Economic issues relevant to the Basin Plan Review

Technical paper for MRGC | 24 April 2026

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1 Introduction and summary

1.1 Background

Frontier Economics has been asked by Murray River Group of Councils (MRGC) to consider selected economic issues relevant to the Basin Plan Review.

This paper is not a comprehensive update of our previous reports on social and economic impacts of the Basin Plan in Victoria, from 2022[1] and 2017[2]. Rather, this paper provides updated information and discusses issues identified by MRGC for potential incorporation into the MGRC's response to the MDBA's Issues Paper, addressing:

- Socio-economic impacts (section 2)
  - Water recovery to date, and into the future
  - Water use, and the change attributable to the Basin Plan
  - Irrigated agricultural production, as a component of total agricultural production
  - Regional impacts, including cumulative impacts and tipping points
  - Agricultural employment
  - Support provided to facilitate change.
- MDBA modelling of scenarios for the Basin Plan Review (section 3)
  - Scenarios used by the MDBA, and possible supplementary scenarios
  - Assumptions of the MDBA analysis.
- Environmental water use (section 4)
  - SDL assessment findings
  - The 'toolkit' of environmental water managers.

In our view, it is concerning that the Basin Plan Review discussion paper describes the Basin Plan's effect on the Basin-wide economy as "relatively minor," while noting that some irrigation-dependent towns have been disproportionately affected. Councils are concerned that:

- Basin-wide or catchment-scale assessments mask severe localised impacts.
- Communities that have already "paid the price" through buybacks and adjustment may face further cumulative impacts without commensurate support.

The Basin Plan Review discussion paper focuses on environmental and system outcomes but gives limited attention to socio-economic issues, workforce transition, reskilling, or alternative economic pathways for irrigation-dependent communities. It also highlights prioritisation and trade-offs under climate change but does not explain how it will weigh social and economic outcomes alongside environmental priorities. Overall, it does not provide sufficient clarity on the future role of irrigation, associated employment, or implications for irrigation-dependent communities in Northern Victoria.

1 https://www.water.vic.gov.au/__data/assets/pdf_file/0033/669426/social-and-economic-impacts-of-basin-plan-water-recovery-in-victoria.pdf

2 https://www.water.vic.gov.au/__data/assets/pdf_file/0032/669452/social-and-economic-impacts-of-the-basin-in-victoria-2017.pdf

1.2 Key findings

The findings of our paper are:

- **Basin Plan water recovery has significantly reduced overall water use in the GMID and contributed to its variability, which have created challenges for investment in the region.** Annual water deliveries to the region are highly variable (due to seasonal variability, a reduced consumptive pool, and increased horticultural water use down river). This variability is a challenge to investment — for irrigators, regarding on-farm investment and decisions to hold or terminate delivery share; for the network operator (GMW), regarding water delivery infrastructure in the districts; and in associated industries (such as dairy processing), regarding investment which relies on access to the product of irrigated agriculture.
- **Basin Plan water recovery has significantly increased the price of water allocations, under given seasonal conditions**. This may represent an increased cost to much of the horticultural developments in the LMW area. Water demands for permanent horticulture in the lower Murray already require most of the available water to the consumptive pool (current, given current Basin Plan water recovery) in a dry period. This would shift into deficit if further water recovery occurred.
- **Basin-wide or catchment-scale reporting can materially understate the impacts experienced in irrigation-dependent areas.** Aggregation smooths over distributional effects by combining regions with fundamentally different production systems, land uses and exposure to water recovery. As a result, modest average impacts can co-exist with substantial localised reductions in turnover and employment in particular irrigation districts and towns.
  - **Comparisons at the level of "total agriculture" can be misleading because irrigated and dryland agriculture are not economically equivalent systems**. Irrigation is a higher-value, more input-intensive production system, with much higher output per hectare and a distinct risk profile, underpinned by storages, delivery infrastructure and water markets. Aggregating irrigated and dryland outcomes can therefore mask the economic significance of irrigated production and misstate the consequences of reduced irrigation water availability.
  - **Strong dryland seasons do not necessarily offset stress in irrigation communities**. Irrigation is concentrated in defined riverine districts and service towns, while economic returns to dryland activities accrue across broader inland farming areas.
  - **Basin-scale averages mask variation across LGAs, including the extent to which irrigated agriculture contributes to local turnover and supports regional economies**. Turnover impacts reported for LGAs show that aggregating impacts at a Basin-wide level masks materially larger effects at the LGA scale.
  - **Employment impacts are not evenly distributed across the Basin**. In many irrigation-dependent LGAs, agriculture is a major direct employer and supports substantial indirect employment through processing and service industries. Where the employment base is concentrated, incremental reductions in irrigation production can translate into disproportionate job impacts and reduced demand for local services.
  - **Basin averages significantly understate reductions in turnover and employment in irrigation-dependent communities.** In these communities concentrated exposure means relatively small aggregate changes translate into substantial local economic and labour market impacts

  - **For irrigation-dependent LGAs, the impact can be several multiples of the southern Basin average**. LGA-level analysis is therefore essential to capture where impacts occur, and their scale.
- **Cumulative impacts are acute in communities that are exposed to high irrigation dependence with limited economic diversification, and where adjustment pressures have already accumulated over time.** Basin-average turnover impacts do not reflect the full exposure of these communities, including flow-on effects through processing, transport and farm services. aggregate measures do not capture the compounding effect of repeated shocks on business confidence, workforce retention and investment.
  - **Many irrigation communities have already absorbed substantial adjustment through prior buybacks, structural change, and ongoing water availability and price variability**. Vulnerability indicators suggest MRGC LGAs combine high sensitivity and high vulnerability with limited adaptive capacity — further water recovery could be a tipping point for significant regional challenges.
  - **The timing and magnitude of historical transitional assistance programs is significantly disjointed as compared to the timing and magnitude of water recovery — especially buyback**. It is difficult to view them as helping to manage transitions experienced in irrigation communities.
  - **Looking forward, timely and sufficient transition support is required if further water recovery by buybacks is to occur**. Any smoothing of buybacks and adjustment over time would also be expected to aid consolidation and to give confidence to communities and industries to adjust.
- **The MDBA's limited modelling significantly constrains its ability to provide important policy insights.** The MDBA modelling for the Basin Plan Review considers only two scenarios (current and 'full implementation' of the Basin Plan).
  - The implementation gap between these two scenarios is 527GL of water recovery, of which 251GL is expected to be required from Victorian systems.
  - The SDL assessments show that both scenarios are expected to achieve the same level of environmental outcomes in Murray and northern Victorian systems, and that the volumes are likely to represent the Environmentally Sustainable Level of Take. However, risks to environmental outcomes remain — largely relating to flow patterns, seasonality, and constraints on floodplain connectivity (particularly limits on delivering in-bank and overbank flows).
  - Additional modelling scenarios could significantly inform policy, such as estimating how the relaxation of river constraints could improve environmental outcomes, and whether constraints relaxation can address remaining risks in ways that additional water recovery cannot.
- **There is scope to enhance the environmental water management toolkit to enable improved environmental outcomes from better management of the large environmental water portfolio accumulated through water recovery to date**. These tools include trading, delivery, constraints, infrastructure, as well as clear and attainable objectives.

