

RESEARCH ARTICLE

Comparing the success and failure of the Murray–Darling Basin Plan’s water recovery programs

Sarah Ann Wheeler^{1,2} 

¹College of Business, Government and Law, Flinders University, Bedford Park, South Australia, Australia

²School of Economics and Public Policy, Faculty of ABE, University of Adelaide, Bedford Park, South Australia, Australia

Correspondence

Sarah Ann Wheeler, College of Business, Government and Law, Flinders University SA 5042, Australia.
Email: sarah.wheeler@flinders.edu.au

Funding information

Funding for this article was part provided by ANU and ARC DP200101191.

Abstract

The Murray–Darling Basin (MDB) Plan is held up by some as an exemplar for world-leading water policy, whilst others have called it a failure. Total proposed recovery was to return 3200 GL of consumptive (e.g. namely irrigation) water use to non-consumptive (e.g. environmental) use in the MDB, making it one of the largest planned reallocations of water resources in the world. As of June 2023, over AUD\$13 billion was committed financially from the Australian government to Basin water reform, with AUD\$7.7 billion spent to date on water recovery programs. The implementation of the Plan has been mired in controversy, and it missed its first water recovery targets that had been set for 2024, requiring substantial legislation amendments. This study provides a qualitative policy overview comparison of the success and failure of the two main water recovery programs implemented—buyback of water entitlements from willing sellers and subsidising irrigation infrastructure (on and off-farm) projects. It concludes that contrary to the popular view held by many, the buyback water recovery program has been a success—achieving

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial](https://creativecommons.org/licenses/by-nc/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

© 2024 The Author(s). *Australian Journal of Public Administration* published by John Wiley & Sons Australia, Ltd on behalf of Institute of Public Administration Australia.

the majority of the water recovered to date, at the least cost, with the least negative externalities—in comparison to infrastructure programs.

KEYWORDS

Basin Plan, buyback, irrigation infrastructure subsidies, policy comparison, vested interests, water policy

Points for practitioners

- Assessing success and failure of MDB water recovery programs requires establishing effectiveness, efficiency and equity criteria. Greater work on the benefits of water reallocation downstream and cultural water is needed.
- A comparison of MDB buyback water recovery programs with irrigation infrastructure programs found higher net benefits for buyback programs.
- Use first-best policy to address each water policy objective, not one policy aimed at addressing multi-objectives.
- Overall, the Plan.s overall success is still to be determined, given the difficulty in judging environmental outcome success that is intrinsically linked with other external factors.

1 | OVERVIEW OF WATER ISSUES IN THE MURRAY–DARLING BASIN

Global warming, overallocation of water resources to consumptive uses, land-use change, increased extinction, and declining and vulnerable ecosystems pose substantial policy challenges, in Australia and elsewhere (SoE, 2021, WEF, 2019). Numerous policies, both demand and supply management based, have been implemented in an attempt to address long-term sustainability and water scarcity issues (Alexandra, 2018; COAG, 1994; Wheeler, 2024). The biggest water policy reform in Australia, and indeed, probably one of the biggest water reallocations attempted in the world, is the Murray–Darling Basin (MDB or the ‘Basin’) Plan, legislated in 2012. The Plan has been described as ‘world-leading’ (e.g. Ballard, 2020; MDBA, 2023b), whilst at the same time critiques have outlined substantial problems (e.g. Colloff & Pittock, 2022; Williams & Grafton, 2020).

The Basin is Australia’s largest agricultural region and is an area of very important environmental, economic, social, cultural, and recreational significance. It is an area where there has been extensive water policy reform in the past century, including COAG water reform agreement

in 1994 and the National Water Initiative (NWI) in 2004 (e.g. Alexandra, 2018; COAG, 1994; Marshall & Alexandra, 2016). The Millennium drought in the 2000s was one of the worst recorded droughts in the MDB's history (Van Dijk et al., 2013), and widespread fears about environmental collapse led to the enactment of the *Water Act 2007*, which involved substantial legislative and regulatory water reform (Bell, 2022; Grafton & Wheeler, 2018). Importantly, the *Water Act 2007* established the key objectives for the *MDB Plan*, namely: '3d(i) to ensure the return to environmentally sustainable levels of extraction for water resources that are over-allocated or overused' and '3d(ii) to protect, restore and provide for the ecological values and ecosystem services of the MDB' (Commonwealth of Australia, 2007, pp. 2–3).

Water recovery (namely the recovery of water from the consumptive pool [mainly from irrigators] for use by the environment) started from 2007–2008 onwards, under the *National Plan for Water Security* (renamed *Water for the Future* in 2008) (Grafton & Wheeler, 2018). There were two main policies used for water recovery: (i) on- and off-farm infrastructure subsidies and (ii) buying water directly back ('buyback') from water entitlement owners. The largest program funding was for water infrastructure subsidies (AUD\$5.8 billion was originally allocated for this—this program is known as the *Sustainable Rural Water Use and Irrigation Infrastructure program*), where on-farm (and off-farm) subsidisation of irrigation infrastructure was provided in exchange for water entitlements. On-farm projects include converting flood irrigation systems to drip irrigation systems or deepening on-farm storages to reduce evaporative losses. Some irrigation water recovery programs (e.g. in South Australia) allowed expenditure on other farm investments, beyond irrigation infrastructure. Off-farm projects include lining delivery channels to reduce seepage or decommissioning underutilised irrigation network sections. The irrigation infrastructure operator provides a share of the 'saved water' to Government. Non-irrigation infrastructure modernisation projects include environmental or other farm works that return water to the environment (Wheeler, 2024). Numerous issues have been raised regarding the subsidisation of irrigation infrastructure, and the extent to which it is consistent with NWI water reform agreements (Alexandra, 2018).

AUD\$3.1 billion was originally allocated for buybacks, called the *Restoring the Balance program* (Wheeler, Xu, et al., 2024). Buyback involved the direct purchase of permanent water entitlements from willing sellers. Most of the existing environmental water has been recovered through voluntary offers of water by multiple sellers via an open tender process (Grafton & Wheeler, 2018). Some occasional permanent purchases in the buyback program have been strategic and targeted with direct negotiation with sellers. There has also been a very occasional strategy of buying/selling temporary water allocations (the Commonwealth Environmental Water Holder [CEWH] can supplement environmental flows from permanent entitlements by buying water allocations in areas where needed).

The Murray–Darling Basin Authority (MDBA—created from the previous MDB Commission) was established under the *Water Act 2007*, with a key role to specify long-term levels of sustainable water use—known as sustainable diversion limits (SDLs). After a lengthy process and much controversy in the lead-up to implementation (i.e. considerable negative reaction to the initial 'Guide to the Basin Plan' released in 2010 that recommended 3000–4000 GL in long-term average annual yield [LTAAY] that should be recovered from consumptive to environmental use), the final Basin Plan stipulated the recovery of 2750 GL, with an additional 'upwater' of 450 GL of water for the environment to be secured through 'supply infrastructure efficiencies' (Grafton & Wheeler, 2018), bringing total proposed recovery to 3200 GL, to be fully recovered by mid-2024. All water recovery figures reported in this study are in LTAAY, although it must be noted that concerns have been raised regarding the purchase of some low security entitlements by the Commonwealth which

TABLE 1 Summary of key Water Act and Basin Plan legislation.

