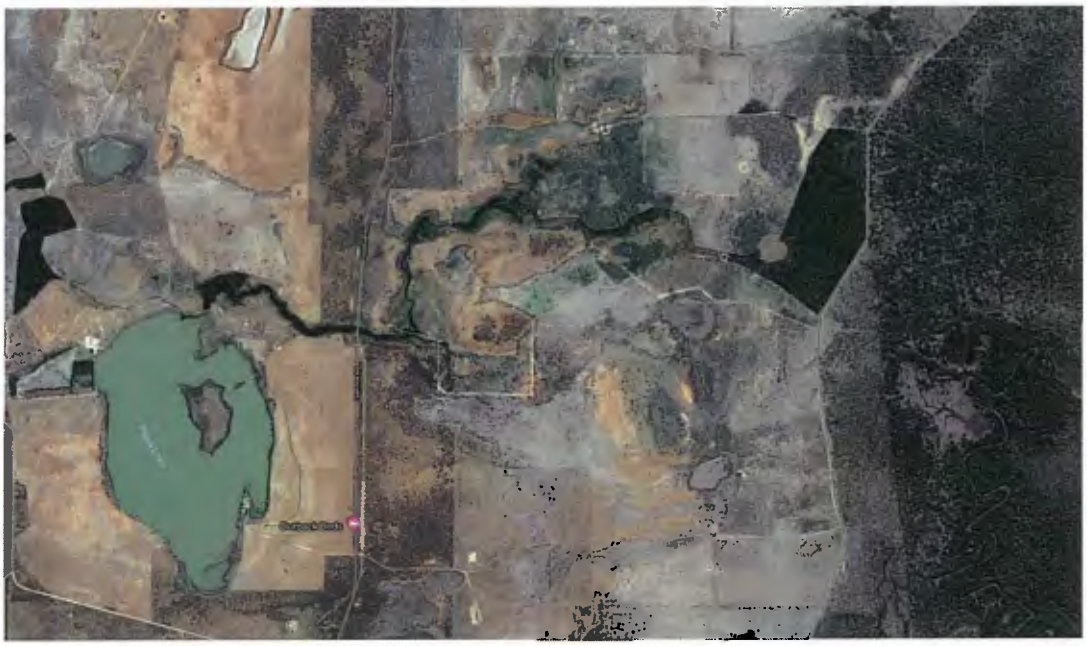
Murray Darling Basin Plan: Five-year assessment – Draft Report 30 August 2018.

Submission: Narwie Partners

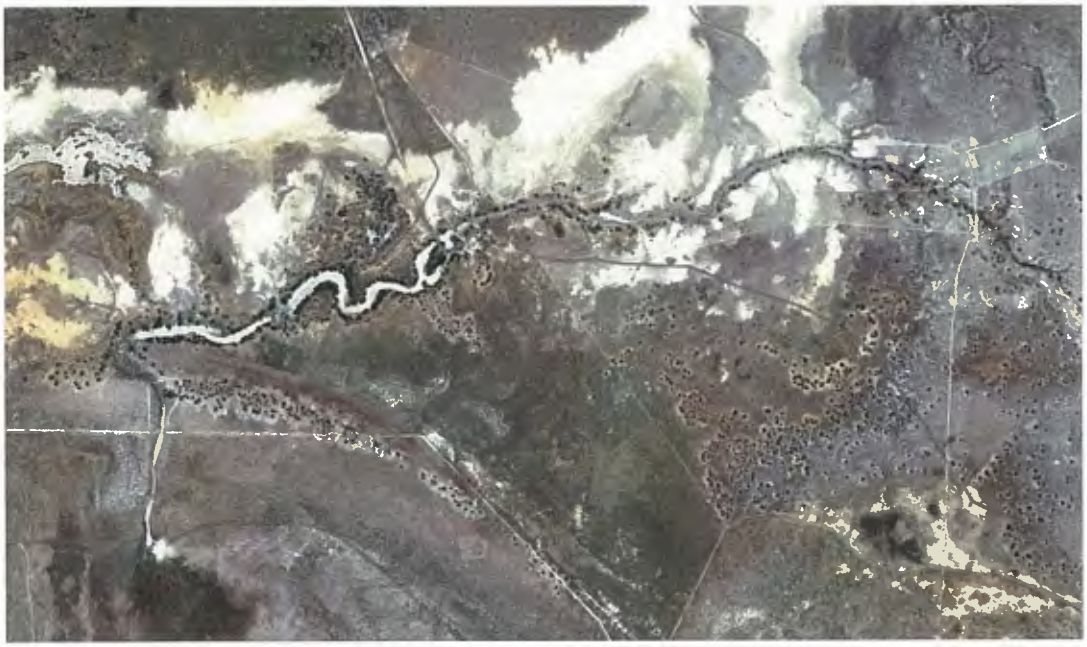
"I don't understand why government and bureaucracy is not upholding the law as it states... I do not understand why a government cannot follow the law....
...couldn't organise water in a dunny"[1]

[1] Evidence of Mr Stuart Le Lievre, Australian Floodplain Association, to the South Australian Murray-Darling Basin Royal Commission, Day 20, 24 August 2018, p 2247.

Maps - Narwie, Paika Lake, Paika Creek, Mckay Creek & Geraki Creek



Paika Lake after being filled in 2011 for the first time in 115 years. Showing the passage of water to Paika Lake from Narwie via Mckay Creek and Paika Creek and part of the Paika Levee constructed between 1907 and 1911.



Geraki Creek running from Macommon Lake, left to Pitarpunga Lake, right.

Executive summary

1) Narwie Partners submit it is premature to conclude that the Murray Darling Basin Authority (MDBA) and the Murray Darling Basin Plan (MDBP) have made significant practical progress, because the process of bridging the gap between water recovery targets and the new Sustainable Diversion Limits (SDLs) is nearly complete;
2) Narwie Partners submit it is premature to conclude that the new management arrangements, including those for both environmental watering and water trading, are working well;
3) Narwie Partners further submit the Productivity Commission should inquire into "*the matter of the effectiveness of the implementation of the Basin Plan and the water resource plans*" as required by the *Water Act 2007,*[2] by examining the validity of the ESLT and related SDLs, not assume their validity. Narwie Partners submit the Productivity Commission should not limit its review as it set out its 'Overview".[3]
4) Narwie Partners submit the MDBA and the MDBP ignore the best science around climate change and it is not acceptable for the Productivity Commission to simply suggest that for its 2026 review of the MDBP the MDBP "*will need to be forward-looking, and consider emerging risks (such as climate change). For the 2026 review to be based on the best available knowledge, new information may need to be generated, and planning for this should commence now.*"[4]

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[2] *Water Act 2007* (Cth), s 87(1), see Appendix 3.
[3] Murray-Darling Basin Plan: Five Year Assessment (Draft Report), The Basin Plan and the Commission's approach to assessing implementation, p 5.
[4] Murray-Darling Basin Plan: Five Year Assessment (Draft Report), Reporting, monitoring and evaluation, p 265.

5) Narwie Partners submit the MDBA failed to comply with the Act when setting the environmentally sustainable level of take (ESLT) and this necessitates the ESLT, and related SDLs, for the MDBP to be properly developed by an independent panel of the best scientific minds available from a range of relevant scientific disciplines.
6) Narwie Partners, enlarging on the previous submission, strongly support the Productivity Commissions recommendation the MDBA be separated into two separate institutions, a body to implement a properly developed plan and a body to ensure compliance with the plan.
7) Narwie Partners, with the strongest possible voice, urge the Productivity Commission to closely examine submissions to, and sworn evidence adduced on oath before, the SA MDBRC and give careful consideration to the serious issues raised by that evidence before it concludes its first 5-year assessment report.
8) Narwie Partners submit to comply with the requirements of the Water Act 2007 the MDBP must ensure the LRBN Floodplain and the wider Lowbidgee Floodplains are restored to sustainable environmental health by managing the water resource to ensure over bank flood conditions during the months of August, September and October are achieved across the floodplain.
9) Narwie Partners submit the Balranald Choke must be restored to its natural operation, by removing the block banks and replacing them with appropriate infrastructure, for the MDBP to comply with the requirements of the *Water Act 2007* and ensure the LRBN Floodplain and the wider Lowbidgee Floodplains are restored to sustainable environmental health.
10) Narwie Partners submit a vital aspect of the solution to the problems of water quality in the Murrumbidgee River, the Murray River and other MDB rivers is the re-establishment of the 'chains of

pools' and reconnection of the rivers to their natural floodplains by way of natural overbank flooding.

11) Narwie Partners submit the Western Lakes region of the Lowbidgee provide an outstanding opportunity to examine an innovative approach of combining environmental sustainability with modernized intensive irrigation after the environmental needs have been met. Narwie Partners submit this approach complies the requirement of the *Water Act 2007* that the ESLT be determined solely by the environmental considerations contained in the Act.

Introduction

Lowbidgee Floodplain is a significant part of the lower Murrumbidgee floodplain. It is referred to and identified in various ways by various NSW and Commonwealth government departments and authorities. In some government departments it is referred to as the *Lowbidgee Flood Control and Irrigation District* (LFC&ID). LFC&ID is a natural floodplain. The words '*and Irrigation*' in the name have always been largely an anomaly as very little traditional irrigation takes place and has reduced over the last 20 years. The term LFC&ID appears to have lost some of its currency but is still used within the NSW government.

In many instances the lower Murrumbidgee floodplain is simply called 'Lowbidgee' and can be identified as the riverine or riparian environment area west of Hay to the junction of the Murrumbidgee River with the Murray River. The Commonwealth Environmental Water Office in its '*Long-term Intervention Monitoring (LTIM) Project*' refers to this area as a part of the Balranald Reach, one of three zones with a degree of hydrological uniformity.[5] Within the Balranald reach six broad zones were

[5] The other two zones are referred to as the Carrathool Reach and the Narrandera Reach. See Commonwealth Environmental Water Office '*Long-term Intervention Monitoring (LTIM) Project*' Murrumbidgee River System Selected Area evaluation

identified, including the Western Lakes zone and the Redbank zone (which is further divided into two management subzones being Redbank North and Redbank South).[6]

The Western Lakes and the Redbank zones comprise different and very distinct bioregions. For the purposes of this submission the Western Lakes zone includes the lakes west of the Balranald-Ivanhoe Road and south of Box Creek down to Waldaira Lake, Waldaira Creek and the Murray River.[7] The Western Lakes zone is characterised as semi-arid sandy 'mallee' landscape, the Murray-Darling Depression Bioregion.

The Redbank North zone is characterised as floodplain, the Riverine Plain Bioregion. For the purposes of this submission the area referred to as the Balranald Reach is called 'Lowbidgee' or the Lowbidgee Floodplain.

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report 2014-16, November 2016, available at http://www.csu.edu.au/research/ilws/research/sra-sustainable-water/murrumbidgee-ltim-project#horizontalTab5. The report was prepared by officers from the Institute for Land, Water and Society Charles Sturt University, Centre for Ecosystem Science University of New South Wales, Water and Wetlands Team Science Division of the NSW Office of Environment and Heritage, NSW Trade and Investment Narrandera Fisheries Centre and the Commonwealth Environmental Water Office.

[6] The six zones are the mid-Murrumbidgee wetlands (82,800 ha), Pimpara-Waugorah (55,451 ha), Redbank (92,504 ha), Nimmie-Caira (98,138 ha), Fiddler-Uara (75,285 ha) and The Western Lakes (3459 ha). Note: the Western Lakes zone as identified by the LTIM is only a fraction s of its actual size and the LTIM definition it limited to Paika Lake, its feeder creeks, Penarie Creek, Hobblers Lake and their immediate surrounds.

[7] "*Environmental water needs of the Lower Murrumbidgee (Lowbidgee) floodplain – Discussion Paper 1 – Approach and ecological considerations*", NSW Department of Primary Industries, Office of Water, July 2012, p 5. The Western Lakes include Pitarpunga Lake, Tin Tin Lake, Macommon Lake, Dundomalle Lake, Hobblers Lake, Muckee Lake, Paika Lake, adjacent unnamed lakes and at its southernmost point Waldaira Lake and the creeks connecting those lakes. The area covered by this definition of the Western Lakes is closer to 100,000 ha compared to the LTIM definitions 3459 ha.

Paika Station comprised a large part of the Western Lakes and Redbank zones prior to being broken up in 1923. Narwie Partners operate their agri-business in the Western Lakes zone and the Redbank North zone.

The area where Narwie Partners operate their agri-business, Redbank North and the Western Lakes, for the purposes of this submission is generically referred to as Lowbidgee Redbank North or LRBN unless it is necessary to distinguish between the two Bioregions in which case Murray-Darling Depression Bioregion is referred to as the Western Lakes Bioregion and Riverine Plain Bioregion as the Riverine Bioregion.