2 Socio-economic impacts

2.1 Water recovery to date and into the future

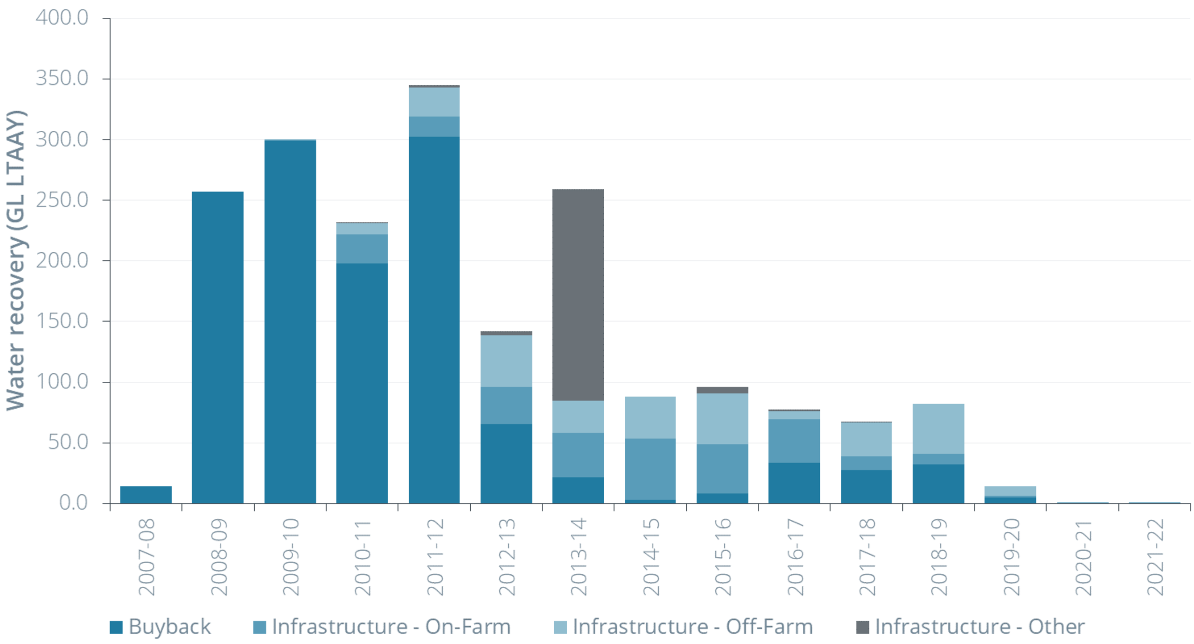
2.1.1 Water recovery to 2022

Our 2022 report found that, as at 30 June 2022, 2,107.4 GL (long-term equivalent) of surface water had been recovered across the MDB towards the 2,075 GL 'Bridging the Gap' target.

Water recovery relied mainly on entitlement buybacks from 2007–08 to 2011–12, and on other methods in later years (Figure 1).

By 30 June 2022, Victorian and South Australian systems had delivered the required recovery towards 'Bridging the Gap' SDLs, while some NSW and Queensland systems still required further recovery. The target assumed successful delivery of the SDL Adjustment Mechanism (SDLAM) project suite.

Figure 1: Commonwealth MDB water recovery methods, 2007-08 to 2021-22



Source: DCCEEW internal database, cited in FE & TCA 2022.

2.1.2 Water recovery 2022 to 2026

Since our report, several developments have changed the context:

- NSW and Queensland systems have made further progress towards 'Bridging the Gap', including through buyback tenders, with small shortfalls remaining in some systems. As at 31 December 2025[3], the Northern Basin recovery totalled 306.7 GL against the 320 GL target, and the target was effectively achieved in the NSW southern Basin zone.

[3] https://www.mdba.gov.au/sites/default/files/publications/Progress-on-water-recovery-as-at-31-December-2025.pdf

- The Basin Plan's additional 450 GL concept (previously subject to positive or neutral socio-economic impacts) was recast as a hard target in the *Water Amendment (Restoring Our Rivers) Act 2023* (with an aim to minimising socio-economic impacts). As at 31 December 2025[4], water recovery progress towards the 450 GL target was 37.3 GL in the northern Basin and 122.7 GL in the southern Basin; including 0.2 GL in the Wimmera–Mallee, total progress was 160.2 GL.
- MDBA's 2025 SDLAM Assurance Report[5] found many major SDLAM projects will not be delivered in time, or at all, and estimated achievable supply contributions at 250–350 GL/year. That implies a shortfall of about 255–355 GL/year against the original 605 GL/year SDLAM determination. As SDLAM reconciliation continues through 2026, the size of this shortfall—and the additional recovery required—will become clearer. [6]

2.1.3 Water recovery into the future

Further water recovery is required to meet legislative requirements under the original 2012 Basin Plan (2,750 GL) and the 2023 450 GL target.

The Basin Plan Review discussion paper[7] presents initial SDL assessments under a fully implemented Basin Plan, assuming 300 GL recovery to address an SDLAM shortfall and 450 GL of additional recovery (100 GL from the northern Basin and 350 GL from the southern Basin).

This implies 100 GL of recovery in the northern Basin and 650 GL in the southern Basin.

Given the 122.7 GL of progress in the southern Basin by 31 December 2025, this implies a further 527 GL is required.

If the remaining recovery is distributed across southern Basin systems as shown in Table 1, Victoria would be required to provide about 250 GL of Basin-wide recovery.

Table 1: Future water recovery (GL), under 'full implementation' of Basin Plan

	BtG target	Contribution to 450GL target	Contribution to 300GL SDLAM redress	450GL progress (Dec 2025)	Extra recovery required
NSW	761.2 (45%)	158.2	135.6	56.0*	237.8
ACT	4.9 (0.3%)	1.0	0.9	1.5	0.4
VIC	786.1 (47%)	163.4	140.0	52.6*	250.8
SA	131.8 (8%)	27.4	23.5	12.7	38.2
sMDB Total	1684.0 (100%)	350.0	300.0	122.8	527.2

4 https://www.mdba.gov.au/sites/default/files/publications/Progress-on-water-recovery-as-at-31-December-2025.pdf

5 https://www.mdba.gov.au/sites/default/files/publications/SDLAM-Assurance-Report-Dec2025.pdf

6 https://www.mdba.gov.au/sites/default/files/publications/sustainable-diversion-limit-adjustment-mechanism-reconciliation-framework-dec-2024.pdf

7 https://www.mdba.gov.au/sites/default/files/publications/2026-murray-darling-basin-plan-review-discussion-paper.pdf

*Note: *Volumes in addition to those in the table are reported as being contracted or agreed to be purchased under the Voluntary Water Purchase Program, as at 25 Feb 2026 (https://www.dcceew.gov.au/water/policy/water-recovery/government-water-purchasing/voluntary-restoring-our-rivers).*
Source: Frontier Economics calculations based on MDBA data as at 31 December 2025.

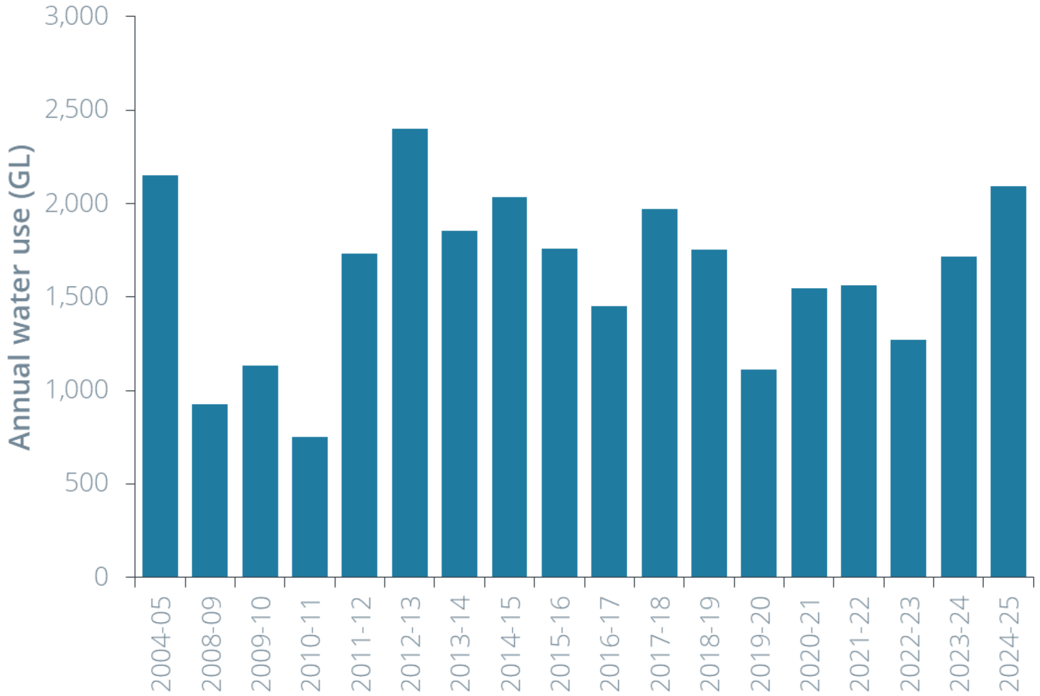
The source of these recovery volumes within Victorian systems is unclear. Constraints on moving water from above the Barmah Narrows to below, and from the Goulburn system to the Victorian Murray (via intervalley trade rules that are often binding) — both of which were less of a concern at the time of previous water recovery — may direct how recovery through buybacks is sourced. These constraints make 'shared reduction amounts' across connected catchments less appropriate and could concentrate further recovery in Zone 7 (Barmah to the SA border) to pursue lower Murray objectives — this could particularly affect water use in the Torrumbarry irrigation district, if water use by LMW diverters remains strong in line with the trend over the past decade (see next section).