Year	Water legislation
2007	<i>Water Act 2007</i> (Cwlth, removed trade barriers, carryover introduced, unbundled systems, dictated development of MDB plan)
2008	<i>Water Amendment Act 2008</i> (Cwlth, created the MDBA which replaced the MDBC)
2012	<i>The Basin Plan 2012</i> (Cwlth, to be reviewed & revised through 7-year implementation phase)
2012	<i>Water Amendment Act 2012</i> (Cwlth, Long-term average SDL adjustment)
2015	<i>Water Amendment Act 2015</i> (Cwlth, surface-water purchases capped at 1500 GL, more flexibility with efficiency measures)
2015	<i>National Water Commission (Abolition) Act 2015</i> (Cwlth, abolished NWC)
2016	<i>Water Legislation Amendment Act 2016</i> (Cwlth, Sustainable Diversion Limit Adjustment [SDLAM])
2018	<i>Water Amendment Act 2018</i> (Cwlth, SDLAM introduced as offsets, water recovery reduced in Northern Basin)
2018	<i>Basin Plan Amendment Instrument 2018</i> (Cwlth, changed SDLs, groundwater changes and response to review of Water Act 2007)
2019	<i>Water Amendment Act 2019</i> (Cwlth, Indigenous Authority Member)
2021	<i>Water Legislation Amendment Act 2021</i> (Inspector-General of Water Compliance and Other Measures)
2023	<i>Water Amendment Act 2023</i> (Cwlth, Restoring our Rivers) (removing buyback cap, expanding type of projects to deliver 450 GL, delaying targets from 2024 to 2027, water market recommendations introduced; increased funding for Indigenous water purchase)

Source: Updated from Grafton and Wheeler (2018).

Moore et al. (2020) refer to as ‘sub-prime’ water. Wheeler et al. (2020) provide further discussion on issues with how LTAAY figures are calculated using the long-term diversion limit equivalent (LTDLE) factors and how these factors have regularly changed.

After legislation of the Plan in 2012, water policy reform in Australia stalled and, has been argued elsewhere, went backwards with substantial reversals in governance and policy (Walker, 2019; Wheeler, 2014). Grafton and Williams (2020) suggest these changes are largely a result of concentrated lobbying and rural community backlash. Some of these changes included an amendment to the *Water Act 2007* in 2015 to cap voluntary purchase of water entitlements (‘buy-back’) to 1500 GL; the axing of the National Water Commission in 2015; the relocation of the water portfolio from the federal Department for the Environment to the Department for Agriculture; the abandonment of the *Sustainable Rivers Audit* in 2012; states providing far less emphasis and attention to water monitoring, metering, enforcement, and compliance; and finally, the 2018 Basin Plan amendment act that both (a) decreased physical water recovery in the Northern basin from 390 to 320 GL and (b) legislated the MDBA’s proposed SDL Adjustment Mechanism, which in effect decreased the need to physically recover 605 GL of water entitlements through ‘an equivalent reduction in surface-water diversions’ via proposed water supply (e.g. installing regulators or building levee banks) and efficiency projects (e.g. improving on-farm and off-farm water infrastructure) (Alexandra, 2018; Chipperfield & Alexandra, 2023; Colloff & Pittock, 2019; Commonwealth of Australia, 2018; Grafton & Wheeler, 2018).

After both media exposure of water theft in mid-2017 and widespread fish death in the Darling River in early 2019 (AAS, 2019), community and environmental group pressure demanded improved water governance. As illustrated in Table 1, in 2019, the *Water Amendment Act* changed

to require an indigenous member for the MDBA board, and in 2021, the Inspector-General of Water Compliance and other measures were legislated. As of 2021, the original *Water Act* had been amended 29 times, and there is a myriad of other relevant water legislation.

A change in government and increasing attention paid to First Nations concerns and values saw the latest 2023 water legislative amendments being the strongest reinstatements of the original aim of achieving sustainability and a significant reduction in consumptive water use in the Basin, which was the original purpose of the water recovery measures put forward in the *Water Act 2007*. The *Water Amendment Act 2023* amended the *Water Act 2007* and *Basin Plan 2012*. Changes included (with the key changes including) expanding the type of projects (i.e. buyback) that can deliver the Basin Plan target of 450 GL of environmental upwater; repealing the 1500 GL cap on Commonwealth water purchases (to allow additional buyback to occur); enabling Water for the Environment Special Account funds to be used to enhance environmental outcomes; increasing funding for indigenous water holding purchase; providing additional time for states to deliver SDL adjustment mechanism projects and greater powers for the Inspector-General of Water Compliance; providing a roadmap for the delivery of constraints relaxation projects; delaying the review of the *Act* from 2024 until 2027; and implementing water market reform recommendations (Commonwealth of Australia, 2023; Productivity Commission, 2023).

As of 30 September 2023, the total volume of water entitlements recovered to achieve environmental outcomes was 2107.4 GL in LTAAAY (MDBA, 2023a). This represented 77% of the original 2750 GL diversion target reduction in the Basin Plan that was meant to be achieved, along with the additional 450 GL, by mid-2024. The Commonwealth government announced the successful buyback of 44.3 GL on 31 October, 2023, which has left most of the 450 GL of upwater to be recovered, plus the 605 GL of water 'offsets' through water supply and efficiency projects to be met (DCCEEW, 2024). These offset projects have been heavily criticised and remain highly uncertain (Colloff & Pittock, 2019; Grafton & Wheeler, 2018; Productivity Commission, 2023; Walker, 2019).

Figure 1 provides an overview snapshot of Basin Plan water recovery goals and significant amendments in those goals over time.

This study on the MDB Plan is part of a special issue investigating the success and failure of Australian public policy. Investigating the successes and failures of the MDB Plan is a very interesting case study, given the many changes in policy implementation over the past decade and a half. The study is not designed as an actual policy evaluation (e.g. as a fully quantitative benefit–cost analysis or detailed comparison of with MDB Plan outcomes versus without MDB plan outcomes). A full policy evaluation would need to look at all the objectives of the MDB Plan and how well they have been achieved, which is out of scope for this study. In contrast, the aim of this study is to pick one of the most important objectives of the Plan—namely water recovery targets—and to compare the success and failure of the two main programs (buyback and on- and off-farm irrigation infrastructure) implemented to recover water.