Background to the submitting parties

Narwie Partners is the farming operation of the Connellan family at Narwie (3,237 hectares) (Riverine Bioregion) and Geraki (7,891 hectares) (Western Lakes Bioregion), on the Murrumbidgee River, and the Balranald-Ivanhoe Road, with the most southern boundary of Narwie approximately 20 kilometres north of Balranald, NSW. Narwie and Geraki form part of what was Paika Station prior to it being broken up when sold in 1923. In the 95 years since our grandfather, Thomas Connellan, purchased the properties in August 1923 the Connellan family have operated their farming business at Narwie and Geraki.

The two properties are approximately 10 kilometres apart, with the historic Homebush Hotel roughly midway between the boundaries of the two properties. Narwie comprises an extensive River Red Gum floodplain forest with associated open swamps, a smaller area of open Black and Grey Box forest and a smaller area of Mallee Forest bordering on the floodplain (all form part of the LRBN Riverine Bioregion). Geraki is predominately comprised of tree-less Salt Bush plains with Box Creek, at times a kilometer or more in width, running across the Salt Bush plains into Pitarpunga and Tin Tin Lakes. Geraki has a smaller area of dry

lakebeds, with Black and Grey Box open forest on parts of the lakebeds and a creek, Geraki Creek, connecting two lakebeds, Macommon Lake and Pitarpunga Lake. Geraki Creek connects the northern end of Macommon Lake to the northern end of Pitarpunga Lake. Geraki is part of the LRBN Murray-Darling Depression Bioregion.

Whilst these lakes are considered dry lakes in the modern era, prior to the 1900s and the construction of the major dams and the diversion of water for irrigation these lakes would fill in major Lowbidgee floods and may be topped up in lesser floods depending on the previous season. The NSW Office of Water, Department of Primary Industries, recognises the western extent of the LRBN flood inundation area, in the absence of all flood mitigation levees, includes the lakes west of the Balranald-Ivanhoe Road (i.e. the lakes in the Western Lakes zone and Western Lakes Bioregion).[8]

Prior to the construction of the dams and diversion of water for irrigation Macommon Lake would fill from its southern end from the Murrumbidgee River via Mckay Creek, Paika Creek and Paika Lake. Pitarpunga Lake would fill from the northern end of Macommon Lake via Geraki Creek. Pitarpunga Lake would also fill from Box Creek (whose ultimate source is the Lachlan River) to the north either directly or both directly and through Tin Tin Lake. Box Creek flowed further south out of Tin Tin Lake down to Waldaira Lake, which connects to the Murray River via Waldaira Creek and fills mainly from the Murray River via Waldaira Creek.

This was, and remains, an area of immense ecological significance as a wetland area of rivers lakes and creeks. The NSW Office of Water observes the "*Paika Levee limits western floodplain inundation of the*

[8] *Environmental water needs of the Lower Murrumbidgee (Lowbidgee) floodplain – Discussion Paper 1 – Approach and ecological considerations*", NSW Department of Primary Industries, Office of Water, July 2012, p 5 – 6.

floodplain but the lunette lakes and the graduation from the floodplain into mallee and sandhills country provide ecotonal[9] biodiversity services that enhance the lower Murrumbidgee floodplain itself."[10]

The Western Lakes zone may be described as a remnant from the period approximately 15,000 years ago when the Willandra Lakes dried as a result of the change in climate.[11] However whilst the Willandra Lakes have been dry lakes for millennia, the system of lakes that comprise the Western Lakes Bioregion continued to fill from both the Murrumbidgee River via McKay and Paika Creeks and from the Lachlan River via Box Creek until the late 1880s early 1890s and probably as recently as 1904. Box Creek has flowed down to Pitarpunga and Tin Tin Lakes as recently as 1956, 1972-3 and 2011.

During a period of 35 years, from 1970, the Narwie Partners farming operation also included 400 acres of licensed irrigation used predominately for cereal cropping. The partners determined to sell a portion of the irrigation licence as part of the government buy back during the millennium drought, partly in recognition of the reality climate change will have for the viability of flood irrigation operations in northern, central and western NSW.

When the opportunity arose in 2010 for the first time in 115 years Narwie Partners facilitated the filling of Paika Lake through the Mckay Creek and

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[9] Ecotones are areas of high biological diversity between two ecosystem types, containing the diversity of each of the neighbouring ecosystems and further species that are purely ecotonal in nature, hence ecotones between two habitats are often richer in species than either of the habitats.

[10] *Environmental water needs of the Lower Murrumbidgee (Lowbidgee) floodplain – Discussion Paper 1 – Approach and ecological considerations*", NSW Department of Primary Industries, Office of Water, July 2012, p 8.

[11] The Willandra Lakes filled from the Lachlan River via the Willandra Creek and include lakes such as Moornanyah Lake, Mulurulu Lake, Garnpung Lake, Lake Leaghur. Lake Mungo, Lake Arumpo, Chibnalwood Lakes and Lake Pringle.

Paika Creek, which flow through Narwie, and were a part of the historic Paika Station (Macpherson) water fluming and channel used in the 1870 – 1920 period to provide stock and domestic water to the outlying areas of Paika Station from the Murrumbidgee River. Narwie Partners have indicated they will continue to facilitate the use of McKay Creek and Paika Creek to enable the water levels in Paika Lake to be maintained and for the McKay Creek and Paika Creek environmental corridors to return to sustainable environmental health. The Paika-Mckay Creek umbilical cord connects Paika Lake to the western end of the lower Murrumbidgee floodplain, as now defined by the Paika Levee, at Narwie and is considered by Narwie Partners to be a very significant local biodiversity hot spot. It provides the ecotonal services described above.

"Our businesses are built on utilizing these wetlands, and it's a sort of symbiosis – we rely on them and we've fought politically to ensure that the water is maintained to them .... if it wasn't for the fact that the landholders over three or four generations were here fighting ... the water would have been lost"[12]

The symbiotic relationship between the two ecosystems[13] enabled relatively high stocking rates to be sustained, in comparison with single ecosystem utilization. It allowed both ecosystems to be spelled by providing time for recovery and provided a variety of feed for healthy stock. Without water flowing through Paika Creek into Paika Lake and other wetlands along Penarie Creek, much of Paika's valuable grazing

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[12] *"Lowbidgee Natural Resources Management Plan"*, David Eastburn, Murrumbidgee Catchment Management Authority, 3 December 2007, quoting Narwie Partners, p 40 - 41

[13] The two ecosystems being the semi-arid sandy 'mallee landscape, the Murray-Darling Depression Bioregion, and LRBN Floodplain, the Riverine Plain Bioregion.

land away from the floodplain, including Geraki, cannot be fully utilized and become economically unviable.[14]

History of Lowbidgee from 1850 - 2018

To appreciate the impact of the Murray-Darling Basin Plan (MDBP) on the Lowbidgee Floodplain it is necessary to understand the historical and current nature of the Lowbidgee Flood Control and Irrigation District (LFC&ID). Water use in the LFC&ID is substantially different from the rest of the Murrumbidgee Valley. It needs to be treated according to its natural cycle, which is substantially different from the man-made pattern of water use in the Valley, to prevent the often unintended but disastrous impacts to the Lowbidgee Floodplain.

1. Between the late 1840's when European squatters, and subsequently grantees under NSW colonial legislation, occupied land surrounding Paika Lake and Yanga Lake and 1880 the Lowbidgee Floodplain continued to operate largely unchanged from its natural operation prior to European intrusion into the area.
2. 1872 – journalist from *Town & Country Journal* on a visit to Paika Station recorded "*There are a large number of lakes on the station, in fact it is too well watered.*"[15]
3. 1880 - deepening of Yanco Creek cutting to divert water from Murrumbidgee River begins (Yanco Creek is approximately 280 km east of Balranald near Narrandera);
4. 9 April 1887 - Peter MacPherson (Paika Station) writes to The Sydney Mail "*the Yanko cutting may divert so much of the floodwaters as would influence the overflow at Paika*"; [16]

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[14] Narwie Partners in an interview recorded 16/7/2004 as summarised by David Eastburn, "The Paika Lake System – An Eco-hydrological and Socio-Political History" by David Eastburn, September 2013, p 32.
[15] The Paika Lake System – An Eco-hydrological and Socio-Political History" by David Eastburn, September 2013 at p 137.
[16] Ibid David Eastburn, at p 31.

5. 15 November 1897 – Humphrey Davy writes to *The Australasian Pastoralists' Review* to protest "*the 'absurdity and injustice' of governments 'permitting water distribution before any attempt is made at conservation' and suggested the policy of robbing one portion of the community to divide the proceeds among another portion, or the impoverishment of one part to enrich another part' was 'arbitrary and unjust'*"; [17]
6. 1899 - the first large scale community based environmental movement in Australia begins, focused on McKay Creek, Paika Creek and Paika Lake, to protect the Lowbidgee floodplain as a consequence of the increasing diversion of water from the Murrumbidgee for irrigation through Yanco cutting and other irrigation developments; [18]
7. 1902 - faced with the inevitable loss of natural flooding and the consequent ecological marginalization of the lower Murrumbidgee floodplains Walter Macpherson (Paika Station) began the process of isolating the related system of lakes and creeks by damming the floodwater out of Pitarpunga Lake and Macommon Lake by building banks across the feeder creeks, Geraki Creek and Penarie Creek. Macpherson also foresaw the possibility of using artificial irrigation to grow crops on the dry lakebeds exploiting the natural cycle of flooding and drying and supplementing it with irrigation during periods when the lakes were dry. To this end in the late 1880s he commenced construction of a system of fluming over the flood plain to carry the water pumped from the Murrumbidgee River into a 72 mile (115 kilometre) system of channels.[19] This channel system, although unused since around 1920, remains in place on Narwie and Geraki. Fluming was also used to carry water across Geraki

[17] Ibid David Eastburn at p 32.
[18] Ibid David Eastburn at p 32
[19] Ibid David Eastburn, at p 139, quoting form the Argus 29 July 1911.

Creek and further north for at least 10 kilometres.

8. May 1904 - John Monash completes his report for the Lower Murrumbidgee Locking League, Balranald NSW and recommends no less than 5 weirs be built between the junction of the Murrumbidgee and Murray Rivers and the Nimmie Creek off-take from the Murrumbidgee River west of Hay. He nominated the sites "*with due regard to the most important natural offtakes, so that very moderate flood flows will be enabled to pass out of the river at the points which most directly control the largest areas of flooded country.*"[20] The landholders voice concern that the possibility of very moderate flows will not enable the continuing viability of their farming businesses. It is determined, in consultation with John Monash, a total of 9 weirs in this stretch of the river would provide some level of confidence the health of the floodplains and the local business could be sustained.
9. 24 August 1905 - Leslie Wade[21] established the process of removing water from Lowbidgee floodplains and requiring the Lowbidgee landholders to compensate themselves for the cost of any minimal steps taken by successive NSW Governments to rectify the damage done to the environment and the value of their land by pronouncing *"(T)hey should be made to use the water for intense cultivation. If the people below Hay wish to use the waters of the Murrumbidgee they should have properly constructed irrigation channels, for which, of course, they would pay interest,*

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[20] "Barren Jack Reservoir, Murrumbidgee Northern Water Supply and Irrigation Bill. Report showing the effect of the above scheme on the lower Murrumbidgee River, with suggestions.," p 8.

[21] Principal Engineer of the Water Supply and Sewerage Branch of the Public Works Department of NSW from 1901. His brother, Sir Charles Wade was Premier, 1907 – 1910, and Attorney General, 1904 -10, of NSW.

and use the water in a proper scientific manner".[22]

10. September – December 1905 – Leslie Wade recommends no weirs be constructed to provide compensation for the loss of water in the Lowbidgee from the irrigation developments on Yanco Creek and insists "*(I)t is doubtful if the proposed weirs will be able to divert a sufficiently large volume of water to give the results anticipated. If such weirs are constructed, it should be on the understanding that the water to be diverted is the surplus after the requirements of the canals and other works for intense irrigation are met*".[23]
11. 1906 - Wade rationalizes cutting off water to the Lowbidgee floodplains and the degradation of the floodplain ecosystems by asserting that the Lowbidgee landholders must adopt 'proper scientific' practices.[24]
12. 1907 - Walter Macpherson continues the process of isolating the related system of lakes and creeks - Paika Lake, Dundomallee Lake and Muckee Lake and the creeks connecting them McKay Creek and Paika Creek – from the Murrumbidgee River and the Lowbidgee floodplain. To achieve this Macpherson commenced by banking off the creek furthest from the Murrumbidgee, Geraki Creek, and working progressively to the creek, McKay Creek, that provided the most reliable connection to the floodplain once the Paika Levee was completed.
13. 1907 Macpherson commences construction of the Paika Levee, in an attempt to ensure adequate flooding, replicating the depth and duration of the natural flooding, could be achieved on the remnant

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[22] Ibid David Eastburn at p 36. Taken from "*Report from the Select Committee*", L Wade 1905, *Murrumbidgee Northern Water Supply and Irrigation Bill.* NSW Legislative Assembly.
[23] Ibid David Eastburn at p 36. Taken from "*Water Conservation and Irrigation within the State*", Wade L 1905, *Conference on Water Conservation and Irrigation,* NSW Public Works Department, Appendix II.
[24] Ibid David Eastburn at p 131.

of the LRBN floodplain.[25] He calculated restricting floodwaters to the area east of the Paika Levee would provide the only viable area of the floodplain as a result of the massive diversion of water from the Murrumbidgee River being implemented by Leslie Wade and the NSW government.