It should also be noted that *in addition* to Basin Plan water recovery, there will be additional water entitlement purchases to be made for the Aboriginal Water Entitlements Program (AWEP), however this water remains available to the consumptive pool.

2.2 Water use and the change attributable to the Basin Plan

Irrigation water availability and use in northern Victoria have been highly variable over the past 20 years. Water recovery for the environment began during periods of extreme drought and major floods. Recent irrigation deliveries in Victoria have been buoyed by the increased water availability from the exceptional rainfall in 2022 and carryover into subsequent years (Figure 2), despite net exports of more than 100 GL in each of 2023–24 and 2024–25.[8]

Figure 2: Victorian irrigator annual water use

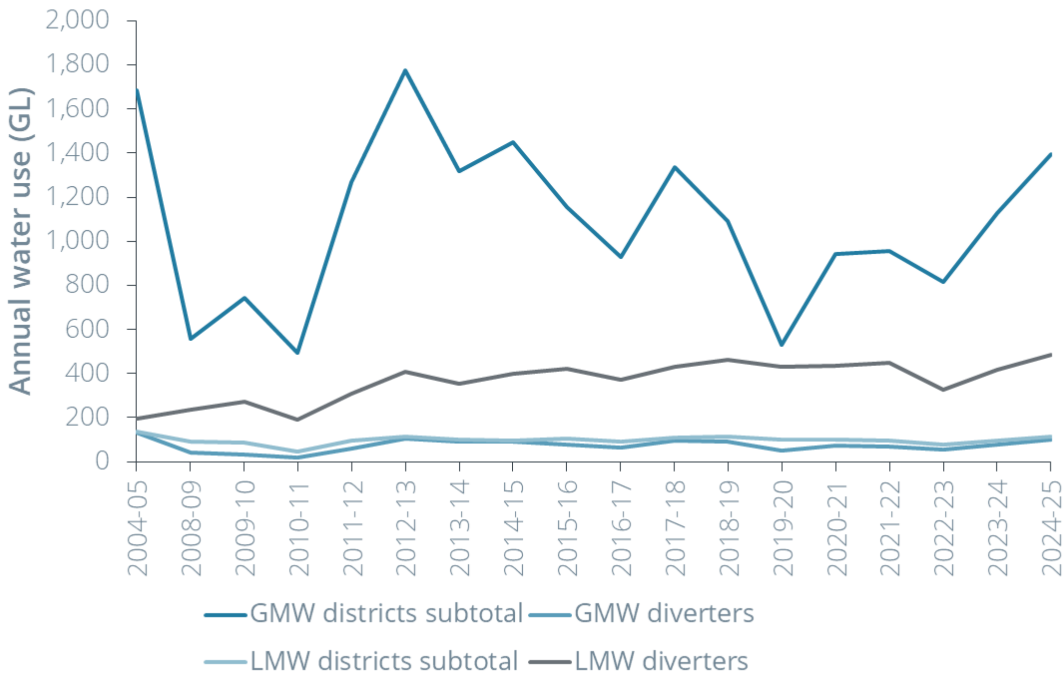


Source: DEECA 2025 and data request.

8 https://waterregister.vic.gov.au/images/documents/Victorian-Water-Trading-Annual-Report-2024-25.pdf

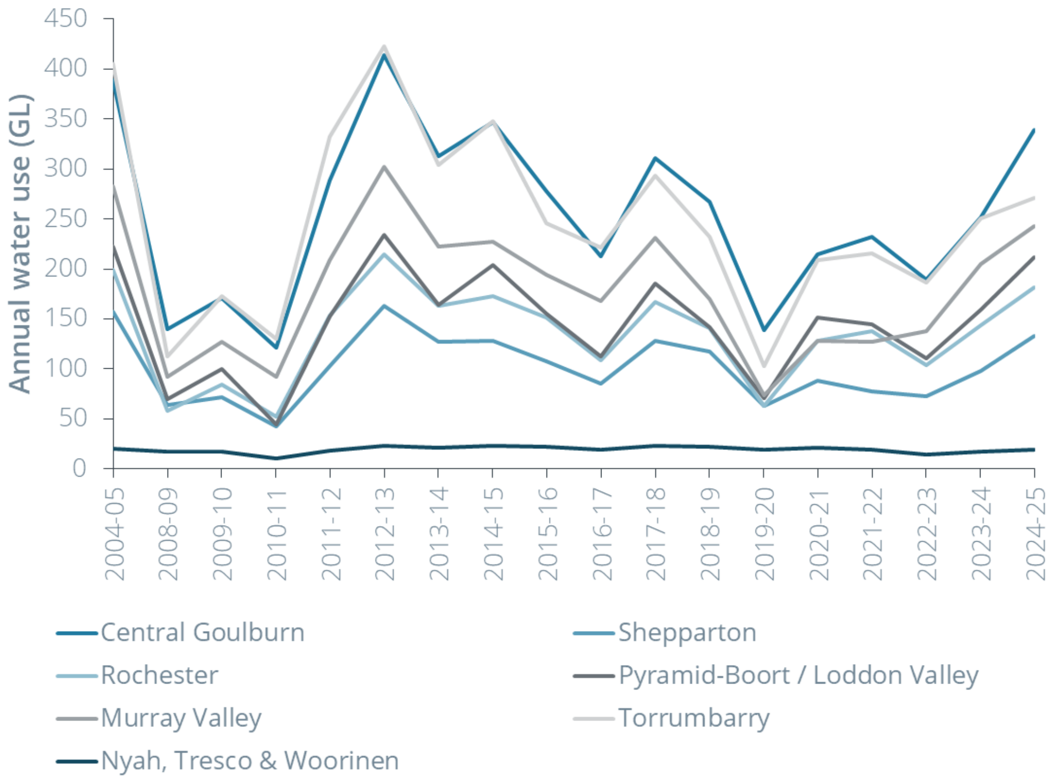
Within this pattern of total irrigation water use, there has been a trend of increasing horticultural water use by LMW private diverters since the mid-to-late 2000s, while deliveries to GMW districts remain highly variable and still account for the largest share of use (Figure 3). Water use across GMW districts shows a similar pattern (Figure 4), except for the pumped districts (Nyah, Tresco and Woorinen), which have significant horticultural land use.

Figure 3: Victorian irrigator water use, by GMW and LMW districts and diverters



Source: DEECA 2025 and data request.

Figure 4: Victorian irrigator water use, by GMW districts



Source: DEECA 2025 and data request.

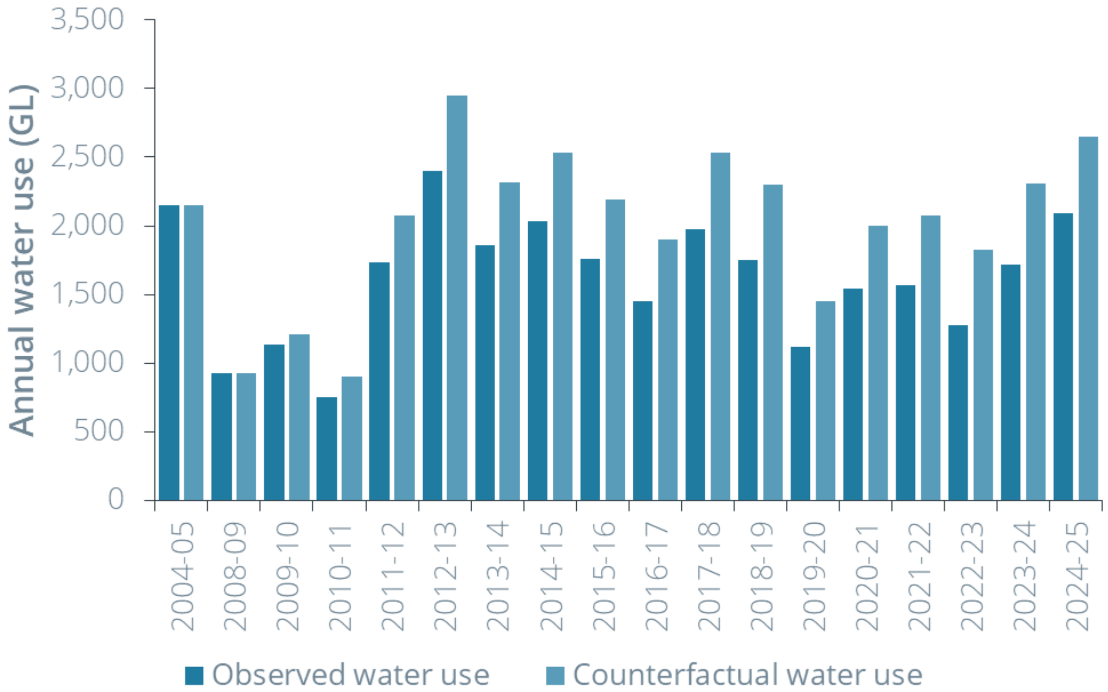
Our 2022 report estimated counterfactual water use (i.e., water use without the Basin Plan) based on:

- Southern MDB entitlement buybacks, including the characteristics of purchased entitlements. The analysis excluded buybacks observed in 2025, as they would have had limited effect on 2024–25 availability and use.
- Allocations that Victorian entitlements purchased for the environment would otherwise have received.
- A trade adjustment based on observed net trade in each year, scaled in proportion to the counterfactual change in allocated volumes.

