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COMMENT ON THE PRODUCTIVITY COMMISSION'S MURRAY-DARLING BASIN PLAN: IMPLEMENTATION REVIEW 2023

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The Productivity Commission (PC) was required to report on the effectiveness of the Basin Plan and water resource plans for the five-year period ending 19th December 2023. **Overall, we commend the Productivity Commission for their thorough review and the quality of their interim report.** We do not seek to provide a highly detailed review here, but instead our aim is to provide some additional comments that we think are very important for the PC to consider in finalising reporting. Our comments here are primarily based on material we originally prepared for the Senate's *inquiry into the Water Amendment Act 2023 (Restoring our Rivers*), but we also draw upon the wider literature. In summary, we provide seven broad comments for the PC to consider:

i. Provide volume of water (and cost per ML) returned under different program funding.
ii. Provide more information on the costs and benefits of on-farm irrigation infrastructure programs.
iii. Place more critical scrutiny on the claims of socio-economic harm from water recovery, the need for the socio-economic test, and encourage the development of a standard to ensure the most appropriate socio-economic analysis is funded by governments.
iv. Place more emphasis on the need for more research on the benefits for First Nations and downstream communities, and for a new renewed focus on cultural water attainment.
v. Comment on the ongoing need for a water audit (and proper water accounting) in the Basin.
vi. Provide more critical consideration regarding climate change and water overallocation effects in commentary on future Basin Plan reviews in 2026.
vii. Provide additional comment regarding structural adjustment and regional diversification.

1. **Provide Volume (and cost per ML) of Water Returned Under Different Program Funding** (Table 1 (p. 8) and Table 2.1 (p. 55)). We recommend that the PC highlight the volumes (ML) returned under each funding source, and make the $/ML more explicit. As outlined in our Senate submission:

   "As at 31 August 2022, recovering water through irrigation infrastructure has cost Australian taxpayers 3.1 times more per ML than buying water back from willing irrigators. Since the cap was imposed in 2015, there has been very little water bought back. Hence, the cap is seen as limiting any current or further purchase of water from

entitlements, and why it must be repealed for water recovery to be effective. Although both forms of water recovery have increased over time, irrigation infrastructure subsidies $/ML are significantly trending upwards at a faster rate. Strategic buyback purchases have also been shown to be significantly more costly than voluntary water recovery methods. This cost differential in water recovery methods will continue to worsen. The projects put forward by states are now quoting huge amounts – regularly figures over $20,000 per megalitre for water recovery are being asked (e.g. Ley, 2022). Allowing for return flows and other issues, the cost differential between the methods increases substantially (Williams and Grafton, 2019).”

Table 1: Water Recovery Volumes and $ Paid from 2007-08 to 31 August 2022

Financial Year	Gap Bridging Infrastructure ($m) 7,8,10,11	Gap Bridging Infrastructure (GL/y) 10,11,12,13	Irrigation Infrast. $/ML	Purchase (buyback) ($m) 7,8	Total Purchase (GL/y)	Total Purchase $/ML
2007-08	86.0	-		33.1	14.214	2,328.7
2008-09	55.8	-		371.7	257.215	1,445.1
2009-10	189.1	0.7	254,508.7	780.2	298.974	2,609.6
2010-11	221.2	68.8	3,215.0	357.7	197.801	1,808.4
2011-12	527.6	190.8	2,765.0	540.9	302.302	1,789.3
2012-13	520.5	72.0	7,233.6	112.9	65.383	1,726.7
2013-14	492.4	259.6	1,897.0	55.9	21.254	2,630.1
2014-15	557.1	27.5	20,281.0	60.8	2.806	21,667.9
2015-16	262.6	25.9	10,123.0	40.0	8.32	4,807.7
2016-17	507.1	42.2	12,020.6	23.9	33.755	708.0
2017-18	426.4	2.1	203,047.6	117.2	27.232	4,303.8
2018-19	229.6			159.7	32.072	4,979.4
2019-20	108.5			17.6	5.07	3,471.4
2020-21	113.7					
2021-22	212.0					
2022-23	12.0					
Total	**$4,521.6**	**689.6**	**Ave: $ 6,557**	**$2,671.6**	**1,266.403**	**Ave: $ 2,109**