14. 1910 – Construction of Berembed Weir, on the site chosen by Leslie Wade, completed under the *Barren Jack and Murrumbidgee Construction Act 1906*, and begins diverting water from the Murrumbidgee through Bundidgerry Creek to the Main Canal for irrigation at Narrandera, Leeton and Griffith.
15. 1911 – Walter Macpherson completes the Paika Levee, running 23 kilometers from the high ground near Ganaway Lake to opposite the Tala Creek / Murrumbidgee River confluence and the natural Choke in the Murrumbidgee at Chaston's Cutting. Macpherson was faced with the loss of the entire floodplain on Paika Station as a result of the construction of dams and expansion of the capacity of creeks, by cutting and widening, for the purpose of irrigation hundreds of kilometers to the east of the Lowbidgee Floodplain. By isolating the lakes and restricting floods to an area less than 5 kilometers from the Murrumbidgee River, Macpherson sought to retain as much of the floodplain as possible given the huge reduction of water that would now come down the river. Sadly, as a result the Lowbidgee floodplain was reduced by over 2/3 of its natural area, lost its incredible important system of natural creeks and lakes connecting the semi-arid sandy 'mallee landscape, the Murray-Darling Depression Bioregion, and lower Murrumbidge Floodplain or Lowbidgee floodplain, the Riverine Plain Bioregion.
16. With the completion of Paika Levee Walter Macpherson completed the isolation of the Lowbidgee lakes on Paika Station by isolating Nowie Lake, Marimley Lake, Ganaway Lake and Tori Lake from the

[25] Ibid David Eastburn at p 135.

Murrumbidgee River and Lowbidgee floodplains.

17. August 1911 – H. G. McKinney, former Chief Engineer of Water Conservation in the NSW Department of Works writes to *Sydney Morning Herald* noting the NSW government had informed Lowbidgee landholders they had no right to the floodwaters and they therefore had no right to claim compensation for any diminution resulting from the Murrumbidgee Irrigation Area (MIA), confirming the views expressed by Leslie Wade and the long held fears of the landholders. McKinney also noted the months of August to October were the most valuable period for flooding the Lowbidgee as this produced the best feed consistent with the natural cycle. He noted this would be the time when the new reservoirs would be replenished and hence floodwater not be available to the Lowbidgee Floodplain at the most critical time for a healthy floodplain.[26]
18. 13 July 1913 – MIA launched with the first diversion via Yanco Creek.
19. December 1913 – Construction of Griffith commences, construction of Leeton had begun earlier in 1913.
20. 1914 - 1915 – severe drought in the Lowbidgee. Paika Station was considered drought proof as a result of Lucerne grown on a portion of the recently dried Paika Lake.[27]
21. 1916 – Long-lasting major flood in the Lowbidgee with Loorica Lake on Yanga Station filling for the first time since 1894. September 1916 Murrumbidgee River reaches 17 feet (5.2 metres) at Balranald, the highest flood since 1906.[28]
22. 1917 - *River Murray Agreement Act*, came into force, was administered by the River Murray Commission and, to provide

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[26] Ibid David Eastburn at p 137 – 138, extract from *Sydney Morning Herald,* 26 August 1911.
[27] Ibid David Eastburn at p 142.
[28] Ibid David Eastburn at p 142 – 143.

some level of rehabilitation of the Lowbidgee floodplain, provided for the construction of 9 weirs between Hay and the junction of the Murrumbidgee River with the Murray River.

23. 1922 – Border Railways Agreement signed requiring all large stations within 15 miles of the Moama to Balranald rail line, including Paika Station, to be subdivided and for certain areas to be sold.
24. August 1923 – Thomas and Lucy Connellan acquire Narwie and Geraki as part of the break-up of Paika Station with the assurance given to them and other buyers by the NSW, Victorian and Commonwealth Governments 9 weirs would be, and were ready to be, built between Hay and the junction of the Murrumbidgee with the Murray pursuant to the *River Murray Agreement Act* and the Border Railways Agreement.
25. 1926 - 1929 – the Murrumbidgee River does not overflow its banks, as it would have prior to the construction of the upstream dams and other works, including the Yanco Cutting and Berembed Weir, for irrigation purposes, inflicting a severe drought on the Lowbidgee Floodplain.
26. July 1927 – Lower Murrumbidgee Defence League formed and Thomas Connellan elected president of the League for the first time;
27. 27 February 1928 – Delegation of the Lower Murrumbidgee Defence League, led by Thomas Connellan, met with Prime Minister S. M. Bruce to press for the construction of 9 weirs between Hay and the junction of the Murrumbidgee River with the Murray River as provided for in the *River Murray Agreement Act.*
28. 1930 – In the face of opposition from the Lower Murrumbidgee Defence League the River Murray Commission recommends to the Government the *River Murray Agreement Act* be amended to reduce the weirs to be built between Hay and the junction of the

Murray from 9 weirs to 2 weirs.

29. 1932 – 1933 – Construction of the weirs stalled. Meetings between NSW Premier Stevens and Lower Murrumbidgee Defence League at Deniliquin, and later at Hay, resulted in the League being informed that if they agreed to the number of weirs being reduced from 9 to 2 as proposed by the River Murray Commission the NSW Government would cooperate with the Commonwealth Government to facilitate the amendment of *River Murray Agreement Act* and move forward with the construction of weirs at Redbank and Maude.

30. July 1934 – In an act of desperation a delegation of the Lower Murrumbidgee Defence League, led by Thomas Connellan as president of the League, wait outside the Federal Cabinet meeting in Canberra to urge the proposed amendments to the *River Murray Agreement Act* be passed before the dissolution of Parliament for the general election due in 1934, so construction of the 2 weirs could begin.

31. 16 January 1937 – After 12 years work agitating for the construction of weirs on the Lower Murrumbidgee to provide some level of Lowbidgee Floodplain rehabilitation, Thomas Connellan and other delegates from the Lower Murrumbidgee Defence League meet NSW Premier, B.S.B. Stevens, to commemorate the commencement of Redbank Weir and argue for water to be made available to fill Paika Lake by using the floodplain and creeks from Redbank Weir.[29] The Maude and Redbank Weirs, built as compensation structures under the *River Murray Act 1919* for the loss of flooding caused by river regulation and major storage

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[29] This history from 1917 to 1937 is taken from the "*Lower Murrumbidgee Defence League – Souvenir - Issued on the Occasion of the Commencement Ceremony at Weir No. 5 [Murrumbidgee] Redbank Weir, near Balranald, on 16th January, 1937, by the Hon B. S. B. Stevens, Premier of New South Wales; and the Banquet given in his honour by the League at the Royal, Balranald, that evening*"

construction, provided for only a fraction of the water available to the floodplain under the natural operation of the Murrumbidgee River. This was of course the outcome intended by Leslie Wade and his supporters. The Lowbidgee landholders not only lost a substantial asset and suffered a substantial loss in the value of their land and businesses but were required to pay for the 'compensation' through rates levied on the flood waters they received to cover the cost of constructing and maintaining Maude and Redbank weirs

32. 1945 – The NSW government declares the LFC&ID, based on the operation of Maude and Redbank weirs.
33. 2004 – Construction of the Redbank North Chanel down to Balranald Choke completed.
34. 1945 -2013 - The operation of the Maude and Redbank weirs and the water diversions into the LFC&ID was under NSW Ministerial discretion from 1945 to 2013. There was no licence or allocation. This District is prohibited from accessing water from the major storages under this Ministerial Discretion. Supply was derived from what is now called supplementary water: that is rainfall feed events running into the river from areas downstream of the major storages. The District was, and still is, managed and operated by Water NSW and area-based charges funded the District's operation prior to 2013;
35. 2013 – Water Licences for the floodplain issued to the LFC&ID for the first time. Three licences, the Lowbidgee Supplementary Water Licences (Lowbidgee SWL), were issued:
    - Nimmie Caira [owned by the Commonwealth Government via the Commonwealth Environmental Water Holder];
    - Redbank South [owned by the NSW State Government via Yanga National Park]; and
    - Redbank North [owned by a collection of landholders,

including Narwie Partners, and now divided into separate sub-licences based largely on the property holdings of the landholders].

These licences are quarantined to the LFC&ID and cannot be traded outside this area. Under the *Water Management Act 2000* (NSW) and the *Water Sharing Plan 2003* the Crown still has ultimate control including responsibilities for the environment.

36. The Lowbidgee SWLs were issued consistent with the methodology used to issue all Murrumbidgee Supplementary Licences. That is, the entitlement was issued on the year of greatest usage. The entitlement of the three Lowbidgee Licences totaled 747,000 ML. However, under the *2003 Murrumbidgee Water Sharing Plan* the LFC&ID has an extraction limit of some 296,000 ML. This figure was derived from the Murray Darling Basin Cap on diversions of 1993, which listed Lowbidgee as 296,000 ML (as we note below this cap appears to have been further and significantly reduced). This was an average annual diversion rate prior to 1993 as LFC&ID had no allocation or licence. All other figures in the MDBC Cap, relating to water users, listed each user's entitlement or abstraction limit. This is an example of the failure of relevant authorities to recognise the LFC&ID is substantially different from other water users and this failure leads to substantial, severe and perhaps at times unintended impacts.

37. In its 2015 submission to the NSW water pricing authority (IPART) DPI Water (NSW) indicated the 3-year average actual water take for Lowbidgee SWL was 61,174 ML. On these figures the water going to the Lowbidgee floodplain has been reduced from an entitlement of 747,000 ML, to a cap of 296,000 ML with an actual average annual delivery of 61,174 ML. This is a staggering reduction in the water available to the Lowbidgee floodplain. It is no wonder the health of this iconic floodplain is in jeopardy.

38. In their May 2018 consultation paper DPI Water (NSW) and the MDBA propose to alter the Long-term diversion limit equivalent factors (LTDLE or 'cap factors') for LRBN from the 2011 factor of 0.336 to the draft 2018 updated factor of 0.172.[30] The consultation paper assures landholders the factors do not alter entitlements and are not considered during water resource assessment to determine allocations. Rather the purpose is to allow 605 GL of water to remain in the system for non-environmental use, namely consumptive uses.[31]The paper asserts if too much water is recovered for the environment there will be impacts on other water users. "*The updated factors, once adopted, will affect the amount of water recovered against the targeted recovery in some catchments.*"[32] It is difficult to understand what all this means for the LRBN floodplain but it strongly suggests there is no intention by DPI Water NSW and the MDBA to ensure the recovery of water to restore the floodplain to environmentally sustainable health.
39. The diversion of water for irrigation at Yanco Creek and Bundidgerry Creek (Berembed Weir) several hundred kilometers to the east of the Lowbidgee floodplain resulted in Macpherson's desperate attempt to retain some of the natural floodplain close to the Murrumbidgee River but spelt the end of natural flooding in this series of lakes and stranded some 65,000 hectares of historically regularly inundated flood-dependent land with rich alluvial soils.[33] Since this time local landholders, the successors of Walter Macpherson and including Narwie Partners, have struggled to adapt to farming dry lake beds and floodplains flooded irregularly

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[30] "*Consultation Paper: NSW updated factors for water recovery*" NSW Department of Industry, May 2018, p 11.
[31] "*Consultation Paper: NSW updated factors for water recovery*" NSW Department of Industry, May 2018, p 4.
[32] "*Consultation Paper: NSW updated factors for water recovery*" NSW Department of Industry, May 2018, p 5.
[33] Ibid David Eastburn at p 32.

and out of sync with the natural cycles causing the value of their farms to diminish whilst politically connected irrigators artificially flood water onto land that cannot survive drought and will consequently succumb to the encroaching climate change.

40. The combined effect of the Yanco Cutting and Berembed Weir, together with Leslie Wade's insistence that no provision be made to ensure the Lowbidgee floodplains were protected and, that if any works were done to provide even minimal support to the floodplain environments, the landholders of the Lowbidgee be required to pay for those works, remains the approach to the Lowbidgee by the successive NSW and Commonwealth governments through to the MDBA and the MDBP in 2018.