This provides a broad estimate of water that would have been available for use (or carryover) in the absence of the water recovery through entitlement buybacks.[9] Results at the Victorian level are shown in Figure 5.

9 Water recovery that shares the water savings with project participants is not represented in the counterfactual. These volumes are significantly less than the magnitude of buyback changes to the consumptive pool.

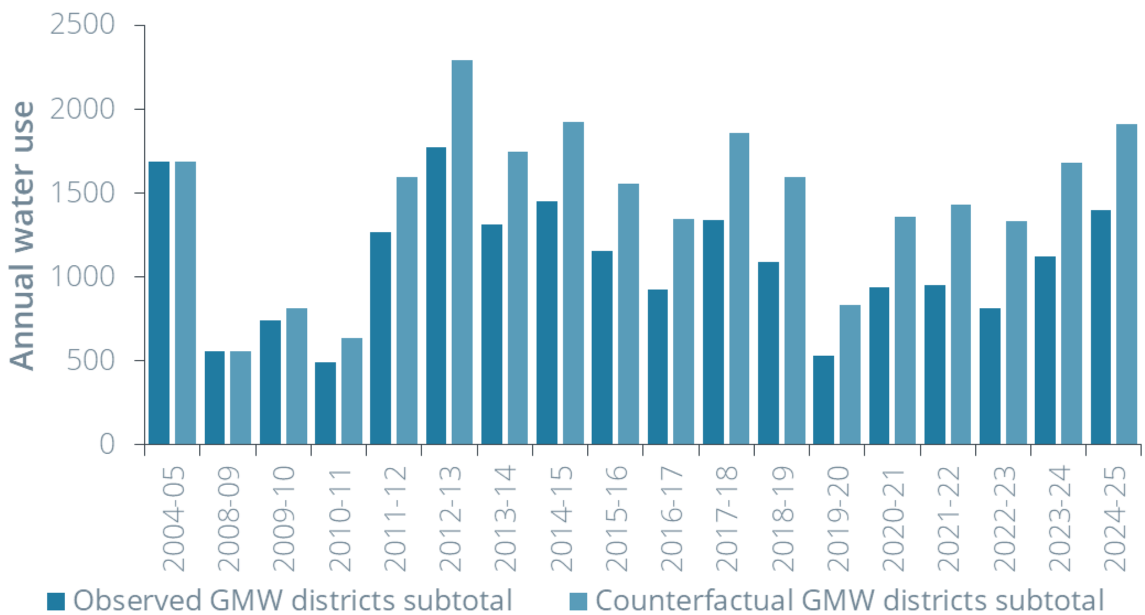
Figure 5: Observed and counterfactual water use (Victoria)



Source: Frontier Economics.

Consistent with our previous approach, we assume the difference between observed and counterfactual Victorian water use is borne by GMW district customers (Figure 6), because horticultural water use is assumed unchanged from a no-Basin-Plan counterfactual. On that basis, higher counterfactual use would have occurred entirely through additional use by GMW district customers.

Figure 6: Observed and counterfactual water use (GMW districts)



Source: Frontier Economics.

With the updated data, our 2022 findings still hold:

- Entitlement buybacks have reduced water available for irrigation in Victoria. While carryover, trading behaviour, and farm investment would have differed in the absence of water recovery, the logical counterfactual is materially higher irrigation water use than actually occurred.
- Regardless of where entitlements were purchased, reduced irrigation water use in Victoria has been concentrated in the GMID. Horticulture continued to expand in the NSW, South Australian and Victorian Mallee regions despite the water recovery undertaken in these areas.

Basin Plan water recovery has significantly reduced water use in GMID districts.

GMID water use is highly variable between years. This variability is a challenge to investment — on-farm and regarding holding delivery share, in the districts regarding water delivery infrastructure, and in associated industries (such as dairy processing) relying on variable primary production.

Across the last three years of data (2022–23 to 2024–25), GMID annual water use would have been in the order of 50% higher (than observed levels) in the absence of the observed Basin Plan buybacks.

(For clarity, this is equivalent to the statement that ‘it is estimated that buyback for the Basin Plan resulted in reduced water use in the GMID by 33%’).

Lower water use reduces irrigated agricultural production — the impact may be broadly proportional to the change in water use, or smaller if the additional counterfactual water would have been used less efficiently than average. Lower primary production also reduces inputs for food processing and manufacturing. For dairy, our 2022 report found that a smaller milk pool contributed to factory closures (e.g., Rochester and Leitchville) and under-utilised processing capacity, increasing costs and reducing productivity. Saputo reported shutting down one of two dryers at one site, with profitability adversely affected by reduced milk intake.[10] A smaller milk pool also increases competition for supply, contributing to higher farmgate prices in northern Victoria than in other Victorian milk regions.[11] The impacts on communities with significant dairy production and processing are discussion in Box 1.

Box 1: Dairy industry and communities

Pressures on the dairy industry and associated communities have continued since our 2022 report. Saputo[12] noted “a context of declining milk production in Australia”, and that “the availability of raw milk has been declining in recent years due to a national milk production decline. In this region [Australia], we compete with other dairy processors to attract milk to our facilities” and “estimates of future discounted cash flows were reduced due to the increasing disconnect in the relation between international cheese and dairy ingredient prices and farm gate milk prices in a context of declining milk production in Australia”.

[10] Saputo 2021 Annual report.

[11] Dairy Australia, pers. comm.

[12] Saputo 2025 Annual report

Processors have looked to other regions to source milk. The Murray Darling Basin Dairy Industry 2025 Strategic Plan[13] noted:

- Australia's 'Big 4' dairy processors are Saputo, Fonterra, Lactalis and Bega Cheese, who collectively account for around half of industry revenue and receive the bulk of Australia's raw milk all have operations in the Murray Darling Basin primarily in northern Victoria.
- In addition to processing milk produced locally, milk processors in the Murray Darling Basin also source milk freighted from other production regions notably Gippsland and the southwest of Victoria. Northern Victoria is well located to service national consumer and export markets. However the transport of raw milk represents a significant cost to processors that is continuously assessed against facilities operating below efficient utilisation levels, driving up per-unit costs and putting pressure on margins. The industry's investment in processing infrastructure in the MDB over the past decade coincided with local MDB milk production declining by approximately 35% since 2012.

In line with this, it has been observed[14] that milk movements in 2023 were influenced by the mismatch between production and manufacturing capacity — with milk being hauled to Northern Victoria from both Gippsland and Western Victoria).

Further, the MDB Dairy Industry 2025 Strategy Plan (p.11) noted that:

> *The LGAs of Campaspe, Moira and Greater Shepparton in northern Victoria has one of the highest concentrations of dairy processing anywhere in Australia. The region's manufacturing sector generates $5.5 billion annually, employs more than 6,200 people and injects more than $500 million in salaries and wages into the local economies. Food and grocery manufacturing represents more than 60% of this activity and this is dominated (more than 52%) by the dairy industry.*

1 Lactalis Australia (Bendigo)
2 Fonterra Australia (Stanhope)
3 Kyvalley Dairy (Kyabram)
4 Tatura Milk (Tatura)
5 ACM (Girgarre)
6 Noumi (Shepparton)
7 Bega Cheese (Strathmerton)
8 Saputo (Cobram)
9 Milawa Cheese Co. (Milawa)
10 Riverina Fresh (Albury)
11 Saputo (Kiewa)
12 Gundowring Ice Cream (Gundowring)
13 Goulburn Valley Creamery (Kyabram)

There are economies of scale and networks in dairy processing. The smaller milk pool has resulted in factory closures (such as Rochester and Leitchville) as well as under-utilised milk processing capacity (as there is significant processing capacity to be filled) which has significantly impacted productivity and costs.