2 | CRITERIA FOR POLICY SUCCESS AND FAILURE

2.1 | Overall criteria

As McConnell (2010) argues, supporters of a policy often argue that it is successful, while opponents assert it a failure. Evaluating policy outcomes is difficult, as there are always various benefits and costs with multiple dimensions, evidence, and interpretation. McConnell (2017) outlines three aspects of evaluating policy, namely (i) *success and failure as 'fact'*: using objective phenomena

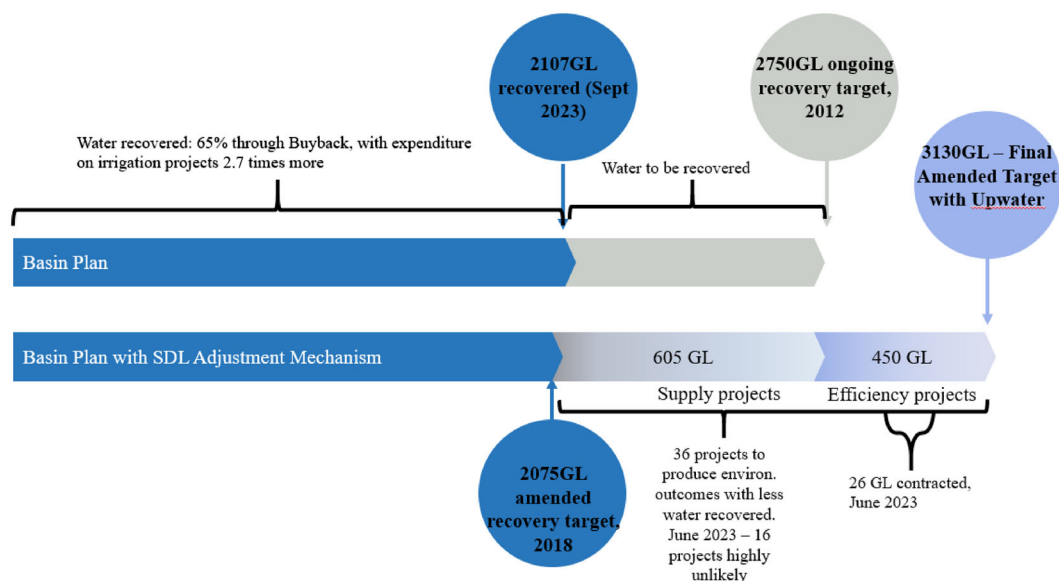


FIGURE 1 Overview of Basin Plan and recovery, as of 2023.

Source: Adapted and updated from Lyons et al. (2023, p. 266).

[Colour figure can be viewed at wileyonlinelibrary.com]

and strong evidence to determine a policy result; (ii) *success and failure as ‘perception’*: policy outcomes is determinate on people’s opinions; and (iii) *success and failure as ‘constructed reality’*: some evidence of policy outcomes exist and is measured, while other impacts are subject to conflicting interpretations. Defining success of a policy is made more difficult by a wide variety of factors, including differing perceptions and timeframes; multiple and conflicting goals and benchmarks; degrees of success and failure; evidence variability; and distributional issues (Howlett, 2023; McConnell, 2010, 2017). Drawing especially from McConnell’s (2010, 2017) criteria of the review of policy as a program, as well as considering the wider literature (e.g. Hajkowicz et al., 2000; Quiggin, 2019), this study proposes key six factors for policy success:

1. *Goal Achievement*: Are goals of the original policy effectively achieved within budgets, with all intended issues addressed with desired outcomes?
2. *Implementation*: Were there enough resources, coordination between relevant stakeholders, guidelines, and effective monitoring mechanisms put in place? Were ethical and moral principles and legal requirements adhered to?
3. *Stakeholder Support and Collaboration*: Was there public support and acceptance, especially from key stakeholders? Was there collaborative process put in place to implement the policy?
4. *Net Social Benefits*: Did the benefits of the policy outweigh all its costs? This includes an evaluation of all externalities and unintended impacts that may have occurred. Was the policy the most effective policy that could have been put in place, or were there better alternatives? What is the quality of the evidence used to assess various impacts?
5. *Evaluation and Adaptation*: Are the policy outcomes continuously reviewed, with changes put in place to adapt to changing circumstances and/or updated information, and are decisions on the project made accountable and transparent?

6. *External Factors*: Are external factors important in determining policy outcomes or effectiveness? Are these factors unforeseen or predictable?

This study takes the above six key factors and evaluates the two main water recovery programs deployed under the MDB Plan. These six factors do not have equal weighting, though all are fundamentally important. Indeed, the impact of whether the policy is achieving its goals and its benefits and costs (factors one [effectiveness] and four [net social benefits]) are arguably the most important, followed by implementation, evaluation and adaptation, stakeholder support, and external factors.

It is important to reemphasise that this is *not* a full policy quantitative evaluation of the success of the MDB Plan. In assessing policy effectiveness and net social benefits, many guidelines and frameworks exist, both qualitative and quantitative. Qualitative methods include legislative review; interviews; and multi-goal policy analysis, case studies, and narrative and ethnographic methods. Quantitative methods include tools such as benefit–cost analysis, multi-criteria analysis, quasi and natural experiments, randomised control trials, surveys, and observational studies (Kilonzo & Ojebode, 2022; Hajkowicz et al., 2000; Wheeler, Xu, et al., 2024). Choice of method is dependent upon time, resources, research question, and overall objective. This study does not conduct new data collection, nor take a full quantitative evaluation, that is not the point of the special issue on policy success and failure, but instead uses insights and findings from the literature to construct an overview of the overall policy success of the two water recovery programs in the MDB plan. In particular, the aim is to provide an overview of the benefits and costs (namely the positive and negative outcomes) of the implementation of the two main water recovery programs employed to achieve the overall main goal of reducing consumptive water extraction in the Basin.

2.2 | Identifying criteria to measure water recovery program success

The MDB Plan represents a very interesting case study of policy success—and perhaps failure. It is a significant piece of legislation, as well as a multi-faceted policy that had many original objectives and goals. The main objective of the Plan is to return water to the environment (through two main water recovery programs) by reducing diversions by irrigators and others to redress the balance between consumptive use and the environment (Commonwealth of Australia, 2012). Additional objectives (apart from water recovery) included easing constraints, water market legislation, amongst others, which all require additional water policy to be implemented.

The Plan's implementation has been highly controversial, with many claims of socio-economic impact from water reallocation (e.g. see overview in Wheeler, Xu, et al., 2024). Therefore, there are a number of elements (e.g. effectiveness and efficiency) to success and failure that could be considered, namely: (i) Is the MDB Plan contributing to a healthier environment (with multitudes of possible questions here)? (ii) Has the Commonwealth met the water recovery targets established? (iii) What has been the cost of the programs? Namely, what has been the overall impact of the various water recovery programs (namely buyback vs. irrigation infrastructure) on budgets, socio-economic outcomes, and farm changes?