The optimum time for flooding the Lowbidgee Floodplain

Since the late 1800s it has been recognized the optimum outcome for Lowbidgee Floodplain habitat is achieved under natural conditions that existed prior to the implementation of river regulation for the purposes of irrigation in the 20th century, that is:

- under the over bank flood conditions;
- during the months of August, September and October.[34]

"The time of flooding, the temperature of the water, the duration of flooding and many other things play a vital part in what grows, whether it is edible stock fodder or a useless, even poisonous, weed. We learnt too that useful species like couch and nardoo can be useless and will not be eaten by grazing animals, but have to be left to dry and burnt, if flooded at the wrong time. Couch grass areas, for example, take a spell and useless foxtail takes over for a time, and then couch appears again. Cattle

[34] Ibid David Eastburn at p 137 – 138, extract from *Sydney Morning Herald,* 26 August 1911.

introduced too early muddy water in swamps and prevent growth of rushes.

Since completion of Blowering Dam, I believe there has been some deterioration in pastures due to too low a water temperature in water released during the winter months. In warmer months, water temperatures have a chance to rise slightly in the long trek down the river and as they spread over the ground. A spring flood always yields better sock feed than a winter flood. The old-timers knew and said that long before the weirs were built, they also pointed out that a warm dry autumn allows the ground to dry and crack open and to aerate before the spring growing season."[35]

Environmental water has achieved some tangible ecological benefits especially when the environmental water is delivered in the winter – spring season. Presently environmental water is solely delivered through the diversion works at Red Bank Weir. Environmental "piggy back flows" are kept out of the area by a series of artificial banks and levees constructed along the Murrumbidgee River between Red Bank Weir and Balranald. These structures are under the management and control of Water NSW.

Lowbidgee SWL holders are only entitled to supplementary flows determined after all other water users needs are met. Consequently flooding of the Lowbidgee rarely occurs during the optimal period. This has resulted in the degradation of natural plant species and the enhancement of invasive plant species such as Bathurst burr, horehound and scotch thistle. It now appears to be leading to the excessive germination of River Redgum saplings with a significant risk they will invade the treeless swamp areas and shade out valuable native pastures in other areas.

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[35] Harold Connellan to Lowbidgee League, Balranald, 16 June 1978 on the occasion of his retirement as president of the League, Ibid David Eastburn at p 203.

The Lowbidgee Floodplain has been under-going accelerated ecological degradation since the 1960's principally due to a decrease in flooding as a result of river regulation.

Narwie Partners submit to comply with the requirements of the *Water Act 2007* the MDBP must ensure the LRBN Floodplain and the wider Lowbidgee Floodplains are restored to sustainable environmental health by managing the water resource to ensure over bank flood conditions during the months of August, September and October are achieved across the floodplain.

Operation of lower Murrumbidge choke

Upstream of Balranald a natural choke in the Murrumbidgee River occurs (called the Balranald Choke or the Choke at Chaston's Cutting) with a river channel capacity of around 9,000 Mega litres of flow per day (Ml/day). This compares to Wagga's 80,000 Ml/day, Hay 40,000 Ml/day, Maude 20,000 Ml/day Red Bank Weir 12,000 Ml/day and downstream of Balranald 12,000 Ml/day.

This choke is listed in the Constraints Management Strategy as 9,000 Ml/day. The Commonwealth's desired outcome is to get 12,000 Ml/day passed the choke to allow adequate flooding in the Junction Wetlands downstream of Balranald and other positive environmental effects further down in the Murray.

The removal of artificial block banks and levees along the Murrumbidgee River upstream and downstream of the choke would result in the river and floodplain operating naturally in this area and would allow the water

required by the Commonwealth (the 3,000 Ml/day above the chokes capacity) to flow around the choke by going out on the floodplain above the choke and back into the river below the choke.

These artificial levees and block banks are part of Water NSW's Lowbidgee Flood Control and Irrigation District infrastructure. This infrastructure was built in the 1940's to allow Red Bank Weir to inundate the forest floodplain on both sides of the river, from Red Bank to Balranald, without flows running back into the river through the many natural flood runners that connect the river and floodplain in this area. This infrastructure has broken the connectivity between the floodplain and Murrumbidgee River in this area, except in years of Valley wide major flooding events. Red Bank Weir was built as a compensating work for the loss of flooding in this area due to the construction of Burrinjuck Dam.

In August 2017 the Commonwealth and NSW Governments initiated an environmental flow of approximately 22,000 Ml/day at Wagga which was targeting the Mid Murrumbidgee billabongs and lower level wetland areas of the River. The flow then progressed into the lower section of Murrumbidgee River. The size of the flow between Red Bank Weir and Balranald was reported to be 9,000 Ml/day and remained at this level for approximately 10 days. The 9,000 Ml/day flow caused a small amount of overbanking onto Red Bank South (Yanga National Park), there was little or no overbanking onto the Red Bank North floodplain.

The artificial block banks and levees held the water out. The river water level was between at 60 to 100 cm higher than the surrounding floodplain/wetlands. If the block banks in the river levee were removed (and replaced with appropriate water infrastructure) the floodplain and river would operate in a natural manner. Allowing water to exit the river above the choke and flow out onto the flood plain, then flow past the

choke and back into the river below the choke where the river increases in capacity again.

This would have provided a substantial flood event through the Red Bank system, but also would have substantially improved the flooding achieved in the Junction Wetlands.

The residual water of this environmental flow event was then diverted into Lake Victoria, which enabled NSW to the use it to supply its South Australian commitment under the *River Murray Act.* This enable NSW to use environmental water to improve the NSW general security allocation levels.

It is now apparent that the Commonwealth Water Holder can initiate an environmental flow that would provide substantial flooding in both the Red Bank and Junction wetlands, with the removal of block banks in the river levee in the Red Bank system and replacement with appropriate water infrastructure.

This demonstrates the potential to initiate environmental flows in a year of low allocation levels (approximately 30% plus carry over) and to be done without impact on the constraints further upstream in the Murrumbidgee Valley. This flow would have positive environmental effects in the Murray.

The continued failure of the NSW Minister for Water to direct the removal of these block banks (and replace them with appropriate infrastructure) arguably places the Minister in breach of the *Water Act.* [36] Consistent with the *Water Act 2007* (Cth), and the obligations it imposes on the Commonwealth Minister and the MDBA, it is the duty of the NSW

[36] *Water Act 2000* (NSW), ss 3(b), and 5(2)(a) – (c).

Minister to protect and where possible restore the River and its dependant ecosystems.

The Murrumbidgee River, including the Lower Murrumbidgee Floodplain, is an endangered ecological community under the *Fisheries Management Act 1994* (NSW).

The floodplain ecosystem is a dynamic integrated system. It relies on connectivity between the river channel and the floodplain to drive essential ecosystem services and maintain biodiversity (Natural Resources Council 2009).

The installation and operation of in-stream structures and other mechanisms that alter natural flow regimes of rivers and streams has been listed as a key threatening process under the *Fisheries Management Act*.

The main impetus for the Nimmie-Caira project was to allow the bypassing of this river choke via flows from Maude Weir. This has subsequently proved physically impossible to do when the Murrumbidgee River at the choke is full.

In the past it was an ambition of some NSW bureaucrats to use Yanga Lake as an on-route storage to supply the NSW commitment to SA. The private landholders of that time in the Nimmie-Caira and Yanga were strongly opposed, fearing they would be denied access to supplementary flows, because the State would capture this water to supply its SA commitment and by so doing increase the general security allocation levels.

It is plausible that some people still have ambitions to use Yanga Lake as

an on-route storage; to capture environmental flows under the guise of fish refugee or similar, so that it can then be use it to supply the SA commitment to the same end effect. Clearly this would be at the expense of the Murrumbidgee River and the Murray Darling system, as environmental flows would be diverted away from the intended purpose. This would signal the continuation of the policies that led to the decline in the health of the Murray Darling Basin in the first instance. If this proves true, then in effect, it could be said that the aid convoy sent out by the Howard Government for the Murray Darling River system is being hijacked by the very entities that caused the need for the aid convoy in the first place.

The "water savings projects" - 'supply measures', 'constraints easing' and 'efficiency measures' - need very close scrutiny to assess their real effect.

At stake is a more diverse and resilient Murray/Darling Basin economy, which is very much needed to face the impending effects of climate change.

Narwie Partners submit the Balranald Choke must be restored to its natural operation, by removing the block banks and replacing them with appropriate infrastructure, for the MDBP to comply with the requirements of the *Water Act 2007* and ensure the LRBN Floodplain and the wider Lowbidgee Floodplains are restored to sustainable environmental health.

Turbidity in the Murrumbidge River

The benefit to be derived from rectification and the consequent improvement in the ecology of the Lowbidgee floodplain extends far beyond the interests of Lowbidgee SWL landholders.

The health of the Murrumbidgee and other rivers in the MDB was a matter of significant note to early explorers and settlers. The Murrumbidgee River is described as having clear running water, a pebble and gravel bed above Wagga Wagga and a sandy bed below that point in the river.[37]

"(M)ost of Australia's inland rivers (unlike the traditional view of rivers in the geologically younger and wetter areas of Europe and parts of the USA, for example) formed 'chains of ponds' in between and around wetlands. However, Andrews claimed that ninety per cent of these had disappeared since white settlement. The result of this naturally occurring pattern in our dry landscape was that much of the water stayed 'in-ground' .... Confirming Andrew's observations are diaries of early white explorers such as Thomas Mitchell and John Oxley, in which the term 'chain of ponds' frequently appears. Others, such as Charles Sturt and Ludwig Leichhardt, gave excellent descriptions of chains of ponds and vast wetlands and reed beds. Of great relevance is that various Aboriginal artists (such as Tim Leura Tjapaltjarri), with their unique aerial view, beautifully capture the series of steps in valleys that appear as chains of ponds...";[38]

Today there are significant concerns for the sediment load in the river and the need to address the impact of accelerated erosion;
"Hopefully, a better understanding of the causes for accelerated erosion will allow the community and the government to avoid the mistakes that were made in the past. The legacy of 200 years of poor land management

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[37] "*Sediment supply and transport in the Murrumbidgee and Namoi Rivers since European settlement*", Jon Olley and Anthony Scott, CSIRO Land and Water, Canberra, Technical Report 9/02, December 2002, p 21.
[38] "*Call of the Reed Warbler*", Charles Massy, University of Queensland Press, 2017, p 149 – 150. The reference to Andrews is to Peter Andrews of Tarwyn Park and author of "*Back from the Brink: How Australia's Landscape Can Be Saved*, ABC Books, Sydney 2001.

continues to be a serious environmental and economic problem throughout the Murray-Darling Basin.

It is vital that government funding of sustainable land management continues and, hopefully in the future, both the government and the community will take a more pro-active approach, rather than reacting after the damage has been done."[39]

Narwie Partners submit a vital aspect of the solution to the problems of water quality in the Murrumbidgee River, the Murray River and other MDB rivers is the re-establishment of the 'chains of pools' and reconnecting the rivers to their natural floodplains by way of natural overbank flooding.

Stable, endangered and declining species on Narwie and Geraki

Independent studies have established that, in addition to the stable populations of frog and bird species inhabiting the Narwie floodplains and their surrounds, a number of endangered and declining bird and frog species also depend on the Narwie floodplain for breeding and habitat. Notably since 2009 and the millennium drought the following endangered or vulnerable frogs and birds have been independently recorded on the Narwie floodplain:

- Southern Bell Frog (*Litoria raniformis)* (also known as the Growling Grass Frog);[40]
- Inland or Giant Banjo Frog (*Limnodynastes interioris)*;[41]
- Australasian Bittern (*Botaurus poiciloptilus*);[42]

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[39] Ibid Jon Olley and Anthony Scott, p 51.
[40] Listed as endangered under the *Threatened Species Conservation Act 1995* (NSW) and vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).
[41] Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (Vic), Schedule 2.
[42] Listed as endangered under the *Biodiversity Conservation Act 2016* (NSW) and the *Environment Protection and Biodiversity Conservation Act 1999* (Cth), threatened

- Caspian Tern;[43]
- Little Egret;[44]
- White-bellied Sea-Eagle[45].

Other species observed on Narwie floodplain by government authorities independently of Connellan family members are set out in Appendix 1. Whilst not all of these bird species have been observed breeding there is evidence many of these birds do breed and raise their young on the Narwie swamps.

Appendix 2 sets out numerous native mammals, lizards, snakes, insects, fish, turtle and native plant species regularly observed by family members on Narwie and Geraki.