The concentration of jobs, and risk of milk supply (or costs of milk supply transportation) pose risks of further tipping points for milk processing and the related communities. In

13 https://gardinerfoundation.com.au/wp-content/uploads/2025/07/MDB-Stategy-2025_web.pdf

14 https://adpf.org.au/wp-content/uploads/2024/05/Australia-milk-pool-study-Final-scenario-report-16-Apr2024.pdf

particular, if local milk production drops further and/or surplus 'milk' is unavailable or too costly to transport (such as fuel price risks), then a throughput volume decline places risk on dairy processor economic viability. Given the importance of dairy processors to employment (directly and through associated businesses) in the towns where they are located, processor closure represents a risk to the community more broadly.

Basin Plan water recovery has significantly increased the price of water allocations, under given seasonal conditions. This may represent an increased cost to much of the horticultural developments in the LMW area.

The Basin Plan Evaluation[15] noted water recovery does push prices slightly higher because it reduces the total volume of water available in the market each year. However, estimates of the size of this impact vary between different studies, with estimates ranging from 14% to 44% for allocation prices. Controlling for other factors, Whittle et al. estimated that across the period 2005–2020, all types of water recovery over the period 2005–06 to 2018–19 had increased the volume-weighted average allocation price in the southern Basin by $47 per megalitre on average.

While these higher prices may be a benefit to sellers of water allocations, they represent an additional cost to water allocation purchasers. Horticultural developments in the LMW area, in particular, are exposed to significant allocation purchases. Our work for the NWC in 2011[16] identified:

> *Some almond producers have sold entitlements, including to the Commonwealth, to reduce their debt levels. The further development of complementary water risk management tools, such as the Victorian carryover and system reserve policies, has enabled these producers to become more reliant on the allocation market. There are examples of almond growers who are now totally reliant on buying allocations to meet their entire needs each year.*

Council has informed us that horticulturalists continue to be pressured to sell water entitlements as a means to manage debt and continue to rely heavily on water allocation trading — through spot purchases as well as long-term contracted purchases of water allocations.

Recent work for DEECA[17] has identified that water demand for permanent horticulture continues to increase, as existing plantings continue maturing and new developments progress. As also identified in 2022, this 2025 report found that the risk remains that permanent horticultural demand in the lower Murray will exceed supply under extreme dry conditions. The report found "Commonwealth water recovery could further heighten pressure on horticultural headroom in both the connected and lower Murray regions" (p.19).

Water demands for permanent horticulture in the lower Murray already require most of the available water to the consumptive pool (current, given current Basin Plan water recovery) in a dry period. This would shift into deficit if further water recovery occurred.

The systems from which any future water recovery volumes are source of will also change potential impacts. The above analysis for DEECA assumed recovery between systems in line with the current environmental water holdings (and did not assume recovery of any SDLAM shortfall).

15 MDBA 2025, Basin Plan Evaluation.

16 National Water Commission 2011, Water trading in the almond industry.

17 WSP 2025, Water availability and demand in the southern Murray-Darling Basin (2025 Update): An assessment of future water availability and permanent horticulture irrigation water demand, Melbourne.

However, given the limits on intervalley movement of water (such as from the Goulburn and Murrumbidgee to the Murray, and from the Murray above Barmah to below Barmah), there may be a case for more future water recovery to occur from the lower Murray system (of NSW and VIC, and SA) in order to contribute to Murray environmental outcomes. In this case (including SDLAM shortfalls), the impact of water availability for permanent horticulture in the lower Murray would be more severe. This would have impacts in the region where horticulture is developing, as well as where the water recovery may have been sourced from.

2.3 Roles of dryland and irrigated agricultural sectors

It is widely recognised that irrigated agriculture typically generates higher returns per hectare than dryland production. In Australia, irrigation accounts for only around 5% of tilled agricultural land and around 0.58% of the national landmass, while dryland activities occupy around 54.2%. Despite this relatively small footprint, irrigation generates around 25–30% of national agricultural value and around half of agricultural sector profits[18].

The Murray–Darling Basin is one of Australia's most productive agricultural regions and contains around 70% of Australia's irrigated land area[19]. Irrigation uses a much smaller land base but generates a disproportionately large share of agricultural value and profit. This reflects the fact that irrigated enterprises are typically centred on higher-value crops, tighter input management and higher productivity per hectare. By contrast, dryland agriculture is generally broadacre, less input-intensive and more exposed to seasonal volatility[20]. There are fundamental differences in production systems, risk exposure and underlying economic structure. Given the reported 2020-21 GVAP[21] and GVIAP[22] of roughly $35 billion and $10 billion, for dryland and irrigation land use respectively, we can derive the gross value of production per hectare for both dryland and irrigated agriculture. This leads to a per hectare GVAP of $401.5/ha and a GVIAP of $6,045.95/ha[23]. This demonstrates that irrigated agriculture has a higher marginal return per hectare compared to dryland agriculture.

Further high-capability irrigated land is not economically equivalent to dryland land. Irrigation occurs where soils, topography and infrastructure support higher-value production, and its purpose is to maximise yield and returns on investment. Shifting productive irrigated land into dryland use would typically reduce productive intensity and economic value[24]. This difference is reflected in market prices. In the Border Rivers, a major 2024 transaction was assessed at up to $10,000/ha for irrigation land versus around $5,000/ha for dryland cultivation, reinforcing that irrigated and dryland hectares are not equivalent assets[25].

At an aggregate level, dryland agriculture outweighs irrigated agriculture in gross value because it occupies far more land and can operate across a wider range of soils and climates, with lower

18 Eslamian, S., & Eslamian, F. (Eds.). (2023). Handbook of Irrigation Hydrology and Management: Irrigation Case Studies (1st ed.). CRC Press. https://doi.org/10.1201/9781003353928

19 NWA 2022: Murray-Darling Basin: Region description: Geographic information

20 Eslamian, S., & Eslamian, F. (Eds.). (2023). Handbook of Irrigation Hydrology and Management: Irrigation Case Studies (1st ed.). CRC Press. https://doi.org/10.1201/9781003353928

21 GVAP represents the gross value of agricultural production, which is the estimated total monetary value of all agricultural commodities produced, measured at the wholesale prices realised in the marketplace

22 GVIAP represents the gross value of irrigated agricultural production, which is the estimated monetary value of agricultural commodities produced with the assistance of irrigation.

23 *4610.0.55.007 - Water and the Murray-Darling Basin - A Statistical Profile, 2000-01 to 2005-06 and Basin Plan evaluation (p.173)*

24 Irrigation planning | NSW Government

25 Defining property sales of 2024 put Worral Creek on top - Grain Central

upfront capital and maintenance requirements. Figure 7 shows the substantial GVAP of dryland agriculture dominating the GVIAP[26] (with the area between GVAP and GVIAP being attributable to dryland).

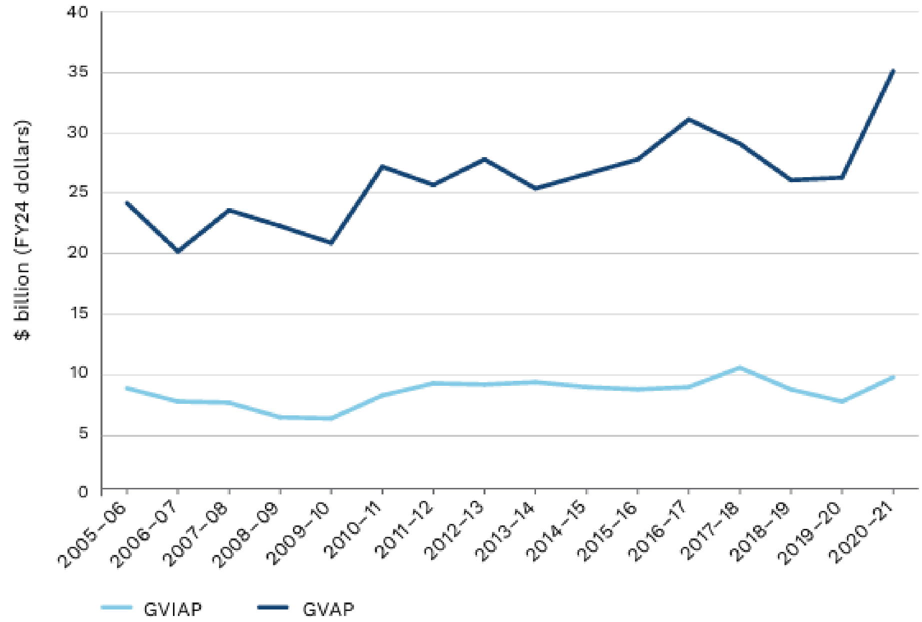
The chart in Figure 7 was cited in the Basin Plan Evaluation to evidence that:

> *In real terms, the gross value of agricultural production (GVAP) in the Basin in 2020–21 was about $35.1 billion, compared with $27.8 billion in 2012–13 and $23.6 billion in 2007–08. This represents an increase of 26% since Basin Plan adoption in 2012 and 49% since 2007... The gross value of irrigated agricultural production (GVIAP) in the Basin grew in real terms from $7.7 billion in 2007–08, when water recovery commenced, to $9.8 billion in 2020–21 (p.173–4)*

Our interpretation is somewhat different: **Coming out of the Millenium Drought and after larger scale water buybacks, the growth in GVIAP has been negligible while a significant growth in GVAP has been driven by dryland agriculture.**

We would expect that the impacts of the Basin Plan implementation on agriculture is predominantly on irrigated agriculture. This is because water recovery has significantly reduced the consumptive pool of water available for irrigation, whereas SDLs have not reduced the rainfall relied on by extensive dryland agriculture.