1. Estimates of water recovery are calculated using water recovery factors that allow for comparison with Basin Plan targets. The factors are subject to revision through the Water Resource Plan accreditation process to account for the best available information. This table has been prepared consistent with accredited WRPs and revised NSW factors, which may change once those WRP's are finalised. Further information is available at: www.dcceew.gov.au/water/policy/mdb/water-recovery/progress-recovery/accounting
2. All water recovery figures are expressed in gigalitres per year long-term average annual yield (GL/y) terms.
3. Allow for minor variations in totals due to rounding.
4. The water recovery data provided is considered accurate to the nearest megalitre, being the third decimal place.
5. The water entitlements referred to in this table are held by the Cwlth and do not include state held environmental water.
6. Water recovery is reported at the point at which water savings or purchase have been received, estimated or agreed under contract or through a funding agreement. Contracted arrangements may change prior to settlement in some circumstances.
7. Expenditure includes actual Administered funding only.
8. The purchase and infrastructure expenditure corresponds to settlement and infrastructure milestone payment dates and therefore may not align with the reported water volumes for that financial year.
9. The 2019-20 groundwater recovery figure includes 0.5 GL/y gifted to Cwlth by the Queensland government, acquired through compulsory license reductions to achieve SDL target in QLD Upper Condamine Alluvium groundwater resource unit.
10. Infrastructure recovery and expenditure includes SRWUIP expenditure within the Murray-Darling Basin and the efficiency and purchase component of the SA River Murray Sustainability Program ($122.548m).
11. Infrastructure expenditure includes the SA Riverine Recovery Project. This project recovered 7.2 GL/y which does not contribute to gap-bridging targets and has been excluded from the water recovery volumes above.
12. Water Smart Australia program water recovery of 2.2 GL/y has been excluded. It is not possible to identify the portion of project funding that achieved this recovery.
13. The Mitiamo Pipeline Project water recovery of 1.0 GL/y has been excluded as the project was funded through the National Water Grid Fund.

Source: DCCEEW personal data request – estimates valid as at 31 August 2022.

2. **Provide More Information on the Costs and Benefits of On-farm Irrigation Infrastructure Programs** (e.g. pp 63-65). There are many issues associated with the on-farm irrigation efficiency programs that have not been canvassed in the report. We also believe it is very important to highlight that not all on-farm irrigation efficiency programs are the same, and revised versions may be useful in future water recovery programs. See these comments in our Senate submission:

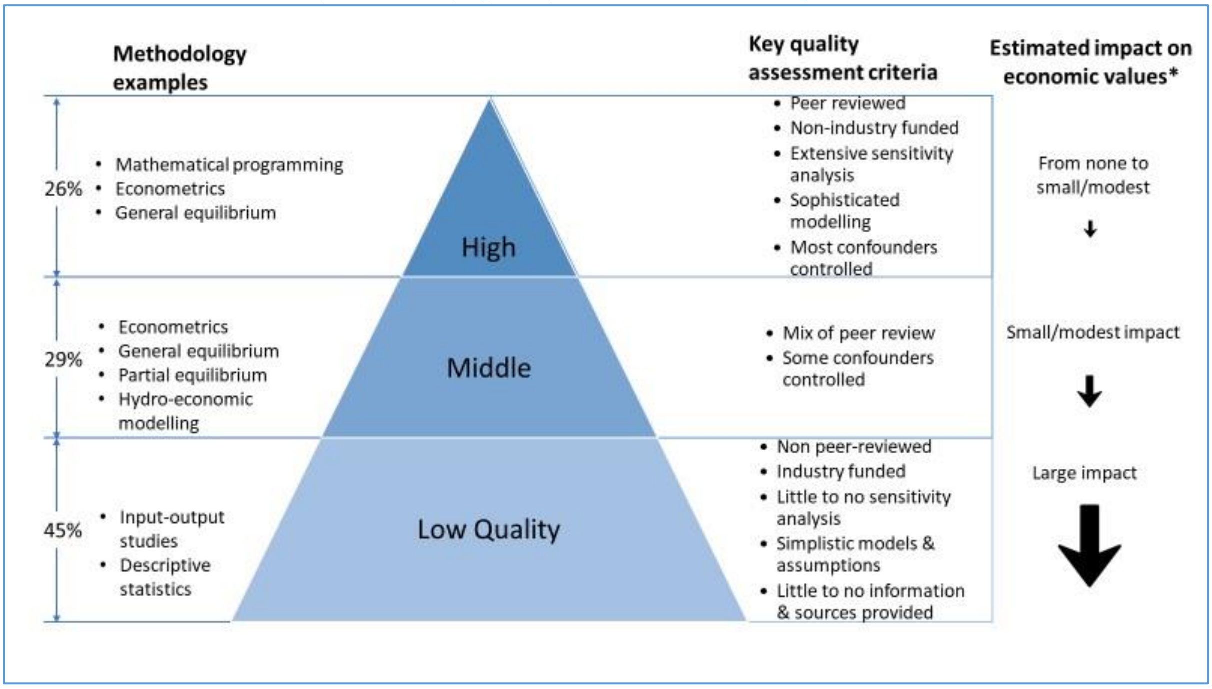
   > ***"Apart from not being cost-effective, irrigation infrastructure subsidies & supply projects have substantial unintended (positive and negative) consequences****. Positive intended consequences include increased farm productivity and improved water quality (where saline return flows are reduced). However, negative unintended consequences include: reduced return flows; rebound effect on irrigated land area and water extractions; increased utilisation of water entitlements; increased substitution; equity issues; flood plain harvesting increases; and resilience issues. See Wheeler et al. (2020) for more discussion, and Williams et al. (2023) provide recent research that illustrates the growth in large farm dams over time, and illustrates that dams have proliferated - especially in areas where floodplain harvesting is practiced."*
   >
   > ***"All on-farm water recovery infrastructure programs are not the same.*** *There is a tendency to treat on-farm irrigation infrastructure programs as all water efficiency programs – and there is a general view that there is a technical limit to how much water can be recovered this way. However, it needs to be noted that there are at least 13 different irrigation infrastructure programs to recover water across states that were funded through the Sustainable Rural Water Use Infrastructure Program. They all contain differing criteria, objectives, budgets, and methods/activities allowed. At least one of these schemes – the SA River Murray Sustainability Program – allowed for other (non-irrigation infrastructure) farm activities to be subsidised instead. For example, irrigators could use the money to subsidise various farm productive activities (e.g., netting fruit/nut trees), and transfer some of their water entitlements as part of the program. There is the strong indication that such programs (non-irrigation infrastructure) may have less unintended consequences on water extraction and water behaviour than other irrigation infrastructure programs (e.g. the Healthy Headwaters program in Queensland which most likely lead to increased floodplain harvesting as it spent a large proportion of its money in raising dam walls)."*