Cost recovery from Lowbidgee landholders

Lowbidgee SWL landholders are expected to pay full cost recovery for infrastructure, and the related administrative costs, of a system that has disrupted the natural operation of the river systems to the point the Lowbidgee floodplain has been severely degraded. Lowbidgee SWL continue to be required to pay for the system that is supposed to rectify the damage done. The benefit to be derived from rectification and the consequent improvement in the ecology of the Lowbidgee floodplain extends far beyond the interests of Lowbidgee SWL landholders.

At the urging of Leslie Wade by 1911 the NSW government had

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under the *Flora and Fauna Guarantee Act 1988* (Vic), Schedule 2, vulnerable under *National Parks and Wildlife Act 1972* (SA) and rare or likely to become extinct under the *Wildlife Conservation Act 1950* (WA).

[43] Japan-Australia Migratory Bird Agreement (JAMBA).

[44] Listed as endangered under the *Flora and Fauna Guarantee Act 1988* (Vic), Schedule 2 and on the "*Advisory List of Threatened Vertebrate Fauna in Victoria – 2007*", Department of Sustainability and Environment Victoria.

[45] Listed as vulnerable under the *Threatened Species Conservation Act 1995* (NSW).

determined they would deny Lowbidgee landholders had any right to the floodwaters that made the purchase of their properties attractive. This attitude has continued to today.

Imposing cost recovery charges on Lowbidgee landholders, not only denies their fundamental rights but is requiring those landholders to pay for the cost of compensating themselves and the cost to rectify systems developed to favour irrigation and other water users needs above the Lowbidgee environment and landholders. Cost recovery treats Lowbidgee SWL landholders as irrigators, which they are not and cannot be.

The full cost recovery charges by DPI Water/ Water NSW are not being met with full service delivery, some license holders have not received any of their water entitlement in the past 6 years, others only a small fraction of their entitlement. However, over the last 6 years it appears almost all the water entitlement has gone into one landholders cotton crops, whereas prior to 2012 all the water entitlement was dedicated to the Red Gum Forest as its first priority.

The lack of transparency means Narwie Partners are unable to ascertain with certainty what the actual position is. As already noted full cost recovery requires landholders to pay to partially compensate themselves for the damage inflicted to benefit others and to do so regardless of how much, if any, water is delivered.

Responsibility for the Lowbidgee floodplain ultimately rests with the NSW State Government under the *Water Act 2000* (NSW) and the MDBA under the *Water Act 2007* (Cth). It is a national and state government responsibility, not the responsibility of Lowbidgee SWL landholders who have long borne some of the economic cost of the irrigation focused management of the river systems.

Legislative framework

For convenience extracts of the *Water Act 2007* (Cth) (the Act) have been set out in Appendix 3 to this submission.

Does the MDBP meet the requirements of the Water Act 2007?

Narwie Partners submit the short answer is it does not.

The objects of the *Water Act 2007* are set out in s 3. Relevant to this issue they include:

- enabling the Commonwealth and the Basin States to manage MDB water resources in the national interest;
- give effect to relevant international agreements and provide special measures in accordance with those agreements to address threats to the MDB water resources;
- in giving effect to those agreements promote use and management of MDB water resources to optimise economic, social and environmental outcomes;
- without limiting the these last two points:
    - ensure the return to environmentally sustainable levels of extraction for water resources that are over-allocated or over used;
    - protect, restore and provide for the ecological values and ecosystems services of MDB taking particular account of the impact of water take on watercourses, lakes, wetlands, ground water and water dependent ecosystems and associated biodiversity; and
    - subject to these two, maximise net economic returns to the Australian community from the use and management of MDB water resources

The purposes of the MDBP are set out in s 20. The MDBP is required to provide for integrated management of MDB water resources in a way that promotes the objects of the Act.

The general basis for the development of the MDBP is set out in s 21. A hierarchy is created by s 21(1), (2), (3) and (4). In s 21(1) the Act requires the MDBP to give effect to international agreements. The requirements of s 21(2) and (3) must not limit s 21(1). Further the requirements of s 21(4), and thus exercise of powers and functions by the MDBA and the Minister, are subject to s 21(1), (2) and (3). Significantly under s 21(2) the MDBP must:

- be prepared having regard to the fact
    - use of MDBP water resources has had, and is likely to have, significant adverse impacts on the conservation and sustainable use of biodiversity;
    - MDBP water resources consequently require special measures to manage their use to conserve biodiversity; and
- Promote sustainable use of MDBP water resources to protect and restore the ecosystems, natural habitats and species reliant on MDBP water resources and to conserve biodiversity.

The Minister and the MDBA must exercise their powers and perform their functions, pursuant to s 21(4), taking into account the principles of ecologically sustainable development and act on the basis of the best available scientific knowledge and socio-economic analysis.

The mandatory content of the MDBP is set out in s 22. Item 6 of the table in s 22(1) mandates the MDBP set maximum long-term annual average quantities of water that can be taken on a sustainable basis from the water resources for the MDB as a whole and for each water resource plan area.

These long-term annual average sustainable diversion limits (SDLs) are defined by s 23. Pursuant to s 23(1) an SDL must reflect an environmentally sustainable level of take (ESLT).

The ESLT is defined in s 4 by reference to solely environmental consideration and means the level at which water can be taken from a water resource which, if exceeded would compromise:

- key environmental assets; or
- key ecosystem functions; or
- the productive base; or
- key environmental outcomes -

of the water resource.

It is clear the objects of the MDBP, as set out in the Act, prioritise the environment and mandate the SDLs to reflect the ESLT. This is consistent with the dire environmental circumstances of MDBP ecological and environmental health that triggered the development of the national approach to the MDB and the consequent MDBP.

The definition of the ESLT is clear the level of water taken from a water resource must be set to ensure the environmental assets etc are not compromised, i.e. not endangered or exposed to or made liable to danger. We note this interpretation of the Act is consistent with the preliminary views expressed by the Commissioner of the SA MDBRC[46] Further, the triple bottom line approach, namely taking social and economic implications into account as well as the exclusively mandated environmental factors, adopted by the MDBA when establishing the ESLT, and therefore the SDLs, does not comply with the requirements of the Act.

[46] "*Issues Paper No. 2*", Murray Darling Basin Royal Commission, 30 April 2018.

In this regard we note the statements of Minister Turnbull in the Second Reading Speech:

> *"Our scientists tell us that we can expect throughout southern Australia a hotter and drier future. We must learn to do more with less water, we must make every drop count and to do that, we need a new approach where our greatest system of waters is managed in the national interest. ....*
>
> *The key objectives of the National Water Initiative are to improve the efficiency of water use and establish clear pathways to return all water sources to environmentally sustainable levels of extraction. These are the objectives of the Water Bill and the National Plan for Water Security. ...*
>
> *In the 1920s, 2,000 gigalitres were extracted from the basin each year. Annual water use now often exceeds 10,000 gigalitres—a fivefold increase in water use.*
>
> *While this increase in water use has underpinned massive agricultural development in the basin, it has also been the cause of a marked decline in the basin's environmental health. In 2001, an assessment for the Murray-Darling Basin Commission found that more than 95 per cent of the river length examined was in a degraded environmental condition. There has been a reduction in the areas of healthy wetland, native fish numbers have declined, salinity levels have risen and algal blooms have increased in frequency. Put simply, with so much water being extracted, there is less water to flow through the system to maintain the basin's natural balance and ecosystems."*[47]

Underpinning the work of the MDBA and the MDBP is an assertion, often unstated, the total water diverted for consumptive use in the whole MDB will, in any given year, average 13,623 GL, which is rounded to 13,700

[47] Hansard, House of Representatives, Wednesday, 8 August 2007, p 4 - 5.

GL/y. The MDBA initially proposed an additional 3,000 – 4,000 GL/y be recovered for the environment and based on this proposed the ESLT for the MDB as whole was 9,700 – 10,700 GL/y. [48]

The MDBA asserts the ESLT:

> *"is based on the best available information and scientific analysis. It reflects a balanced judgement of environmental, socioeconomic and operational factors, and is based on evidence of future sustainability, rather than historic use."*[49]

Narwie Partners submit this assertion is not borne out by the evidence and this is the reinforced by lack of transparency and candour noted by the Productivity Commission in regard to the proposed 'supply measures', 'constraints easing' and 'efficiency measures'.[50] The MDBA states the ESTL is based on a 'balanced judgement' of a number of matters that are irrelevant to the determination of the ESLT.[51] It is clear the MDBA ignored the strong scientific evidence, that the recovery of 3856 GL for the environment at best gave a high uncertainty of successfully achieving ecological sustainability and 6983 GL was required to achieve a low uncertainty of successfully achieving ecological sustainability.[52] Despite the clear evidence available to the MDBA the ESLT set by the MDBP is

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[48] "*Guide to the proposed Basin Plan, Overview*" - Volume 1, MDBA, 2010, 'The SDL proposal for surface-water, p xxiii.

[49] "*Plain English summary of the proposed Basin Plan*", MDBA, November 2011, p vii

[50] "Murray-Darling Basin Plan: Five Year Assessment (Draft Report), Key Points p 2.

[51] "*Guide to the proposed Basin Plan, Overview*" - Volume 1, MDBA, 2010, 'Social and economic effects considered in developing proposed sustainable diversion limits' p xx, 'Factors influencing the setting of surface-water SDLs', p xxii.

[52] Evidence of Peter Cosier, Director, Wentworth Group of Concerned Scientists, to the SA MDBRC, Day 2, 27 June 2018, Transcript p 206 - 216 and Evidence of Prof John Williams, Soil Physics Hydrologist, Adjunct Professor, Crawford School of Public Policy, Australian National University, to the SA MDBRC, Day 3, 28 June 2018, Transcript p 280 - 288.

10873 GL, based on returning 2750 GL to the environment by reducing the consumptive use of water by 2750 GL.[53]

The MDBA and the MDBP give no clear explanation of how the figure of 2750 GL was determined. As noted above the ESLT is defined in the Act solely in environmental terms and does not allow for economic and social factors to be considered on its determination. Despite this in its explanation of methods and outcomes the MDBA state:

> *"To do this MDBA has approached implementing the concept of compromise in the definition of the ESLT (see Text Box 1-1) having regard to the objects of the Water Act, the purpose of the Basin Plan, the objective of a healthy working Basin and the wise use concept, and the need to optimise economic, social and environmental outcomes - in this sense taking into account a triple bottom line approach. This optimisation must also occur within the limitations and constraints of our current system."*[54]

This does not comply with the Act and the 2750 GL is clearly insufficient to achieve even a high level of uncertainty of achieving ecological sustainability. Put plainly 2750 GL is incapable of achieving sustainable use to protect and restore MDB ecosystems, natural habitats and species and to conserve biodiversity as required by s 21(2)(b). Despite this the MDBA proposes to return water to the environment by means of untested, 'supply measures', 'constraints easing' and 'efficiency measures' in a vain attempt to justify setting the level of water to be recovered from consumptive use for the environment at an unsustainable 2750 GL. This is

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[53] *"The proposed environmentally sustainable level of take for the surface water of the MDB – Method and Outcomes"*, MDBA, November 2011, p 101 and *"Plain English summary of the proposed Basin Plan"*, MDBA, November 2011, p vii.

[54] *"The proposed 'environmentally sustainable level of take' for surface water of the Murray-Darling Basin: Methods and outcomes"*, MDBA, November 2011, p 2 – 3.

an exercise in smoke and mirrors and the Productivity Commission is ignoring this reality.

Narwie Partners submit the failure of the MDBA to comply with the Act requires the MDBP ESLT and related SDLs to be properly developed by an independent panel of the best scientific minds available from a range of relevant scientific disciplines. The independent panel should be tasked with regularly reviewing the ESLT and the SDLs to ensure they continue to represent sustainable use of the MDB water resource.

Narwie Partners submit it is premature to conclude, as the Productivity Commission does,[55] that the Murray Darling Basin Authority (MDBA) and the (Murray Darling Basin Plan (MDBP) have made significant practical progress, because the process of bridging the gap between water recovery targets and the new Sustainable Diversion Limits (SDLs) is nearly complete, when no examination has been undertaken of the validity of the SDLs and the related Environmentally Sustainable Level of Take (ESLT)[56] set by the MDBA and the Commonwealth Government.

Narwie Partners further submit it is premature to conclude, as the Productivity Commission does,[57] that the new management arrangements, including those for both environmental watering and water trading, are working well in the face of the evidence adduced before the South Australian Murray-Darling Basin Royal Commission (SA MDBRC) of extremely serious short comings in the management practices of the MDBA in relation to the MDBP and also in light of the Productivity Commission's own recommendations that:[58]

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[55] "Murray-Darling Basin Plan: Five Year Assessment (Draft Report), Key Points p 2.
[56] Water Act 2007 (Cth), s 4, see Appendix 3.
[57] "Murray-Darling Basin Plan: Five Year Assessment (Draft Report), Key Points p 2.
[58] Murray-Darling Basin Plan: Five Year Assessment (Draft Report), Key Points p 2.