Figure 7: GVIAP vs GVAP for the MDB (in $2023-24)



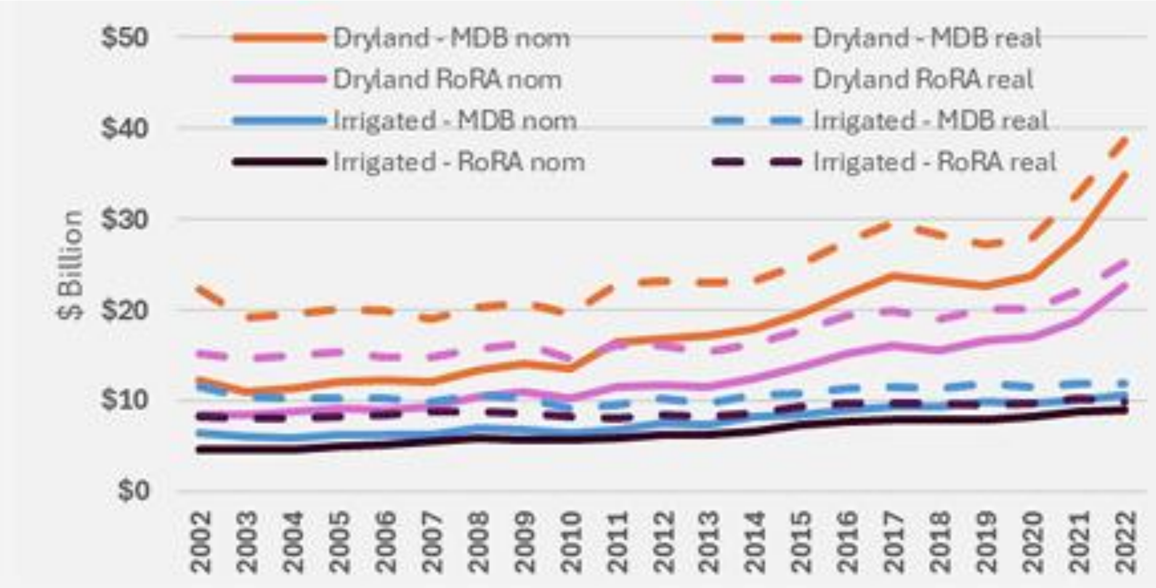
Source: MDBA Basin Plan Evaluation (p.173)

The appropriate lens for Figure 8 is real agricultural turnover (which excludes general inflation), which reflects revenues realised each year and therefore best captures the conditions facing dryland and irrigated enterprises at a point in time and over time [27]. It allows comparison of how the two systems perform through drought, recovery and price cycles.

[26] GVIAP represents the gross value of irrigated agricultural production, which is the estimated monetary value of agricultural commodities produced with the assistance of irrigation.

[27] Econometric analysis of Social and Economic Conditions of Murray–Darling Basin Communities and the Contribution of Basin Plan Activities on Agricultural Turnover

Figure 8: Irrigated and Dryland agriculture turnover



Source: MJA (2025, p.103) (fig 62)

Figure 8 shows dryland agriculture delivers stronger upside in favourable seasons but is more exposed to climatic downside, while irrigation provides a more stable, lower-volatility turnover profile over time[28]. Dryland turnover rises over time but falls sharply in drought periods such as the early 2000s, 2009–10 and 2017–19[29]. Irrigated agriculture is more resilient in those periods because access to water in storage supplements rainfall. Storages that capture winter inflows, carryover, reliable delivery systems and active water markets allow irrigators to smooth production through dry years rather than suffer the significant shocks to turnover typical of dryland systems.

Comparisons between irrigated and dryland agriculture can also imply they support the same regional communities. In practice, irrigated agriculture accounts for only about 3% of the Basin's area, while grazing dominates around 63% of the Basin[30]. The North Central Regional Catchment Strategy similarly distinguishes the "Irrigated Riverine" area (defined by GMID irrigation infrastructure) from surrounding predominantly dryland cropping areas.[31] **As a result, strong dryland seasons do not necessarily offset stress in irrigation communities: irrigation is concentrated in defined riverine districts and service towns, while economic returns to dryland activities accrue across broader inland farming areas.**

Further, irrigation acts as a risk management tool as well as a production input[32]. Where dryland output depends on rainfall, irrigated agriculture is buffered by access to water, water markets and more controllable production systems[33][34]. Evidence from the Millennium Drought shows that even when irrigation water use fell sharply, production value proved more durable than water availability, indicating adaptation through reallocation and more intensive use. In 2007–08

[28] Dryland and irrigated wheat | Department of Primary Industries

[29] Econometric analysis of Social and Economic Conditions of Murray–Darling Basin Communities and the Contribution of Basin Plan Activities on Agricultural Turnover

[30] NWA 2018: Murray–Darling Basin: Region description: Geographic information

[31] Local areas | North Central Regional Catchment Strategy

[32] https://ageconsearch.umn.edu/bitstream/124490/2/2012AC%20Kirby%20CP%20of%20Poster2.pdf

[33] Dryland and irrigated wheat | Department of Primary Industries

[34] https://ageconsearch.umn.edu/bitstream/124490/2/2012AC%20Kirby%20CP%20of%20Poster2.pdf

and 2008–09, irrigation water use was about 31% and 33% of 2000–01 levels, yet nominal GVIAP in 2007–08 was $5,079m compared with $5,085m in 2000–01. Commodity-price-adjusted gross value fell in 2008–09, but far less than water use[35], demonstrating irrigated agriculture's capacity to adapt under challenging conditions.

MDBA's econometric analysis finds agricultural turnover is highly sensitive to prices, with the coefficient on livestock prices described as "particularly pronounced", implying favourable livestock prices materially lift turnover across the southern Murray–Darling Basin[36]. This helps explain the uplift in dryland GVAP and turnover after 2020 as shown in Figures 7 and 8. Meat and Livestock Australia (MLA) reported the National Heavy Steer Indicator at 465.29¢/kg liveweight in March 2026, the third-highest level on record and just below the 471¢/kg record set in October 2021[37]. National trade and heavy lamb indicators also rose above $10/kg in 2025 for the first time on record[38]. Given grazing makes up roughly 50% of land use[39], recent dryland turnover strength is predominantly price-led through cattle and sheep. The implication is that recent dryland strength reflects cyclical price support rather than the underlying productivity and drought-resilience characteristics of irrigation.