Exploring the success of (i) above is a question that is still being researched by many academics and agencies and will be part of the Plan's future evaluation, but the MDBA and CEWH have argued that where there has been environmental watering, greater environmental benefits have occurred (e.g. CEWH, 2022; MDBA, 2020). Conversely, others argue we're not seeing the benefits

we should, citing that many targets of the original Basin Plan (such as an open Mouth to the sea 95% of the time) are still not being met, and conditions in many ecosystems are still degrading (Colloff & Pittock, 2022; Grafton et al., 2022; Kingsford et al., 2017; Lyons et al., 2023; Wentworth Group, 2017). If we were to evaluate the Plan based on question (ii) above of whether all the water volume targets have been recovered, which is an absolute figure, well, that is an easy evaluation to do as the answer is clearly no, which is the main reason why the legislation had to be amended in 2023 with targets for recovery extended (Commonwealth of Australia, 2023; DCCEEW, 2024). However, the answer is not as clear-cut as this, as success of the Plan involves an evaluation of all the benefits and costs—both from water recovery itself and from the implementation of water recovery programs and other policy initiatives, as well as from the situation that would have arisen without the Plan.

Hence, this study simplifies the policy evaluation question and only compares the policy failure and success of the two MDB water recovery programs—buyback of water versus on- and off-farm irrigation projects—using case study and qualitative comparison methods analysis. Conclusions of policy success and failure of each program are drawn based on net benefits overall. Full evaluation of the Plan is left to future research.

3 | SIX CRITERIA OF POLICY SUCCESS AND FAILURE

3.1 | Goal achievement: Have water recovery goals been cost-effectively achieved?

Goal achievement of water recovery is not as easy to discern as suggested above—because of all the various additions, subtractions, other state projects, legal contracts, and ongoing accounting rule changes. Supporting Information [Appendix A](#) provides the background and further details of water recovery to date—and only a brief overall summary is provided here. In summary, as of 30 September 2023, 2107.4 GL of water recovery had been contracted, with many shortfalls in water targets, but with large problems in the supply SDLAM projects (16 out of 36 supply projects considered highly unlikely to be operable) (The Senate, 2023), and of the 450 GL additional ‘upwater’, only 26 GL had been contracted. Table [A1](#) in Supporting Information [Appendix A](#) illustrates that infrastructure projects have returned almost 690 GL, at a total cost of over \$4521 million. This is an average \$2109/ML to recover water through buybacks and \$6557/ML to recover through irrigation infrastructure projects—over three times more. This cost differential in water recovery programs will continue to widen given current estimates.

Hence, to date, reflecting back to [Figure 1](#), the Plan has not achieved its water recovery target goals, which is why the *2023 Water Act Amendment* was needed. There have been very different recovery achievements across buyback and irrigation project programs, with buyback being far more cost-effective.

3.2 | Implementation: Has there been enough resources, coordination, and monitoring, and has it adhered to ethical and moral principles, and relevant legal requirements?

Table [A2](#) in Supporting Information [Appendix A](#) provides a detailed breakdown, by activity, on the current total expenditure on the water reform in the Basin by the Commonwealth. Table [2](#) provides the overall summary of the four main programs of expenditure.

TABLE 2 Commonwealth expenditure (spent and unspent) on water reform in the Murray–Darling Basin as of 30 June 2023.

Program	Total (\$mill)	% Total	Spent (\$mill)	Unspent (\$mill)	% Unspent
Total infrastructure funding	7537	56.7	4826	2711	36.0
Total purchase funding	2837	21.3	2837	0	.0
Total environment funding	1020	7.7	816	204	20.0
Total community, industry, and other funding	1899	14.3	1585	314	16.5
Total	13,293	100	10,065	3228	24.3

Note: See detailed notes to Table A2 in Supporting Information Appendix A.

Source: DCCEEW (2023).

As outlined in Table 2, in nominal terms some \$7.7 billion has already been spent to recover around 2100 GL of water for the environment. In total, as of June 2023, the Australian Government had committed \$13.3 billion on water reform in the MDB. Another \$2 billion has been committed to national water reform priorities (Murdoch, 2020). The two other main programs of expenditure (apart from water recovery from purchase and infrastructure) focus on community, industry, and other funding (\$1.9 billion) and environment funding (\$1 billion). Community and industry funding included money for compliance, the Office of the Inspector-General of Water Compliance (IGWC), water markets, economic development, structural and community adjustment funds, exit grants, water for fodder, aboriginal water entitlements, fish deaths response, and so forth. Environmental funding includes program activities such as implementation of the Living Murray Initiative, the Healthy Coorong Healthy Basin project, other healthy rivers programs, toolkit measures, and so forth. As of 30 June 2023, \$10 billion (namely 76% of committed funds) has been spent, with the largest uncommitted funding areas being infrastructure and the environment. All funds for purchase/buyback had been spent.

It is also important to note that these figures above do not include contributions from other parties, or ongoing funding for statutory functions and institutions (e.g. MDBA, National Water Commission, Commonwealth departments, etc).

The question of whether resources have been spent ethically and morally and within legal guidelines is difficult to answer when dealing with scores of programs, all with differing guidelines and spread over multiple jurisdictions (e.g. see all the activity examples in Table A2). Given it is impossible to assess all the programs here, three broad comments are made.

The first issue that has plagued the Basin Plan from the start was that the original targets set did not reflect the requirements of the *Water Act 2007*, which required that Australia meet its international legal obligations to wetlands and that an SDL for water extraction be established. The SA MDB Royal Commission suggested that the setting of the SDLs was maladministration and that climate change was ignored, with the agreed-upon Basin water recovery targets being driven by politics and not science. Walker (2019) calls certain crucial processes unlawful and especially criticised the Northern Basin Review. Others have raised issues regarding the inadequacies of accounting for climate change (Alexandra, 2020; 2022) and the actual water recovered from certain water entitlements (Moore et al., 2020; Seidl et al., 2020).

Second, there has been serious questions raised regarding the governance of irrigation infrastructure programs—both on- and off-farm. All of them have been charged with a lack of transparency, with some schemes subject to corruption charges (e.g. Victorian Ombudsman, 2011).

Questions often raised by these schemes include conflicts of interest; inappropriate assistance from government employees to private companies and failure to declare gifts; no clear and often biased definitions of how 'water savings' in programs are estimated; serious issues surrounding the 'water offsets' projects and the risk in not achieving positive environmental outcomes; lack of tender process; lack of recognition of return flows; lack of auditing of water recovery; and the deliberate creation of an unworkable socio-economic test to limit further water recovery (Alexandra, 2019; ICAC NSW, 2020; Lyons et al., 2023; Victorian Ombudsman, 2011; Walker, 2019; Wentworth Group, 2023; Williams & Grafton, 2020). As a result of media exposure by Four Corners in 2017 of water compliance issues, efforts to address governance included the MDB Compliance Compact and the establishment of the IGWC in 2021 (removing responsibility for enforcing compliance with the Basin Plan from the MDBA) (Seidl & Wheeler, 2024).