3. **Place more critical scrutiny on the claims of socio-economic harm from water recovery (pp 86-87; 241), the need for the socio-economic test (pp 63-64), and encourage the development of a standard to ensure the most appropriate socio-economic analysis is funded by governments (p. 20, 164).** Although acknowledged in the report that there are a wide range of benefits and costs to water recovery, we think it is very important for the PC to recognise that there exists a wide difference in scientific quality of attribution among studies. Many of the consultancy studies exaggerate claims by confusing "causality with correlation" and using empirical invalid assumptions about lack

of adaptation and substitution in assessing impacts from water recovery. The higher quality peer reviewed studies using economics best practice methods in isolating causal effects, report limited or even positive regional economy benefit when full adaptation and substitution are factored in properly. There is a current lack of scrutiny by the PC report of some figures cited with water recovery (e.g. p. 241 is a prime example). Figure 1 below highlights a systematic literature review and quality grading of 106 water economic studies in the MDB (Wheeler et al., 2023). We refer the PC to this report and to comments in our Senate submission:

> *"Recent work (Wheeler et al., 2023) established an internal and external ranking validity method to judge quality of water economic studies conducted in the MDB. Key findings suggested that studies that have been used as showing evidence of significant socio-economic harm from water recovery (e.g. consultancy studies using methodologies such as input-output analysis or basic assumptions/scenarios) – have very little reliability and are all ranked as low quality, hence should not be relied upon for policy decisions."*

Fig 1: Overview of water recovery studies by quality assessment and impact on economic values



Note: * Economic values include GDP, GRP, GRIAP, employment numbers, farm production, farm gross margins (which may decrease with water recovery). Other economic values such as water market prices have the opposite sign as some studies suggest they increase under water recovery. Diagram is not to scale.
Source: Wheeler et al., (2023; xi)

> ***"There needs to be a standard adopted for economic evidence used in water policy****. The review by Wheeler et al., (2023) highlighted that there needs to be greater standards adopted for funded consultancies on economic impact of water recovery. Half of all work in this space has been of very low quality. More emphasis*

must be given to long-term research that seeks to address causality issues with credible methods (e.g. large sample sizes, dynamic assessment, longitudinal impacts, spill-over effects, area modelling at postcode level)."