Dryland's longer-run turnover uplift should not be read as evidence of irrigation-like resilience. It largely reflects stronger livestock prices, and the econometric evidence shows livestock prices have a pronounced effect on turnover. Recent cattle and lamb indicators have been at or near record highs, lifting dryland revenues without a commensurate increase in underlying production. **Dryland has benefited from a favourable price cycle, but it remains structurally more exposed to rainfall and climate shocks than irrigation.**

Dryland and irrigated agriculture are not economically equivalent. Dryland is larger in aggregate because it occupies a far broader land base, and recent turnover strength has been supported by favourable livestock prices. Irrigation generates far higher economic value per hectare, supports higher-value production systems and provides greater resilience through drought and market volatility. That resilience is underpinned by access to water, storages, delivery infrastructure and active water markets, which allow irrigators to maintain production at times of low rainfall whereas dryland systems face financial shocks. Accordingly, strong dryland results therefore do not offset impacts in irrigation-dependent districts. Summing across irrigated and dryland land masks the fundamentally different risk profiles and understates irrigated agriculture's value, productive intensity and regional significance. **Aggregate Basin-wide reporting can be misleading — the most acute economic and community impacts occur at the LGA level, where irrigation dependence, industry structure and land use differ most.**

2.4 Cumulative impacts and tipping points

Agriculture makes a large economic contribution across Basin communities through turnover and direct and indirect employment. However, impacts vary by community and LGA. Some LGAs have more diverse economies and are less exposed to agriculture, which reduces the effect of past buybacks on overall turnover and employment. Likewise, favourable conditions for dryland

35 https://ageconsearch.umn.edu/bitstream/124490/2/2012AC%20Kirby%20CP%20of%20Poster2.pdf

36 "Current Coefficient (D1): 0.01744 ($p < 0.01$) - Lagged Coefficient (LD): 0.01187 ($p < 0.01$)
Both current and lagged affects are positive and significant, indicating the strong impact of livestock prices on total agricultural turnover." -Econometric analysis of Social and Economic Conditions of Murray–Darling Basin Communities and the Contribution of Basin Plan Activities on Agricultural Turnover--

37 Heavy steer prices surge toward record highs | Meat & Livestock Australia

38 Heavy and trade lamb indicators surge over $10/kg in unison - Sheep Central

39 Land use - DAFF

agriculture can further dampen the observed impact of past water purchases, potentially reducing the apparent effect of additional purchases.

Work to support the *Guide to the proposed MDBP 2011* reported that:

> *"the most vulnerable communities are those that combine all three features: small population, high dependency on agriculture and high irrigation spend per capita. However, even a larger town such as Shepparton may still be at risk, as it provides significant services to a wide range of irrigation dependent communities across northern Victoria and southern NSW*[40]".

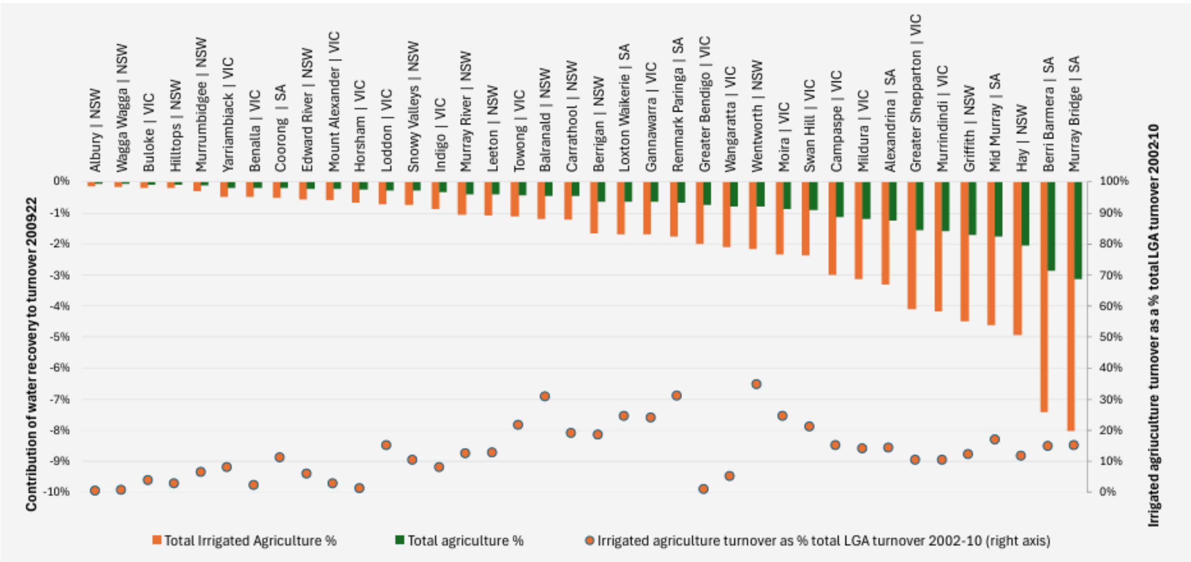
When attempting to quantify socio-economic impacts of previous water recovery efforts, the Basin Plan Evaluation noted:

> *In the southern Basin, water recovery over 2009–2022 resulted in total agricultural business turnover being about 0.7% lower and irrigated agricultural business turnover being about 1.8% lower than it would have been without water recovery*[41]

Of this –1.8% impact on irrigated agricultural business turnover, –1.7% was attributable to water buybacks (which is 94% of the impact from water recovery).[42]

These statistics highlight a Basin-wide impact of water recovery, but aggregation across LGAs can mask much larger impacts in more susceptible LGAs. As a result, the Basin-wide impact understates the impacts for irrigation-dependent LGAs, including those represented by the Murray River Group of Councils — and, in addition, there are also flow-on impacts through irrigation supply chains and associated industries. Consistent with this, Figure 9 indicates larger impacts in some LGAs than those implied by the aggregate southern Basin results.

Figure 9: LGA impacts in the southern MDB



Source: MJA 2025, Social and economic conditions of Murray–Darling Basin communities and the contribution of Basin Plan activities, p.157.

Figure 9 above shows the impact of water recovery purchases on irrigated agriculture and agriculture overall in all of the LGAs in the southern MDB, as well as the contribution of irrigated agriculture proportionate to LGA turnover. At face value, it is evident that to the left of the graph

40 EBC, RMCG, Marsden Jacob Associates, EconSearch, McLeod, G., Cummins, T., Roth, G. and Cornish, D. (2011), 1:10 *Community impacts of the Guide to the proposed Murray-Darling Basin Plan: Volume 1 – Executive Summary*, report prepared for the Murray-Darling Basin Authority, May.

41 MDBA Basin Plan Evaluation, p.66

42 MJA 2025, p.154.

there are many regions that experienced little adverse economic impact from water purchases, with irrigated agriculture making smaller contributions to overall turnover in these regions. In effect, this means that the estimated aggregate Basin-average impact understates the impacts on some LGAs due to outliers that experienced minimal impacts on turnover from water purchases. It can be observed that significant reliance on irrigated agriculture is a driver of the expected impact on irrigated agricultural business turnover in the LGA. This is particularly pronounced across the MRGC LGAs, where localities such as Moira rely on irrigated agriculture to contribute towards 24.5% of their respective LGA turnover. Even in Shepparton, a comparatively well-diversified regional economy, irrigated agriculture still accounts for 10% of total turnover.

The data represented in Figure 9 was derived to approximate values for the impacts on regions covered by the respective councils for the MRGC and Shepparton, as seen below in Table 2. This shows that Shepparton and Mildura are the most impacted regions, with reduced turnover in both irrigated agriculture (and normal agriculture) substantially above the aggregated average In fact, the impact in these LGAs was 1.8 to 2.3 times the impacts reported in the above Basin Plan Evaluation quote.

Table 2: LGA turnover impacts

LGAs of concern	Impact of water recovery on irrigated agricultural turnover	Magnitude of impact of irrigated agricultural turnover (factor)
Loddon	-0.70%	0.39x
Gannawarra	-1.70%	0.94x
Southern MDB as a whole	-1.80%	
Moira	-2.35%	1.31x
Swan Hill	-2.35%	1.31x
Campaspe	-3.00%	1.67x
Mildura	-3.15%	1.75x
Shepparton	-4.15%	2.31x

Source: Frontier Economics analysis from MJA 2025, Figure 102, p.157.

Notably this data only considers impact on turnover for irrigated agriculture, and does not take into account the interdependencies that other industries have with irrigated agriculture in their supply chains that play a role in contributing to an LGA's overall turnover. This important point was recognised in the first round of community consultation for the *Guide to the proposed MDBP 2011* where it was noted by stakeholders at the time that many turnover figures *"do not include the substantial activity and employment in the processing of food and fibre, nor the major sectors that exist to service both primary production and secondary processing, such as transport, light engineering, wholesale supplies and machinery sales. Taken together, these represent a far greater percentage of the total Basin economy, particularly within some regional communities"*.