- The MDBA be separated into two institutions so as to separate implementation responsibilities from compliance responsibilities;
- Basin Governments take joint responsibility for leading implementation and not leave it to the MDBA;
- Basin Officials should be assigned responsibility for managing the significant risks to successful implementation, including the integrated program of projects;
- The Australian Government should align additional water recovery with progress on easing constraints and include strategies to mitigate socioeconomic impacts because the proposed projects to remove delivery constraints risk bringing forward significant expenditure for an asset that cannot be used effectively for many years (Narwie Partners add – 'if at all')

Narwie Partners further submit the Productivity Commission should inquire into "*the matter of the effectiveness of the implementation of the Basin Plan and the water resource plans*" as required by the *Water Act 2007,*[59] by examining the validity of the ESLT and related SDLs, not assume their validity. Narwie Partners submit the Productivity Commission should not limit its review as it set out its 'Overview".[60] Narwie Partners submit for the Productivity Commission to do otherwise would be an act of wilful blindness, given the substantial relevant sworn evidence readily available from the SA MDBRC, and would be a failure "*to examine the preparedness of Basin Governments and their institutions to undertake these activities effectively in the future*" where the activities referred to are "*the processes for setting the sustainable balance and associated targets*

[59] *Water Act 2007* (Cth), s 87(1), see Appendix 3.
[60] Murray-Darling Basin Plan: Five Year Assessment (Draft Report), The Basin Plan and the Commission's approach to assessing implementation, p 5.

in the Plan" and *"measuring the impacts and outcomes of the Plan"*.[61] The failure of the Basin States and the Commonwealth Government to cooperate, and arguably their interference, with the SA MDBRC speaks volumes about the lack of transparency and candour noted by the Productivity Commission. It creates the obvious spectre the Basin States and the Commonwealth Government know the MDBP:

- does not comply with the Act;
- is not based on the best available scientific evidence;
- does not promote sustainable use of the Basin water resources to protect and restore the ecosystems, natural habitats and species that are reliant on the Basin water resources and to conserve biodiversity;
- does not give effect to relevant international agreements; and
- is open to legal dispute and litigation.[62]

Narwie Partners, with the strongest possible voice, urge the Productivity Commission to closely examine submissions to, and sworn evidence adduced on oath before, the SA MDBRC and give careful consideration to the serious issues raised by that evidence before it concludes its first 5 year assessment report.

Climate change

One of the objects of the Act is to give effect to relevant international agreements and provide special measures in accordance with those agreements to address threats to the MDB water resources.[63] The Climate

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[61] Murray-Darling Basin Plan: Five Year Assessment (Draft Report), The Basin Plan and the Commission's approach to assessing implementation, p 5.
[62] Particular note should be taken of the evidence of Daid Papps, former Commonwealth Environmental Water Holder from 2012 - 2018 to the SA MDBRC, Day 25, 5 September 2018, Transcript p 2716 ff and Evidence of Dr Carmody, EDO, to the SA MDBRC, Day 27, 20 September 2018.
[63] *Water Act 2007* (Cth), s 3(b), see Appendix 3.

Change Convention[64] is one of the relevant international agreements as defined in the Act.[65] The Climate Change Convention requires the Parties to:

> "*take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost.*"[66]

The Climate Change Convention also requires parties to:

- promote sustainable management, conservation and enhancement of GHG sinks including forests and other terrestrial, coastal and marine ecosystems;[67]
- prepare for adaption of the impacts of climate change and develop and elaborate integrated plans for water resources and agriculture and the for the protection and rehabilitation of areas affected by drought and desertification, as well as floods;[68]
- take climate change into account to the extent feasible in relevant social, economic and environmental policies with a view to minimizing adverse impacts on the economy, public health and quality of the environment of projects or measures

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[64] Defined as the '*United Nations Framework Convention on Climate Change done at New York on 9 May 1992*', see *Water Act 2007* (Cth), s 4.
[65] See definition of '*relevant international agreement*' *Water Act 2007* (Cth), s 4.
[66] *United Nations Framework Convention on Climate Change,* Article 3 'Principles', clause 3.
[67] *United Nations Framework Convention on Climate Change,* Article 4 'Commitments', clause 1(d).
[68] *United Nations Framework Convention on Climate Change,* Article 4 'Commitments', clause 1(e).

undertaken to mitigate or adapt to climate change.[69]

A purpose of the MDBP is to provide for integrated management of MDB water resources in a way that promotes the objects of the Act by providing for or giving effect to relevant international agreements to the extent they are relevant to the use of those water resources.[70] The MDBP must be prepared so as to give effect to relevant international agreements.[71] The mandatory content of the MDBP, set out in the Act, requires the plan to identify the risks to the availability of Basin water resources that arise from the effects of climate change.[72] The object of the Environmental Special Account, and a function of the Commonwealth Environmental Water Holder, is to enhance the environmental outcomes that can be achieved by the Basin Plan so as to give effect to relevant international agreements.[73] The MDBP, as part of the objectives and outcome in relation to environmental outcomes, is required to ensure water-dependent ecosystems are resilient to climate change and other risks and threats.[74] Similarly, part of the objectives and outcome in relation trading in the water market is to create more efficient and effective market to better manage extreme climate events and strengthen water-dependent industries capacity to adapt to future climate change.[75].

The MDBP does not address or take account of climate change[76] when determining the ESLT and related SDLs. To quote sworn evidence to the

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[69] *United Nations Framework Convention on Climate Change*, Article 4 'Commitments', clause 1(f).
[70] *Water Act 2007* (Cth), s 20(a), see Appendix 3.
[71] *Water Act 2007* (Cth), s 21(1), see Appendix 3
[72] *Water Act 2007* (Cth), s 22(1), Item 3, see Appendix 3.
[73] *Water Act 2007* (Cth), ss 86AA(1) and 105(3).
[74] *Basin Plan 2012,* Compilation No 6, 3 July 2018, .5.03(1)(c).
[75] *Basin Plan 2012,* Compilation No 6, 3 July 2018, .5.07(2)(c).
[76] Evidence of Prof John Williams, Soil Physics Hydrologist, Adjunct Professor, Crawford School of Public Policy, Australian National University, to the SA MDBRC, Day 3, 28 June 2018, Transcript p 278 - 280.

SA MDBRC:

> *"It was a dreadful oversight not to include the analysis of climate change in the subsequent report. And there's no evidence of why it was okay to do that"*[77]

The evidence there will be an increase in temperature over the MDB and a consequent increase in evaporation, probably in the vicinity of an additional several hundred millimeters per year as a result of climate change, is clear. This increased evaporation, unless it is countered by an increase in rainfall, will result in a drying out of MDB.[78] Put simplistically if temperatures rise, as the best science indicates they will and are, then if rainfall remains static there will be less run off available for river and groundwater. The best scientific evidence is that rainfall will reduce over the MDB as a whole. There are no climate mechanisms that indicate rainfall will increase in the southern basin, but clear evidence it will reduce. The evidence around:

- temperature change;
- the consequences of increasing evaporation leading to a drier MDB;
- the consequences of emerging new environments around heat waves; and
- changes in the seasonality of climate such as warmer, clearer drier winters -

is very robust.

Ignoring these fundamental questions, as the MDBP does, raises very serious questions about the viability of the MDB and therefore the current

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[77] Evidence of Prof John Williams, Day 3, 28 June 2018, Transcript p 280.
[78] Evidence of Prof Andrew Pitman, Director of the Australian Research Council Centre of Excellence for Climate Extremes, University of NSW, to the SA MDBRC, Day 28, 21 September 2018, Transcript p 3085 - 3089.

MDBP.[79] The MDBP, by ignoring these fundamental, amounts to an assumption by the MDBA that rainfall across the MDB will increase to compensate for the increased temperature and consequent increase in evaporation and drying across the MDB. The emerging science around dramatic and rapid climate change provides further reason to assert the approach of the MDBA to 10 year planning cycles and ignoring the best science on climate change is completely unacceptable and the absolute antithesis of it having made significant progress.[80]

The work of the CSIRO on the Sustainable Yields Plan brought together the necessary scientific expertise across climate science and hydrology. Neither the MDBA nor the Commonwealth Government have seen fit to invest in the ongoing work required to ensure the work on sustainable yields was maintained to keep up with the dynamic and evolving scientific knowledge in the fields of climate and hydrology. Valuable expertise and time have been, and are being, lost because the CSIRO is not funded to undertake ongoing research in this vital area.[81]

The Minister must ensure the MDBP is developed (by the MDBA) to take into account the principles of ecologically sustainable development and act on the basis of the best available scientific knowledge and socio-economic analysis among other requirements. [82] Failing to consider the best science around climate change[83] and ignoring the strong scientific evidence that an ESLT of 3900 GL at best gave a high uncertainty of

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[79] Evidence of Prof Andrew Pitman to the SA MDBRC, Day 28, 21 September 2018, Transcript p 3093 - 3094.
[80] Evidence of Prof Andrew Pitman to the SA MDBRC, Day 28, 21 September 2018, Transcript p 3097 - 3094.
[81] Evidence of Prof Andrew Pitman to the SA MDBRC, Day 28, 21 September 2018, Transcript p 3106 - 3107.
[82] *Water Act 2007* (Cth), s 21(4), see Appendix 3.
[83] Evidence of Prof John Williams, Soil Physics Hydrologist, Adjunct Professor, Crawford School of Public Policy, Australian National University, to the SA MDBRC, Day 2, 27 June 2018, Transcript p 278 - 280.

successfully achieving ecological sustainability and 6900 GL was required to achieve a low uncertainty of successfully achieving ecological sustainability simply cannot allow the conclusion the MDBA and the MDBP have made significant practical progress.[84]

Narwie Partners submit it is not acceptable for the Productivity Commission to simply suggest that for its 2026 review of the MDBP the MDBP "*will need to be forward-looking, and consider emerging risks (such as climate change). For the 2026 review to be based on the best available knowledge, new information may need to be generated, and planning for this should commence now.*"[85]

Is all irrigation good irrigation?

One of the objects of the Water Act 2007 is '*to promote the use and management of the Basin water resources in a way that optimises economic, social and environmental outcomes'.*[86] This is also a purpose of the MDBP.[87] To achieve the optimum economic, social and environmental outcomes from the MDB water resources requires an active inquiry and evaluation of what are economic and environmentally appropriate uses of the water resource. This requires an examination of the appropriate use of those water resources, most suitable crops and means of irrigation in the light of the best available science on climate change, rather than an assumption that giving priority to irrigation by way of high security licences and medium security licences, regardless of where, by what mechanism

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[84] Evidence of Peter Cosier, Director, Wentworth Group of Concerned Scientists, to the SA MDBRC, Day 3, 28 June 2018, Transcript p 216 and Evidence of Prof John Williams, Soil Physics Hydrologist, Adjunct Professor, Crawford School of Public Policy, Australian National University, to the SA MDBRC, Day 2, 27 June 2018, Transcript p 280 - 288.

[85] Murray-Darling Basin Plan: Five Year Assessment (Draft Report), Reporting, monitoring and evaluation, p 265.

[86] *Water Act 2007* (Cth), s 3(c), see Appendix 3.

[87] *Water Act 2007* (Cth), s 20(d), see Appendix 3.

and for what purpose the irrigation water is used. There is no evidence the MDBA or the MDBP have provided any analysis of critical issues as to the use of irrigation water in the MDB.

Despite these serious issues the MDBA refuses to allow the public to access the science and business plans it claims support its proposed irrigation efficiency measures. There is credible evidence to show "*increases in irrigation efficiency can result in greater on-farm water consumption, groundwater extractions and water consumption per hectare.*"[88] Whilst the Productivity Commission criticizes this lack of transparency and candor Narwie Partners submit this lack of candor, combined with MDBA's lack of interest in the growing impact of climate change calls into question the rigor of its proposals.

Serious issues arise whether currently, and into the future, it viable to grow cotton and rice using broad scale flood irrigation techniques. Serious issues arise whether currently, and into the future, the ecological needs of perennial fruit and nut trees fit with the natural cyclical environment of all parts or perhaps even any parts of the MDB. Serious issues arise whether flood irrigation, as opposed to spray, drip or trickle irrigation is an economically and environmentally viable option. The use of the latest technological innovations in irrigation technology, including techniques to maximize the collection of dew from the air so as to reduce water needs of plants, in countries such as Israel and the Netherlands needs to be considered by the MDBP.