"The socio-economic 'neutrality' test of the 450GL needs to be discarded……. *This test is highly dubious and illogical (Walker, 2019). Taken at the scale recommended….., it is easy for any potential project to be stopped. One critical issue is – who measures impact? Is it based on actual quantified evidence or supposition?"*

4. **Place more emphasis on the need for more research on the benefits for First Nations and downstream communities, and for a new renewed focus on cultural water attainment (e.g. Chapter Five).** We refer the PC to comments in our Senate submission:

"… there needs to be additional research on (a) economic benefits of water recovery for First Nations people and country, and downstream communities …… *The research to date has primarily concentrated on irrigation impacts."*

We believe the PC needs to highlight the wide support by the Australian public for increased cultural water for First Nations. Our Senate submission highlighted that in ongoing research work, it has been found that 38% of respondents surveyed supported recovering more environmental and cultural water. This compared to 22% of respondents who voted for recovering more environmental water beyond current goals. Work by Jackson et al. (2019) also highlighted strong willingness to pay by Australian public for increased water reallocation to First Nations (70% supported reallocating 5% of total irrigation entitlements to cultural water).

5. **Comment on the ongoing need for a water audit (and proper water accounting) in the Basin (in Chapter Nine).** There is currently no commentary in the draft PC report in the governance chapter regarding the need for a thorough water audit in the Basin. We believe that there is still an ongoing need for this audit. We refer the PC to detail in a previous submission by us and others (i.e. Grafton et al. 2018) to the PC's (2018) *Murray-Darling Basin Plan: Five-year assessment*. This comment included:

"*The Australian Government undertake an independent and comprehensive water audit of the MDB (since 2007) using existing remote-sensing data, and other relevant data, to assess the impacts of water recovery and the Basin Plan on relevant inflows and outflows (including return flows). Notwithstanding the recognition of return flows in the Draft Report (see pp. 87-89), we do not see a proper appreciation of the magnitude of the reduction in return flows associated with on and off-farm subsidies and grants for infrastructure to increase irrigation efficiency. We are concerned that despite the availability of remote-sensing data that can be used to estimate actual evapotranspiration, and when combined with estimated inflows and measured diversions, can be used to calculate outflows (including return flows), no such water audit has been undertaken by the Australian Government. Under reasonable and* *evidence-based (using published academic literature on the effects of increased irrigation efficiency on return flows) scenarios, reductions in recoverable return flows could exceed the volume in excess of the Sustainable Diversion Limit Adjustment mechanism (605 GL/year). As highlighted in Colloff, Williams and Grafton (Submission 12), and in the recently published work by Grafton, R.Q. et al. 2018 (The paradox of irrigation efficiency, Science, Vol 361, Issue 6404, pp. 748-50), primary data collection and a regular comprehensive water audit is an absolute necessity. This is necessary to: (i) know what are the effects of water recovery; (ii) to manage adaptively water releases for irrigation and for the environment; and (iii) to ensure the key objects of the Water Act 2007 are placed at unnecessary risk."*

Other sources of information include: Colloff et al. (2018); Seidl et al. (2020); Walker (2019).

6. **Provide more critical consideration regarding climate change and water overallocation effects in commentary on future Basin Plan reviews in 2026 (Chapter Six).** We note (both within the interim report and in a number of submissions) the continued call for climate change to be considered in updated Basin Plan modelling.

   Whilst we support such a call, we believe that at the same time, there must be an ongoing focus on water reallocation issues. Often climate change is blamed by many as the reason for water scarcity, but this often ignored the other major contributor in many regions. Grafton et al. (2022) provide quantitative evidence and modelling to suggest that long-term meteorological trends are only responsible for less than half the decline in stream flows, as measured at Wilcannia in NSW. If decision makers think climate change is primarily or solely responsible for declining stream flows on our 'working rivers', like the Darling River, then they do not need to look for localised water governance solutions, or to make difficult decisions regarding reducing, and regulating, consumptive water extraction.

7. **Provide additional comment regarding issues surrounding structural adjustment and regional diversification (pp 88-89).** We provided additional comments to the Senate regarding the following:

   "Given that there can be socioeconomic costs to communities from water reform, which goes alongside other transitional changes (such as technology change, economic prices, population changes, declining social services, climate change, etc), **we emphasise the need for both proper assessment – and application - of structural adjustment and regional diversification funds**. Such measures we proposed back in 2010 by the Wentworth Group (2010, pp. 22-25) in the strategy of 'Reasonable return and community development'.

   We also emphasise the fact that high quality economic modelling has found that for every job created from irrigation infrastructure upgrades, the money spent on key social services could have created between three and four jobs more in the Basin (Wittwer and Young, 2020). Money needs to be targeted to where it can have the most beneficial return for communities."

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