Finally, our last ethical and moral issue that deserves comment is that the Basin Plan did not originally make any allocation for Indigenous water rights (O'Donnell et al., 2023). This changed after the massive fish deaths in the Northern Basin in 2018, with an allocation of \$40 million to buy water entitlements for First Nations, but as Table A2 showed, as of mid-2023 there was zero expenditure in this program. The late 2023 water amendment increased the budget to \$100 million (DCCEEW, 2024), but Australia is still a long way from a just water reallocation to First Nations, despite strong public willingness for such a reallocation (Jackson et al., 2019; Wheeler, Owens, et al., 2024).

3.3 | Stakeholder support and collaboration: Is there public and stakeholder support and acceptance, with collaborative processes driving policy implementation?

Scores of papers have been written on stakeholders' views towards/engagement with the Basin Plan, which is impossible to go into full details here (for an example, see Wyborn et al. [2023], which examined 34 MDB water reviews since 2004). As a reminder, stakeholders involve the Commonwealth government; four state governments and one territory; farmer and irrigators; water authorities; environmental groups; First Nations; and the public. The Basin Plan is about water reallocation—which means taking water from some consumptive users to reallocate towards others. Conflict has existed from the very conception of the plan, and especially with the release of the Guide to the Basin Plan in 2010. The images of irrigators' burning scores of the Guide in Griffith, NSW, carrying coffins and horse heads into meetings, tractor blockades, and so forth are seared into the memory of many (Wheeler, 2014). Indeed, Wheeler, Zuo, et al. (2024) illustrate that the media portrayal of the Basin Plan has been overwhelmingly negative, with negative stories outweighing positive ones by a ratio of three to one. Environmental groups were equally unhappy at the downgraded legislated targets established in the Basin Plan 2012 and unhappier still at the 2018 amendment which downgraded targets again. First Nations groups have only been allocated budget for water entitlements in the past 4 years, with any yet to be purchased (O'Donnell et al., 2023).

From a state government perspective, Victoria and NSW have continually argued for reduced water targets, changed water recovery mechanisms, and reduced governance. NSW has threatened to pull out of the Plan at least three times, and in 2023–2024, Victoria refused to support the latest water amendment (The Senate, 2023). Issues have been experienced with the implementation of water resource plans, especially in NSW with all their plans late, and then withdrawn, with six still being worked upon as of 21 May 2024 (DCCEEW, 2024). State support has been often contingent on funding received from the Commonwealth.

However, there are many irrigators who are willing to sell water to the Commonwealth (Loch et al., 2014). Indeed, in 2023, the open tender for just under 50 GL was oversubscribed (The Senate, 2023). In terms of the public, there has always been strong support voiced from the public for the goals of the Plan and environmental water recovery (e.g. Hatton MacDonald et al., 2011), and recent research suggests that there is also strong desire for increased environmental and cultural water recovery (Zuo & Wheeler, 2024) but muted support for further Federal takeover of water resources (Wheeler, Owens, et al., 2024).

3.4 | Net social benefits: Did the social benefits outweigh its costs?

The Plan's primary objective is to improve the long-term sustainability of the Basin. Assessing this is difficult, especially because the benefits must be compared to counterfactuals or situations of what would have happened without the Plan. The MDBA (2020) evaluation of the Plan emphasised the ecological benefits that have been found from environmental flows. Currently, there is considerable work being conducted on estimating the net benefits from the Plan for the next evaluation due in 2025, and DCCEE (2024) provides an overview.

Here, we turn to the other benefits and costs of the two main forms of water recovery: buyback versus irrigation efficiency projects. We assess the positive and negative (benefits and costs) of these two programs in Table A3 in Supporting Information Appendix A through 16 sub-components. The ratings of these components are based on a review of the literature and can only be summarised briefly here, and Wheeler (2024) provides a fuller discussion. As noted earlier, buyback has recovered far more water, at a far cheaper price, than irrigation projects, and the fact that it allows greater choice and adaptation through freedom of expenditure of money received for farmers is also a far greater benefit. The other net benefits where buyback easily outweigh irrigation projects include reduced irrigated land area with little rebound effect from farmers consequently increasing their irrigation area; less impacts on water use; reduced water use with no rebound effect on farmers consequently increasing their water use (Wheeler et al., 2020); less problems of return flows (Williams & Grafton, 2020); facilitated exit from irrigation farming; reduced farm debt; improved farm resilience (Wheeler et al., 2018; Wheeler, 2024); improved risk management (Nauges, et al., 2016); improved governance and transparency of programs (e.g. Victorian Ombudsman, 2011); and less environmental harm or other negative externalities such as return flows (Lyons et al., 2023; Williams & Grafton, 2020), as well as allowing for more cultural/environmental objectives to be met, especially with issues surrounding floodplain harvesting in irrigation projects (Slattery et al., 2019; Wheeler, 2024). The areas where the benefits of irrigation projects may outweigh buyback benefits include improving on-farm productivity (Hughes et al., 2020), having a more positive impact (or less of a social cost) on irrigation rural community economic impacts (Wittwer & Dixon, 2013), and providing higher water quality benefits (Wang et al., 2018).

Overall, Table A3 in Supporting Information Appendix A illustrates that there are larger positive outcomes for buyback than irrigation infrastructure programs. And, there are larger negative outcomes for infrastructure programs than buyback, indicating that overall, net benefits of buyback outweigh infrastructure programs.

The social economic costs to Basin communities of water recovery deserve greater comment, as the perceived costs of buybacks on rural communities has been the prime reason by stakeholders (especially lobby groups and some in rural communities) for arguments to move away from this policy instrument (e.g. see arguments in NSWIC [2023] or media commentary in Wheeler, Zuo,

et al. [2024]). The sub-components of on-farm productivity and wider socioeconomic community impacts in Table A3 are the two factors that farming and community groups care about the most. Indeed, there have been consulting studies that have suggested large significant negative impact from water recovery, yet there is little real high-quality evidence that buybacks are the prime reason for decline. Research reporting significant costly impacts from buybacks has been shown to be of low quality and hence less reliable (Wheeler, Xu, et al., 2024).

3.5 | Evaluation and adaptation: Are policy outcomes continuously reviewed and updated/adapted, with decisions transparent?

As outlined previously, the Plan has undergone continuous change: from the capping of buybacks in 2015; to the significant changes in water recovery volumes and projects of 2018; to the extension of timelines and other changes with water recovery deadlines extended from 30 June 2024 to 31 December 2026 (DCCEE, 2024). Wyborn et al. (2023) provide an overview of 34 MDB water reviews since 2004. The next Plan Evaluation (due in 2025—as the Plan is meant to be evaluated every 5 years) and subsequent Review (due in 2026) will be the first major assessment of whether the Plan has achieved its goals and is fit for the future: where issues with regard to climate change, sustainable water limits, First Nations, and regulatory design will be considered. Further amendments will be considered. All these reviews are somewhat open and transparent, although much criticism is present over how some decisions are made (previously discussed, but also see Alexandra [2019] and Wyborn et al. [2023]).

3.6 | External factors: Are external factors important in determining policy success?