It is not appropriate, nor economically or socially feasible, to leave

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[88] "Research shows irrigation efficiency projects actually lead to more water use", Australian Water Association, 5 September 2018, available at http://www.awa.asn.au/AWA_MBRR/Publications/Latest_News/Research_shows_irrigation_efficiency_projects_actually_lead_to_more_water_use.aspx

irrigators and other water users with the impression that they will be able to continue with operations as they currently do when the best scientific evidence suggests severe change is coming and may occur quite dramatically and rapidly. Work needs to be undertaken to assist farmers and the associated communities plan for the very real change unfolding in the MDB. The development of re-construction packages and other assistance to move completely away from flood irrigation into much more water efficient forms of irrigation and to change to crops and intensive farming practices that will be economically and environmentally sustainable in the evolving MDB climate is urgent. Part of this work needs to evaluate where, by reference to the natural system of floodplains, creek systems and inland lakes, the best sites for intensive irrigation are located so that irrigation takes place after the water has been applied to sustain the environment rather than diverting water for irrigation before environmental needs are met.

Narwie Partners submit the Western Lakes region of the Lowbidgee provide an outstanding opportunity to examine an innovative approach of combining environmental sustainability with modernized intensive irrigation after the environmental needs have been met. Narwie Partners submit this approach complies the requirement of the *Water Act 2007* that the ESLT be determined solely by the environmental considerations contained in the s 4 definition.

Restore, protect and provide the ecological values

The objects of the Act include:

- ensuring the return to environmentally sustainable levels of extraction for water resources that are over-allocated or overused;
- protecting, restoring and providing 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;

- subject to those to requirements — maximise the net economic returns to the Australian community from the use and management of the Basin water resources.[89]

The evidence that plants, particularly trees absorb and store carbon and play an important role as carbon sinks is well accepted. The hypothesis forests attract rainfall is controversial and currently not generally accepted.[90]

The restoration and protection of the Lowbidgee as an area of important riverine forest with the related environmentally significant floodplains and ecotone, as described earlier in this submission, are mandated by the Act. As described above the Western Lakes and the LRBN floodplain have been devastated by more than 100 years of continually prioritizing the needs of irrigation over the Lowbidgee environment and welfare and interests of the associated community and landholders. The MDBP, as currently framed, does not provide for the restoration and protection of this important ecosystem nor ensure it will fulfill its important role as a carbon sink.

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[89] *Water Act 2007* (Cth), s 3(c), see Appendix 3.

[90] "*How Forests Attract Rain: An Examination of a New Hypothesis*" by D Sheil and D Murdiyarso, Bioscience, Vol 59 No 4, April 2009.

Appendix 1 – Birds & Frogs

Bird and Frog species independently observed on Narwie

Frogs[91] -

- Plains Froglet (*Crinia parinsignifera)*;
- Barking Marsh Frog (*Limnodynastes fletcheri)*;
- Spotted Marsh Frog (*Limnodynastes tasmaniensis)*;
- Peron's Tree Frog (*Litoria peronii)*.

Birds[92] -

- Australasian Darter;
- Australasian Grebe;
- Australasian Shoveler;
- Australian Little Bittern;
- Australian Hobby;
- Australian Pelican;
- Australian Reed Warbler;
- Australian Shelduck;
- Australian White Ibis;
- Australian Wood Duck;
- Black-fronted Dotterel;
- Black-tailed Native-hen;
- Black-winged Stilt;
- Black Swan;
- Buff-banded Rail;
- Cattle Egret;
- Dusky Moorhen;
- Eastern Great Egret;

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[91] "Nar1 – Watering Report – 2017 - 18" by Helen Waudby and James Dyer – NSW Office of Environment and Heritage, 2018.

[92] "Narwie waterbird surveys, 2017-18" by Jennifer Spencer, Carmen Amos, James Dyer – NSW Office of Environment and Heritage, 2018. This 2017 – 18 Report includes a complete list of waterbird and raptor species recorded at Narwie by NSW OEH from September 2012 to January 2018.

- Eurasian Coot;
- Glossy Ibis;
- Great Cormorant;
- Great Crested Grebe;
- Grey Teal;
- Hardhead;
- Hoary-headed Grebe;
- Intermediate Egret;
- Little Black Cormorant;
- Little Grassbird;
- Little Pied Cormorant;
- Masked Lapwing;
- Musk Duck;
- Nankeen Kestral;
- Nankeen Night-Heron;
- Pacific Black Duck;
- Pink-eared Duck;
- Purple Swamphen;
- Red-kneed Dotterel;
- Royal Spoonbill;
- Sacred Kingfisher;
- Straw-necked Ibis;
- Swamp Harrier;
- Wedge-tailed Eagle;
- Whistling Kite;
- White-faced Heron;
- White-necked Heron;
- Yellow-billed Spoonbill.

Appendix 2 – Other indigenous plants and species

Native mammals, lizards, snakes, insects, fish, turtle, birds and plant species observed on Narwie and Geraki by Connellan family members[#]

Native plant species:

1. Common Sneezeweed (*Centipeda cunninghamii)*;
2. Starfruit (*Damasonium minus);*
3. River Red Gum (*Eucalyptus camaldulensis);*
4. Moira grass (*Pseudoraphis spinescens);*
5. Common Spikerush (*Eleocharis acuta);*
6. Giant Spikerush (*Eleocharis sphacelata);*
7. Watermilfoil (*Myriophyllum sp.);*
8. Swamp Lily (*Ottelia ovalifolia);*
9. Water Ribbon (*Vallisneria sp.);*

Native mammals, lizards, snakes, insects, fish, turtle, birds species:

- Blue-tongued skink (*Tiliqua rugosa asper*);
- Marbled scorpion (*Lychas marmoreus*);
- Murray River turtle (*Emydura macquarii*);
- Red Kangaroo (*Macropus rufus*);
- Eastern Grey Kangaroo (*Macropus giganteus*);
- Emu (*Dromanius novaehollandiae*);
- Goanna – Lace monitor (*Varanus varius*);
- Galah (*Eolophus roseicapilla*);
- Sulphur crested cockatoo (*Cacatua galerita*);
- Major Mitchell's cockatoo (*Lophochroa leadbeateri*);
- Eastern Brown Snake (Pseudonaja textilis);
- Red-bellied black snake (Pseudechis porphyriacus);
- Silver perch (Bidyanus bidyanus);
- Murray cod (Maccullochella peelii).

[#] Not including observations made by government authorities independently of Connellan family members and set out in Appendix 1.

Appendix 3 – MDBP legislative framework

Extracts from the *Water Act 2007* (Cth)

Objects

Section 3

The objects of this Act are:

(a) to enable the Commonwealth, in conjunction with the Basin States, to manage the Basin water resources in the national interest; and

(b) to give effect to relevant international agreements (to the extent to which those agreements are relevant to the use and management of the Basin water resources) and, in particular, to provide for special measures, in accordance with those agreements, to address the threats to the Basin water resources; 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 overallocated 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; and

(h) to provide for the collection, collation, analysis and dissemination of information about:

(i) Australia's water resources; and

(ii) the use and management of water in Australia.

Relevant definitions

Section 4

Basin Plan means the Basin Plan adopted by the Minister under section 44 (as amended from time to time).

environmental assets *includes:*

(a) water-dependent ecosystems; and

(b) ecosystem services; and

(c) sites with ecological significance.

environmentally sustainable level of take *for a water resource means the level at which water can be taken from that water resource which, if exceeded, would compromise:*

(a) key environmental assets of the water resource; or

(b) key ecosystem functions of the water resource; or

(c) the productive base of the water resource; or

(d) key environmental outcomes for the water resource.

environmental outcomes *includes:*

(a) ecosystem function; and

(b) biodiversity; and

(c) water quality; and

(d) water resource health.

Note 1: Paragraph (a) would cover, for example, maintaining ecosystem function by the periodic flooding of floodplain wetlands.

Note 2: Paragraph (d) would cover, for example, mitigating pollution and limiting noxious algal blooms.

environmental water *means:*

(a) held environmental water; or

(b) planned environmental water.

environmental watering means the delivery or use of environmental water to achieve environmental outcomes.

held environmental water means water available under:

(a) a water access right; or

(b) a water delivery right; or

(c) an irrigation right;

for the purposes of achieving environmental outcomes (including water that is specified in a water access right to be for environmental use).

long-term annual diversion limit has the meaning given by item 7 of the table in subsection 22(1).

long-term average sustainable diversion limit has the meaning given by item 6 of the table in subsection 22(1).

relevant international agreement means the following:

(a) the Ramsar Convention;

(b) the Biodiversity Convention;

(c) the Desertification Convention;

(d) the Bonn Convention;

(e) CAMBA;

(f) JAMBA;

(g) ROKAMBA;

(h) the Climate Change Convention;

(i) any other international convention to which Australia is a party and that is:

(i) relevant to the use and management of the Basin water resources; and

(ii) prescribed by the regulations for the purposes of this paragraph.

Fundamental requirements of the Basin Plan

Part 2 Division 1:

19 Simplified outline

(1) This section sets out a simplified outline of this Part.

(2) There is to be a Basin Plan for the management of the Basin water resources. The Basin Plan will provide for limits on the quantity of water that may be taken from the Basin water resources as a whole and from the water resources of each water resource plan area. It will also provide for the requirements to be met by the water resource plans for particular water resource plan areas (these water resource plans are dealt with in Division 2).

(3) The Authority must prepare a Basin Plan and give it to the Minister for adoption. The Minister may adopt the Basin Plan without modification or direct the Authority to modify the Plan.

(4) The Authority may prepare amendments of the Basin Plan and give them to the Minister for adoption. The Minister may adopt the amendments of the Basin Plan without modifications or direct the Authority to modify the amendments.

(5) The Authority must review the Basin Plan at least every 10 years (or sooner if the Minister or all the Basin States request).

20 Purpose of Basin Plan

The purpose of the Basin Plan is to provide for the integrated management of the Basin water resources in a way that promotes the objects of this Act, in particular by providing for:

(a) giving effect to relevant international agreements (to the extent to which those agreements are relevant to the use and management of the Basin water resources); and

(b) the establishment and enforcement of environmentally sustainable limits on the quantities of surface water and ground water that may be taken from the Basin water resources (including by interception activities); and

(c) Basin-wide environmental objectives for water-dependent ecosystems of the Murray-Darling Basin and water quality and salinity objectives; and

(d) the use and management of the Basin water resources in a way that optimises economic, social and environmental outcomes; and

(e) water to reach its most productive use through the development of an efficient water trading regime across the Murray-Darling Basin; and

(f) requirements that a water resource plan for a water resource plan area must meet if it is to be accredited or adopted under Division 2; and

(g) improved water security for all uses of Basin water resources.

21 General basis on which Basin Plan to be developed

Basin Plan to implement international agreements

(1) The Basin Plan (including any environmental watering plan or water quality and salinity management plan included in the Basin Plan) must be prepared so as to provide for giving effect to relevant international agreements (to the extent to which those agreements are relevant to the use and management of the Basin water resources).

(2) Without limiting subsection (1), the Basin Plan must:

(a) be prepared having regard to:

(i) the fact that the use of the Basin water resources has had, and is likely to have, significant adverse impacts on the conservation and sustainable use of biodiversity; and

(ii) the fact that the Basin water resources require, as a result, special measures to manage their use to conserve biodiversity; and

(b) promote sustainable use of the Basin water resources to protect and restore the ecosystems, natural habitats and species that are reliant on the Basin water resources and to conserve biodiversity.

Note 1: See Articles 7 and 8 of the Biodiversity Convention.

Note 2: The Basin Plan must also be prepared having regard to critical human water needs (see Part 2A).

(3) Without limiting subsection (1), the Basin Plan must also:

(a) promote the wise use of all the Basin water resources; and

(b) promote the conservation of declared Ramsar wetlands in the Murray-Darling Basin; and

(c) take account of the ecological character descriptions of:

(i) all declared Ramsar wetlands within the Murray-Darling Basin; and

(ii) all other key environmental sites within the Murray-Darling Basin;

prepared in accordance with the National Framework and Guidance for Describing the Ecological Character of Australia's Ramsar Wetlands endorsed by the Natural Resource Management Ministerial Council.

Note 1: See Article 3 of the Ramsar Convention.

Note 2: A copy of the National Framework and Guidance for Describing the Ecological Character of Australia's Ramsar Wetlands may be found on the Department's website.

Basis on which Basin Plan to be developed

(4) Subject to subsections (1), (2) and (3), the Authority and the Minister must, in exercising their powers and performing their functions under this Division:

(a) take into account the principles of ecologically sustainable development; and

(b) act on the basis of the best available scientific knowledge and socio-economic analysis; and

(c) have regard to the following:

(i) the National Water Initiative;

(ii) the consumptive and other economic uses of Basin water resources;

(iii) the diversity and variability of the Basin water resources and the need to adapt management approaches to that diversity and variability;

(iv) the management objectives of the Basin States for particular water resources;

(v) social, cultural, Indigenous and other public benefit issues;

(vi) broader regional natural resource management planning processes;

(vii) the effect, or potential effect, of the Basin Plan on the use and management of water resources that are not Basin water resources;

(viii) the effect, or the potential effect, of the use and management of water resources that are not Basin water resources on the use and management of the Basin water resources;

(ix) the State water sharing arrangements;

(x) any other arrangements between States for the sharing of water.