External factors with state water governance issues have proven to be highly critical in Plan policy success and failure. Political factors and whether the Liberal/National versus Labour has been in power have been influential in policies regarding the capping of buybacks, the movement to supply projects, and the inability to negotiate constraints relaxation (DCCEE, 2024). In addition, the lack of regulation and enforcement of water activities by state governments and state politics has also played a part in influencing Plan success. The water governance issues across states and various bodies have made achieving goals difficult (Alexandra, 2019), and the scandal of media exposure in Four Corners in 2017 led to massive restructure of compliance in NSW and the creation of the IGWC (Chipperfield & Alexandra, 2023; Grafton & Williams 2020; Seidl & Wheeler, 2024). The scandals have led to increasing focus on current water governance arrangements, with many suggesting ways forward—such as splitting regulatory functions away from the MDBA and reforming governance arrangements. In particular, Alexandra (2019) advocates for clearer adherence to COAG reform principles and a greater separation of water governance powers.

On the environmental and climate side, events that have caused significant issues in influencing success include major events such as the fish kills (in Northern and Southern Basins, but particularly the fish kills in the 2018/19 summer) (AAS, 2019); drought (NSW 2017–2019); climate change; and other water quality and land management issues; all play a part in influencing environmental water outcomes in the Basin (Alexandra, 2019; 2022). Other external factors that influence the success of the Plan will include management of land and water, river operations, and a growing need to consider Indigenous water management.

Finally, to date, both Federal and state governments have not dealt well with structural adjustment issues in small irrigation communities (Productivity Commission, 2018; 2023; Wheeler, 2024). Although there have been funds allocated and a number of programs put in place (e.g. MDB Regional Economic Diversification Fund, MDB Economic development Program, Strengthening Basin Communities Program), such programs have been found to be poorly targeted and spent, as well as lacking in helping transition irrigation areas to dryland areas (e.g. Senate Select Committee on the Multi-Jurisdictional Management and Execution of the MDB Plan 2020) (Productivity Commission, 2018). Additional reporting on socio-economic impacts is also now required, and additional support packages for Basin communities have also just been announced in June 2024 (DCCEEW, 2024).

4 | COMPARATIVE LESSONS

This study has focussed on highlighting the success and failure of the two main water recovery programs (buyback vs. irrigation infrastructure) in the MDB, with many comparative lessons to be drawn. Understanding the success and failure of the Plan itself will be a substantial challenge for future researchers to establish. Has it lived up to its world exemplar label that many believed it was in the beginning? Was it too ambitious in its water recovery targets?

In some areas, the title of world leading could be argued to be well deserved (e.g. formal water markets, substantial water reallocation from consumptive use to the environment, NSW's current satellite and on-ground monitoring of water extractions, wide-scale capping of water rights, traceable rights, and water accounting), but Australia's management of water falls down in many other areas (e.g. cultural water, water accounting, substitution of groundwater for surface water, irrigation infrastructure subsidies, problematic supply offset projects) (Chipperfield & Alexandra, 2023; Seidl & Wheeler, 2024; Wheeler, 2024; Williams & Grafton, 2020). The MDB Royal Commission's claims of maladministration and unlawfulness are also serious criticisms of the Plan (Walker, 2019). Another problem associated with this world-leading label is that Australia has chosen a very expensive pathway of water reallocation, a pathway that many other countries will not be able afford to follow. It is too early to call whether the Plan has been a success. Although environmental water recovered has been used successfully (CEWH, 2022; MDBA, 2020), many ecosystems are still declining (Colloff & Pittock, 2022; Lyons et al., 2023), and the cost to taxpayers has been large.

The results of the comparison of the two water recovery policies of the Plan are perhaps paradoxical. This study has argued that overall, buyback programs have been a success: buyback achieved the majority of the water recovered in the Plan to date, at the least cost, with the least negative externalities, in comparison to infrastructure projects. Yet, the opposite view, which is the popular and most reported view in the press and by many politicians and farming lobby groups (e.g. NSWIC, 2023), is that the buyback program has led to large-scale rural community devastation, farm exit, job loss, higher water market (and food) prices, and worsening food security (see summary and counterarguments in Wheeler, Xu, et al., 2024; Wheeler, Zuo, et al., 2024). The capping of buybacks in 2015, the stop of voluntary tenders, and the 2018 amendment highlight the main water reversal policy changes made. It was only due to the fact that the Plan was going to fail its targets set for 2024 that the 2023 water legislation amendment put buyback as an option back on the table.

On the other hand, even though both on-farm and off-farm irrigation projects have been shown to be less effective, costly, and associated with negative externalities, because they involve many

dollars for farm productivity and engineering works in irrigation districts, these programs are more politically favourable. Vested interests, asymmetric power, and powerful stakeholders mean infrastructure options are considered more 'acceptable' and hence can be more successfully implemented by governments (Grafton & Williams, 2020). Even in the 2023 water amendment, the government is still allocating more budget to infrastructure projects and stating that they want to avoid buybacks wherever possible. The Productivity Commission (2023) stated that although progress has been made for the environment, significant issues remain, and that the federal and state governments must work on implementing a renewed water recovery task—and one that involves voluntary water purchases.

A comparative lesson here is that the government is trying to achieve a number of objectives (water recovery, farm productivity, and economic development) through the use of irrigation projects, but by doing so, they are not fully achieving the original goal of the Plan (namely a sustainable water reallocation between consumptive and environmental use). Lessons from economics include the need to use one policy instrument for one objective: namely use voluntary buyback to recover water entitlements, and use proper structural adjustment funding for transition issues in small irrigation communities (Wheeler, Xu, et al., 2024). There is considerable need to improve MDB rural development and structural adjustment programs, and there remain many good ideas that have not been implemented to date (e.g. Wentworth Group, 2010, pp. 22–25).

Addressing environmental and social issues such as reallocation of water in an era of climate change will be an ongoing policy challenge for Australia (and the world). Further rationalisation of irrigation areas will need to be considered, and there will continue to be contested findings and outcomes. Policy success will probably be measured by how much we can avoid the worst scenarios of mass extinction and widespread environmental degradation, as well as by how effectively we can ensure viable and thriving rural communities.

ACKNOWLEDGEMENTS

The author is grateful for comments received from Keith Dowding, participants in a policy workshop at ANU, Neville Crossman, and from two reviewers which much improved this manuscript. Research assistance was provided by Adam Wheeler and Wenzhu David Tang.

CONFLICT OF INTEREST STATEMENT

The author declares no conflicts of interest.

DATA AVAILABILITY STATEMENT

All data are presented in the Supporting Information.

ORCID

Sarah Ann Wheeler  <https://orcid.org/0000-0002-6073-3172>

REFERENCES

- Alexandra, J. (2018). Evolving governance and contested water reforms in Australia's Murray-Darling Basin. *Water*, 10, Article 113.
- Alexandra, J. (2019). Losing the authority—What institutional architecture for cooperative governance in the Murray Darling Basin? *Australasian Journal of Water Resources*, 23(2), 99–115.
- Alexandra, J. (2020). The science and politics of climate risk assessment in Australia's Murray-Darling Basin. *Environmental Science & Policy*, 112, 17–27.
- Alexandra, J. (2022). Climate risk assessment in the MDB—A review. *Australasian Journal of Water Resources*, 27, 18–30.