Note 1: Paragraph (b): the best available scientific knowledge includes the best available systems for accounting for water resources.

Note 2: An example of a management objective referred to in subparagraph (c)(iv) might be preservation of the natural values of a river system through no development or minimal development.

Note 3: See also subsection 25(3) (which deals with the water quality and salinity management plan).

Basin Plan not to reduce protection of planned environmental water provided for under existing State water management laws

(5) The Basin Plan must ensure that there is no net reduction in the protection of planned environmental water from the protection provided for under the State water management law of a Basin State immediately before the Basin Plan first takes effect.

Basin Plan not to be inconsistent with Snowy Water Licence

(6) The Basin Plan must not be inconsistent with the provisions of the licence issued under section 22 of the *Snowy Hydro Corporatisation Act 1997* of New South Wales.

(7) In applying subsection (6), a variation of the licence after the commencement of Part 2 of this Act is to be disregarded unless the variation is prescribed by the regulations for the purposes of this subsection.

22 Content of Basin Plan

Mandatory content of Basin Plan

(1) The Basin Plan must include the matters set out in the following table:

Mandatory content of Basin Plan

Item	Matter to be included	Specific requirements
1	A description of the Basin water resources and the context in which those resources are used.	The description must include information about: (a) the size, extent, connectivity, variability and

		condition of the Basin water resources; and (b) the uses to which the Basin water resources are put (including by Indigenous people); and (c) the users of the Basin water resources; and (d) the social and economic circumstances of Basin communities dependent on the Basin water resources.
2	An identification of the particular areas that are to be ***water resource plan areas*** for the purposes of this Act and the periods that are to be the ***water accounting periods*** for each of those areas. The Basin Plan may also provide that an area is to be a water resource plan area for the purposes of this Act from the time specified in the Basin Plan. The time may be specified as a particular date, as the time when particular conditions are satisfied or	The identification must specify one or more of the following as the water resources to which any water resource plan for the area will apply: (a) all (or a specified part or share) of the surface water in a particular area; (b) all (or a specified part or share) of the ground water beneath a particular area; (c) all (or a specified part) of a particular watercourse, lake or aquifer. A reference in this Act to the water

particular circumstances start to exist or in any other way. If the Basin Plan includes a provision to this effect, the area is a water resource plan area only from the time specified in the Basin Plan.

resources of the water resource plan area is a reference to the water resources identified as the ones to which the water resource plan applies.

The water resource plan areas in a State, and the water accounting periods for those areas, that are identified in the Basin Plan must, as far as possible, be aligned with the areas and accounting periods provided for in or under the State water management law of that State. However, this does not prevent the Basin Plan identifying an area as a water resource plan area if none of that area falls within an area provided for in or under the State water management law of that State.

The surface water of the Googong Dam Area (within the meaning of the *Canberra Water Supply (Googong Dam) Act 1974*) must be included in a water resource plan area for which

		the Australian Capital Territory (and not New South Wales) prepares a water resource plan (see section 63A). The Authority must consult a State before the Basin Plan identifies as a water resource plan area an area none of which falls within an area provided for in or under the State water management law of that State.
3	An identification of the risks to the condition, or continued availability, of the Basin water resources.	The risks dealt with must include the risks to the availability of Basin water resources that arise from the following: (a) the taking and use of water (including through interception activities); (b) the effects of climate change; (c) changes to land use; (d) the limitations on the state of knowledge on the basis of which estimates about matters relating to Basin water resources are made.

4	Management objectives and outcomes to be achieved by the Basin Plan.	The objectives and outcomes must be consistent with purposes set out in section 20. The objectives and outcomes must address: (a) environmental outcomes; and (b) water quality and salinity; and (c) long-term average sustainable diversion limits and temporary diversion limits; and (d) trading in water access rights.
5	The strategies to be adopted to manage, or address, the risks identified under item 3.	The strategies must relate to the management of Basin water resources.

6	The maximum long-term annual average quantities of water that can be taken, on a sustainable basis, from: (a) the Basin water resources as a whole; and (b) the water resources, or particular parts of the water resources, of each water resource plan area.	The limit must comply with section 23. Sections 23A and 23B deal with adjustments to the limit. Section 75 requires particular matters to be specified in the Basin Plan if a long-term average sustainable diversion limit for the water resources, or a particular part of the water resources, of a water resource plan area is reduced.

The averages are the ***long-term average sustainable diversion limits*** for the Basin water resources, and the water resources, or particular parts of the water resources, of the water resource plan area.

7	For the water resources, or particular parts of the water resources, of each water resource plan area, the long-term annual average quantities of water that may, on a temporary basis, be taken year by year from the water resources, or particular parts of the water resources, in addition to the long-term average sustainable	The temporary diversion provision must comply with section 24.

		diversion limit for those water resources or that particular part. The average is the ***temporary diversion provision*** for those water resources or that particular part. The sum of: (a) the long-term average sustainable diversion limit; and (b) the temporary diversion provision; for those water resources or that particular part is the ***long-term annual diversion limit*** for those water resources or that particular part.	
8		The method for determining whether the long-term annual diversion limit for the water resources, or a particular part of the water resources, of a water resource plan area has been complied with (whether in relation to a particular water accounting period or over a longer period) and the	The method must include provision for accounting for any trading, or transfer, of tradeable water rights.

	extent of any failure to comply with that limit.	
9	An environmental watering plan.	The environmental watering plan must comply with section 28.
10	A water quality and salinity management plan.	The water quality and salinity management plan must comply with section 25.
11	The requirements that a water resource plan for a water resource plan area must comply with for it to be accredited or adopted under Division 2.	The requirements must relate to matters that are relevant to the sustainable use and management of the water resources of the water resource plan area. Subsections (3), (6A) and (6B) provide that certain matters must be included in the requirements.
12	Rules for the trading or transfer of tradeable water rights in relation to Basin water resources. See also section 26.	The rules must contribute to achieving the Basin water market and trading objectives and principles that are set out in Schedule 3. Without limiting the matters that the rules may deal with, the rules must deal with the trading or transfer between Basin States of tradeable

		water rights in relation to Basin water resources.
13	A program for monitoring and evaluating the effectiveness of the Basin Plan.	The program must include the principles to be applied and the framework to be used to monitor and evaluate the effectiveness of the Basin Plan. The program must include reporting requirements for the Commonwealth and the Basin States. The program must include 5 yearly reviews of: (a) the water quality and salinity targets in the water quality and salinity management plan; and (b) the environmental watering plan.

23 Long-term average sustainable diversion limits

(1) A long-term average sustainable diversion limit must reflect an environmentally sustainable level of take.

(2) A long-term average sustainable diversion limit may be specified:

(a) as a particular quantity of water per year; or

(b) as a formula or other method that may be used to calculate a quantity of water per year; or

(c) in any other way that the Authority determines to be appropriate.

Note: Sections 23A and 23B set out how a long-term average sustainable diversion limit may be adjusted.

(3) A reference in this section to a long-term average sustainable diversion limit is a reference to a long-term average sustainable diversion limit for:

(a) the Basin water resources; or

(b) the water resources of a particular water resource plan area; or

(c) a particular part of the water resources referred to in paragraph (b).

Productivity Commission inquiries

Part 3

87 Productivity Commission inquiry—Basin Plan and water resource plans

Power to conduct inquiries

(1) During the 5 year period ending on 31 December 2018, the Productivity Minister must, under paragraph 6(1)(a) of the *Productivity Commission Act 1998*, refer to the Productivity Commission for inquiry the matter of the effectiveness of the implementation of the Basin Plan and the water resource plans.

(2) During the subsequent 5 year period that occurs after the completion of the Commission's most recent inquiry under this section, the Productivity Minister must, under paragraph 6(1)(a) of the *Productivity Commission Act 1998*, refer to the Productivity Commission for inquiry the matter of the effectiveness of the implementation of the Basin Plan and the water resource plans.

Reports on inquiries etc.

(3) In referring the matter to the Productivity Commission for inquiry, the Productivity Minister must, under paragraph 11(1)(b) of the *Productivity Commission Act 1998*, specify the 5 year period in which the referral occurs as the period within which the Productivity Commission must submit its report on the inquiry to the Productivity Minister.

Note: Under section 12 of the *Productivity Commission Act 1998*, the Productivity Minister must cause a copy of the Productivity Commission's report to be tabled in each House of the Parliament.

(3A) Once the matter has been referred to the Productivity Commission for inquiry, the Chair of the Productivity Commission must establish a stakeholder working group in accordance with section 89.

(4) After submitting its report to the Productivity Minister and before a copy of the report is tabled in each House of the Parliament, the Productivity Commission must give a copy of the report to:

(a) the Authority; and

(b) the relevant State Minister for each of the Basin States.

Matters relating to industry, industry development and productivity

(5) For the purposes of paragraph 6(1)(a) of the *Productivity Commission Act 1998*, the matter mentioned in subsections (1) and (2) of this section is taken to be a matter relating to industry, industry development and productivity.

88 Productivity Commission inquiry—National Water Initiative

Power to conduct inquiries

(1) During the 3 year period ending on 31 December 2017, the Productivity Minister must, under paragraph 6(1)(a) of the *Productivity Commission Act 1998*, refer to the Productivity Commission for inquiry the matter of the progress of parties to the National Water Initiative towards achieving the objectives and outcomes of, and within the timelines required by, the National Water Initiative.

(2) During the subsequent 3 year period that occurs after the completion of the Commission's most recent inquiry under this section, the Productivity Minister must, under paragraph 6(1)(a) of the *Productivity Commission Act 1998*, refer to the Productivity Commission for inquiry the matter of the progress of parties to the National Water Initiative towards achieving the objectives and outcomes of, and within the timelines required by, the National Water Initiative.

Reports on inquiries etc.

(3) In referring the matter to the Productivity Commission for inquiry, the Productivity Minister must:

(a) under paragraph 11(1)(b) of the *Productivity Commission Act 1998*, specify the 3 year period in which the referral occurs as the period within which the

Productivity Commission must submit its report on the inquiry to the Productivity Minister; and

(b) under paragraph 11(1)(d) of that Act, require the Productivity Commission to make recommendations on actions that the parties to the National Water Initiative might take to better achieve the objectives and outcomes of the National Water Initiative.

Note: Under section 12 of the *Productivity Commission Act 1998*, the Productivity Minister must cause a copy of the Productivity Commission's report to be tabled in each House of the Parliament.

(3A) Once the matter has been referred to the Productivity Commission for inquiry, the Chair of the Productivity Commission must establish a stakeholder working group in accordance with section 89.

Regard to be had to objectives of National Water Initiative

(3B) When conducting an inquiry, the Productivity Commission must have regard to the objectives provided for in clause 23 of the National Water Initiative.

(4) After submitting its report to the Productivity Minister and before a copy of the report is tabled in each House of the Parliament, the Productivity Commission must give a copy of the report to:

(a) the Council of Australian Governments; and

(b) any subcommittee (however described) of the Council that deals with matters relating to water.

Matters relating to industry, industry development and productivity

(5) For the purposes of paragraph 6(1)(a) of the *Productivity Commission Act 1998*, the matter mentioned in subsections (1) and (2) of this section is taken to be a matter relating to industry, industry development and productivity.

89 Stakeholder working group

(1) A stakeholder working group is to be established for each matter referred to the Productivity Commission for inquiry (a ***referred matter***).

(2) A stakeholder working group for a referred matter:

(a) is to exchange information and views on the referred matter or any issues

relevant to it; and

(b) may provide advice to the Productivity Commission on the referred matter or any issues relevant to it.

(3) A stakeholder working group for a referred matter is to consist of such persons as the Chair of the Productivity Commission thinks fit who are representative of any:

(a) agricultural, environmental, industry, Indigenous or urban water body; or

(b) other body with an interest in the referred matter.

(4) Subject to subsections (5) and (6), the Chair of the Productivity Commission may determine:

(a) any allowances that are payable to a member of a stakeholder working group in relation to his or her contribution as a member of the stakeholder working group; and

(b) any other matter relating to the functioning of a stakeholder working group.

(5) Despite the *Remuneration Tribunal Act 1973*, a member of a stakeholder working group is not to be paid any remuneration in relation to his or her contribution as a member of the stakeholder working group.

(6) A stakeholder working group for a referred matter must meet at least twice about the referred matter before the Productivity Commission submits its report on the matter to the Productivity Minister.

(7) To avoid doubt, a member of a stakeholder working group is not a public office within the meaning of the *Remuneration Tribunal Act 1973*.