- Australian Academy of Science (AAS). (2019). *Investigation of the causes of mass fish kills in the Menindee Region NSW over the summer of 2018/2019*. Author.
- Ballard, C. (2020). Management of Murray–Darling Basin, Australia. *Irrigation and Drainage*, 69, 504–516.
- Bell, S. (2022). The limits of federal state capacity in managing Australia's Murray-Darling River Basin. *Water Alternatives*, 15, 129–149.
- Chipperfield, K., & Alexandra, J. (2023). Water governance, the rule of law and regulating risks to the Murray–Darling Basin. *Australasian Journal of Water Resources*, 27, 103–116.
- Colloff, M. J., & Pittock, J. (2019). Why we disagree about the Murray–Darling Basin Plan: Water reform, environmental knowledge and the science-policy decision context. *Australasian Journal of Water Resources*, 23(2), 88–98.
- Colloff, M. J., & Pittock, J. (2022). Mind the gap! reconciling environmental water requirements with scarcity in the Murray–Darling Basin, Australia. *Water*, 14, Article 208.
- Commonwealth Environmental Water Holder (CEWH). (2022). *Widespread environmental benefits across the Basin*. <https://www.dceew.gov.au/about/news/widespread-environmental-benefits-across-basin>
- Commonwealth of Australia. (2007). *Water Act 2007. Compilation No. 28, 5 August, 2021*. <https://www.legislation.gov.au/Series/C2007A00137>
- Commonwealth of Australia. (2012). *Basin Plan 2012. Compilation number 7, 24 January 2020*. <https://www.legislation.gov.au/Details/F2017C00078>
- Commonwealth of Australia. (2018). *Basin Plan Amendment Instrument 2018. Compilation number 1, 2nd July 2018*. <https://www.legislation.gov.au/F2018L00982/asmade/text>
- Commonwealth of Australia. (2023). *Water Amendment (Restoring our Rivers) Bill 2023. Parliament number 47, 7 December, 2023*. <https://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=Id%3A%22legislation%2Fbillhome%2Fr7076%22>
- Council of Australian Governments (COAG). (1994). *The Council of Australian Governments' Water Reform Framework*. Environment Australia.
- Department of Climate Change, Energy, the Environment and Water (DCCEEW). (2023). *Table of water reform funding in the Murray-Darling Basin*. <https://www.dceew.gov.au/water/policy/programs/water-reform/mdb-funding/table>
- Department of Climate Change, Energy, the Environment and Water (DCCEEW). (2024). *Addendum to the 2012 Basin Plan Regulation Impact Statement*. Author.
- Grafton, R., Chu, L., Kingsford, R., Bino, G., & Williams, J. (2022). Resilience to hydrological droughts in the northern Murray-Darling Basin, Australia. *Philosophical Transactions of the Royal Society A*, 380, Article 20210296.
- Grafton, R., & Wheeler, S. (2018). Economics of water recovery in the Murray-Darling Basin, Australia. *Annual Review of Resource Economics*, 10, 487–510.
- Grafton, R., & Williams, J. (2020). Rent-seeking behaviour and regulatory capture in the Murray-Darling Basin, Australia. *International Journal of Water Resources Development*, 36, 484–504.
- Hajkowicz, S., Young, M., Wheeler, S., Hatton MacDonald, D., & Young, D. (2000). Supporting decisions: Understanding natural resource management assessment techniques: *A report to the Land and Water Resources Research and Development Corporation*. CSIRO Land and Water.
- Hatton MacDonald, H., Morrison, M., Rose, J., & Boyle, K. (2011). Valuing a multistate river: The case of the River Murray, *The Australian Journal of Agricultural and Resource Economics*, 55, 374–392.
- Howlett, M. (2023). Beyond Policy Accidents. In A. Mica, M. Pawlak, A. Horolets, & P. Kubicki (Eds.), *Routledge international handbook of failure*. Routledge, 252–265.
- Hughes, N., Donoghoe, M., & Whittle, L. (2020). Farm level effects of on-farm irrigation infrastructure programs in the southern Murray-Darling Basin, *The Australian Economic Review*, 53, 494–516.
- Independent Commission Against Corruption New South Wales (ICAC NSW). (2020). *Investigation into complaints of corruption in the management of water in NSW and systemic non-compliance with the Water Management Act 2000*. Author.
- Jackson, S., Hatton-MacDonald, D., & Bark, R. (2019). Public attitudes to inequality in water distribution: Insights from preferences for water reallocation from irrigators to Aboriginal Australians. *Water Resources Research*, 55, 6033–6048.

- Kilonzo, S., & Ojebode, A. (2022). Research methods for public policy. In E. R. Aiyede & B. Muganda (Eds.), *Public policy and research in Africa* (pp. 63–85). Palgrave Macmillan.
- Kingsford, R., Bino, G., & Porter, J. (2017). Continental impacts of water development on waterbirds, contrasting two Australian river basins: Global implications for sustainable water use. *Global Change Biology*, *23*, 4958–4969.
- Ley, S. (2022). \$126m to deliver water savings under NSW Off-farm Efficiency Program, Media release, Jan 17, 2022.
- Loch, A., Wheeler, S., Boxall, P., Hatton-Macdonald, D., & Bjornlund, H. (2014). Irrigator preferences for water recovery budget expenditure in the Murray-Darling Basin, Australia. *Land Use Policy*, *36*, 396–404.
- Lyons, K., Pittock, J., Colloff, M., Yu, Y., Rocheta, E., & Steinfeld, C. (2023). Towards a scientific evaluation of environmental water offsetting in the Murray–Darling Basin, Australia. *Marine and Freshwater Research*, *74*, 264–280.
- Marshall, G., & Alexandra, J. (2016). Institutional path dependence and environmental water recovery in Australia's Murray-Darling Basin. *Water Alternatives*, *9*, 679–703.
- McConnell, A. (2010). Policy success, policy failure and grey areas in-between. *Journal of Public Policy*, *30*(3), 345–362.
- McConnell, A. (2017). Policy success and failure. In W. R. Thompson (Ed.), *Oxford research encyclopedia of politics* (pp. 1–26). Oxford University Press. <https://doi.org/10.1093/acrefore/9780190228637.013.137>
- Moore, H., Rutherford, I., Peel, M., & Horne, A. (2020). Sub-prime' water, low-security entitlements and policy challenges in over-allocated river basins: The case of the Murray-Darling Basin. *Environmental Management*, *66*, 202–217.
- Murdoch, C. (2020). *Murray-Darling Basin: Budget Review 2020–21 Index*. https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/BudgetReview202021/MurrayDarlingBasin#:~:text=In%20total%2C%20the%20Australian%20Government,to%20implement%20the%20Basin%20Plan
- Murray–Darling Basin Authority (MDBA). (2020). *The 2020 Basin Plan Evaluation*. Author.
- Murray–Darling Basin Authority (MDBA). (2023a). *Progress of water recovery—as at 30 September 2023*. <https://www.mdba.gov.au/publications-and-data/publications/progress-water-recovery-30-september-2023>
- Murray–Darling Basin Authority (MDBA). (2023b). *2023 Authority advice on Basin Plan implementation*. <https://www.mdba.gov.au/about-us/who-we-are/authority/authority-statements/2023-authority-advice-basin-plan-implementation>
- Nauges, C., Wheeler, S. A., & Zuo, A. (2016). Elicitation of irrigators' risk preferences from observed behaviour. *Australian Journal of Agricultural and Resource Economics*, *60*(3), 442–458. <https://doi.org/10.1111/1467-8489.12134>
- NSW Irrigators' Council (NSWIC). (2023). *Beyond Buybacks: Why we need more than 'Just Add Water'*. https://mcusercontent.com/c6e5c2d75b14461767c095feb/files/a5b591bb-6d1a-9475-a5e5-119d75679d5d/2023_01_31_Beyond_buybacks_Campaign.pdf
- O'Donnell, E., Kennedy, M., Garrick, D., Horne, A., & Woods, R. (2023). Cultural water and Indigenous water science. *Science*, *381*, 619–621. <https://doi.org/10.1126/science.adi0658>
- Productivity Commission. (2018). *Murray-Darling Basin Plan: Five-year assessment* (Issue 90). Author.
- Productivity Commission. (2023). *Murray-Darling Basin Plan: Implementation Review 2023: Inquiry report* (Issue 103). Author.
- Quiggin, J. (2019). *Economics in two lessons: Why markets work so well, and why they can fail so badly*. Princeton University.
- Seidl, C., & Wheeler, S. (2024). *Breaking water laws in the Murray-Darling Basin: Understanding water compliance issues and stakeholder perceptions*. University of Adelaide.
- Seidl, C., Wheeler, S., & Zuo, A. (2020). High turbidity: Water valuation and accounting in the Murray-Darling Basin. *Agricultural Water Management*, *230*, Article 105929.
- Slattery, M., Johnson, W., & Campbell, R. (2019) *Owing down the river: mortgaging the future flows of the Barwon-Darling/Barka River*. The Australia Institute, Canberra.
- State of the Environment (SoE). (2021). *The 2021 State of the Environment report*. Department of Climate Change, Energy, the Environment and Water.
- The Senate: Environment and Communications Legislation Committee. (2023). *Water Amendment (Restoring Our Rivers) Bill 2023 [Provisions]*. Commonwealth of Australia.

- Van Dijk, A., Beck, H., Crosbie, R., De Jeu, R., Liu, Y., Podger, G., Timbal, B., & Viney, N. R. (2013). The Millennium Drought in southeast Australia (2001–2009): Natural and human causes and implications for water resources, ecosystems, economy, and society. *Water Resources Research*, 49, 1040–1057.
- Victorian Ombudsman. (2011). *Investigation into the Foodbowl Modernisation Project and related matters*. <https://www.parliament.vic.gov.au/papers/govpub/VPARL2010-14No89.pdf>
- Walker, B. (2019). *Murray-Darling Basin Royal Commission report*. <https://www.environment.sa.gov.au/topics/river-murray-new/basin-plan/murray-darling-basin-commission>
- Wang, Q., Walker, G., & Horne, A. (2018). *Potential impacts of groundwater sustainable diversion limits and irrigation efficiency projects on river flow volume under the Murray-Darling Basin Plan*. MDBA.
- Wentworth Group. (2010). *Sustainable diversions in the Murray-Darling Basin: An analysis of the options for achieving a sustainable diversion limit in the Murray-Darling Basin*. Author.
- Wentworth Group. (2017). *Review of water reform in the Murray-Darling Basin*. Wentworth Group of Concerned Scientists.
- Wentworth Group. (2023). *(Submission to the Inquiry into the Water Amendment Restoring our Rivers) Bill 2023*. Wentworth Group of Concerned Scientists.
- Wheeler, S. (2014). Insights, lessons and benefits from improved regional water security and integration in Australia. *Water Resources and Economics*, 8, 57–78.
- Wheeler, S. (2024). Achieving a healthy, resilient and sustainable Murray-Darling Basin. In J. Radcliffe & T. Flapper (Eds.), *A thriving Murray-Darling Basin in 50 years: Actions in the face of climate change* (pp. 229–246). Australian Academy of Technological Sciences and Engineering.
- Wheeler, S., Carmody, E., Grafton, R., Kingsford, R., & Zuo, A. (2020). The rebound effect on water extraction from subsidising irrigation infrastructure in Australia. *Resources, Conservation and Recycling*, 159, Article 104755.
- Wheeler, S., Owens, K., & Zuo, A. (2024). Is there public desire for a federal takeover of water resource management in Australia? *Water Research*, 248, Article 120861.
- Wheeler, S., Xu, Y., & Zuo, A. (2024). Developing an economic quality assessment framework and applying it to water economic studies in the Murray-Darling Basin. *Environmental Science and Policy*, 152, Article 103654.
- Wheeler, S., Zuo, A., & Loch, A. (2018). Water torture: Unravelling the psychological distress of irrigators in Australia. *Journal of Rural Studies*, 62, 183–194.
- Wheeler, S., Zuo, A., & Pickersgill, J. (2024). The propensity for negative media reporting of the Murray-Darling Basin Plan in Australia. *Journal of Rural Studies*, 109, Article 103320.
- Williams, J., & Grafton, R. (2020). Missing in action: Possible effects of water recovery on stream and river flows in the Murray–Darling Basin, Australia. *Australasian Journal of Water Resources*, 23, 78–87.
- Wittwer, G., & Dixon, J. (2013). Effective use of public funding in the Murray-Darling Basin: A comparison of buybacks and infrastructure upgrades. *Australian Journal of Agricultural Resource Economics*, 57, 399–421.
- World Economic Forum (WEF). (2019). *The Global Risks Report 2019*. Author.
- Wyborn, C., van Kerkhoff, L., Colloff, M., Alexandra, J., & Olsson, R. (2023). The politics of adaptive governance: Water reform, climate change, and First Nations' justice in Australia's Murray-Darling Basin. *Ecology and Society*, 28, Article 4. <https://doi.org/10.5751/ES-13641-280104>
- Zuo, A., & Wheeler, S. A. (2024). The Australian public's preferences for further environmental and cultural water recovery options in the Murray-Darling Basin. *Journal of Hydrology*, 633, Article 130983. <https://doi.org/10.1016/j.jhydrol.2024.130983>

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Wheeler, S. A. (2024). Comparing the success and failure of the Murray–Darling Basin Plan's water recovery programs. *Australian Journal of Public Administration*, 1–17. <https://doi.org/10.1111/1467-8500.12672>