Overall the tables convey strongly the smoothing of apparent impacts that results from the aggregation of the impact of water purchases on irrigated agriculture and agriculture turnover. The majority of the LGAs in the table are more impacted from water purchases than the basin average. These concerns surrounding aggregation of impacts has been present since the *Guide to the proposed MDBP 2011* where it was recognised that:

> *"change to irrigated agriculture would not be applied equally across the Basin as a whole. It would be concentrated in certain towns and locations where the reduction represents a higher percentage of local economic activity and employment. There is therefore a strong distributional effect. The community impact assessment indicated that the effects may be particularly profound in smaller and more irrigation dependent communities."*

While these conclusions have been acknowledged by DCCEEW, the localised impacts have never been materially quantified:

> *"it is generally understood there are cumulative impacts and distributional differences in the effect of water recovery, and this has contributed to adjustment pressures in some Basin communities, especially smaller and more remote irrigation-dependent communities. Regional centres with larger populations and greater economic diversification, have demonstrated more resilience to the range of structural pressures affecting the Basin[43]."*

This reinforces that the socio-economic impacts of water recovery cannot be adequately understood at a basin-wide level alone; rather, a localised, LGA-level analysis is essential to robustly capture the material effects of water purchases, as experienced by the MRGC LGAs, and Shepparton.

Agriculture also plays an important role in the employment within the LGAs, as displayed below in Table 3 (Albury has been included as a reference point, since it was on the far left of Figure 9). As confirmed by the ABS 2021 Census of Population and Housing (General Community Profile), these regions rely heavily on agriculture for employment. Compared to Albury LGA agriculture's share of employment, the MRGC and Shepparton LGAs have a materially higher employment in the Agriculture, forestry and fisheries (AFF) sectors. The table shows that the AFF sector is the number 1 contributor to employment in the MRGC LGAs and the 5th in Shepparton LGA. This highlights the further significance agriculture plays in the LGAs of northern Victoria.

Table 3: Agriculture, forestry and fisheries (AFF) employment by LGA

LGAs of concern	AFF employment (no. people)	Total employment (no. people)	AFF employment relative to total employment	AFF Rank among industries
Albury	366	26,344	1%	12th
Mildura	3,001	25,101	12%	2nd
Swan Hill	2,043	9,866	21%	1st
Gannawarra	976	4,391	22%	1st
Loddon	1,049	3,085	34%	1st

[43] DCCEEW (2024, p.1):

Campaspe	2,165	17,368	12%	2nd
Moira	1,995	12,870	16%	1st
Shepparton	2,512	30,136	8%	5th
MRGC Total (6 councils)	**11,229**	**72,681**	**15%**	**1st**

Source: Frontier Economics analysis of ABS 2021 Census of Population and Housing (General Community Profile)

As observed in the first round of community consultation for the *Guide to the proposed MDBP 2011*:

> *"any resulting reduction in irrigation production would create third party impacts for farmers who remain, businesses that service farmers, processing companies, and community level businesses and services; and resultant social impacts could include loss of population and change in population mix, change in community identity, increased demand for social services and psycho-social impacts."*

This is further supported by consideration of the employment indirectly associated with agriculture. In Northern Victoria, there is almost one employee in up- and down-stream industries, for every one employee directly working in agriculture, as shown below in Table 4.

Table 4: Direct and indirect employment impacts

		Employment in Northern Victoria (no.)
Direct employment in Agriculture	21008	
Direct employment in up- and down-stream industries	16526	
Ag-related Processing and Manufacturing		*11809*
Agricultural and Construction Machinery Wholesaling		*579*
Agricultural Machinery and Equipment Manufacturing		*142*
Agricultural Product Wholesaling		*787*
Industrial and Agricultural Chemical Product Wholesaling		*154*
Meat, Poultry and Smallgoods Wholesaling		*198*
Farm Machinery and Equipment Repair and Maintenance		*1004*
Agricultural support services		*1853*

Source: Frontier Economics analysis of 2021 ABS census data

As illustrated in Table 4, the role agriculture in these regional communities not only directly support employment but, the entire upstream and downstream supply chain related to irrigated agriculture production, whilst also being key pillar that supports the health of regional communities. It has been stated that across the period 2001 to 2016, the average change in total employment across the 40 irrigation- dependent communities was a decrease of 24.1%[44]. As

[44] community-profiles-guide-may-20180.pdf

such it is noted that further recovery from irrigators will add to the impacts that are already being experienced in communities and will contribute to the ability of irrigation communities to plan for the future[45].

The ABARES community vulnerability framework[46] provides a lens for interpreting how further Murray–Darling Basin water recovery may impact northern Victorian LGAs. The framework reflects each LGA's underlying sensitivity and vulnerability to reduced irrigation water access and adaptive capacity as at 2021, already embedding the adjustment that had occurred through water trade, prior buybacks and infrastructure savings. These communities have already absorbed significant change; the vulnerability scores presented below in reflect residual fragility, not a fresh starting point.

Table 5 presents a vulnerability assessment for the MRGC LGAs and Shepparton. Each LGA is evaluated across three key indicators:

- Adaptive Capacity – The ability of a community to adapt to environmental changes (higher values = greater capacity, which is positive)
- Baseline Vulnerability – The inherent vulnerability of the area without considering exposure factors (higher values = more vulnerable, which is concerning)
- Sensitivity – How sensitive the area is to environmental stressors (higher values = more sensitive, which is concerning).

Table 5: ABARES community vulnerability framework

LGA	Adaptive Capacity	Baseline Vulnerability	Sensitivity
Mildura	Medium (0.37)	Medium (0.53)	**High** (0.52)
Swan Hill	**Low** (0.21)	**High** (0.67)	**High** (0.57)
Gannawarra	**Low** (0.21)	**High** (0.70)	**High** (0.63)
Loddon	**Low** (0.12)	**High** (0.77)	**High** (0.65)
Campaspe	Medium (0.40)	**High** (0.55)	**High** (0.58)
Moira	**Low** (0.25)	**High** (0.63)	**High** (0.56)
Greater Shepparton	High (0.49)	Medium (0.45)	**High** (0.50)

Note: To classify each LGA as Low, Medium or High, the 148 LGAs were ranked for each indicator and split into three equal groups. For Adaptive capacity, this means a 'Low' rating (0.0000 – 0.2729) indicates an LGA sits among the LGAs with the lowest Adaptive Capacity in the entire basin. For Vulnerability, a 'High' rating (0.5446 – 1.0000) indicates an LGA sits among the most vulnerable third of all Basin LGAs. Similarly, for Sensitivity, a 'High' rating (0.4236 – 1.0000) indicates an LGA sits among the most sensitive third of all Basin LGAs. Colour coding has been

45 Social and economic impacts of the Basin Plan in Victoria

46 Community vulnerability and adaptive capacity in the Murray Darling Basin - DAFF

used: Green - Positive (high adaptive capacity OR low vulnerability/sensitivity); Yellow - Moderate concern; Red - Area of concern (low adaptive capacity OR high vulnerability/sensitivity).

Source: Frontier Economics analysis of ABARES community vulnerability framework

Table 5 shows that six of the seven LGAs rate high for both Baseline Vulnerability and Sensitivity, and every LGA in the group records a high sensitivity score. This reflects communities that are particularly exposed to water-related stress regardless of other factors. On Adaptive Capacity, five of the seven rate Low or Medium, with Greater Shepparton the only LGA in the high tier. Loddon stands out as the most acute case, recording the lowest adaptive capacity (0.12) and highest baseline vulnerability (0.77) of the group. This reflects that these LGAs have materially less capacity to withstand further impacts of water recovery. In essence it is evident that these LGAs are already operating under stress, having absorbed years of structural adjustment, and where further water recovery could be a tipping point for significant regional challenges.

2.5 (Lack of timely) Support for adaptation/adjustment

The Basin Plan Evaluation discussed transition assistance programs to assist communities adjust to the impacts of Basin Plan reforms, primarily reduced water availability from water recovery. For example, page 171 (of the Part A: Outcomes report) states:

> *From 2008, in addition to direct investments in on-farm and off-farm water infrastructure and water entitlement purchases, governments have committed more than $260 million (in nominal dollars) to support Basin communities in adapting to a future with less water (MJA 2025). Most of these programs began operating after the most significant water recovery had already taken place. Core transition assistance programs include:*

- *the Strengthening Basin Communities Program (2009–2011), which provided grants to local governments for urban water-saving initiatives and to assist communities in planning for reduced water availability ($64 million spent)*
- *the South Australia River Murray Sustainability Program (2013–2017), which allocated $25 million to regional economic development • the Murray–Darling Basin Regional Economic Diversification Program (2013–2019), which assisted Basin communities in increasing economic diversification and adjusting to a more water-constrained environment ($72.65 million spent)*
- *the Murray–Darling Basin Economic Development Program (2019–2023), which provided up to $24.4 million to 42 projects over 4 years (Round 1) and up to $15 million to support 31 communities impacted by water recovery (Round 2)*
- *the Aboriginal Water Entitlements Program, which makes $100 million available to buy water entitlements for the benefit of First Nations Peoples across the Murray–Darling Basin.*

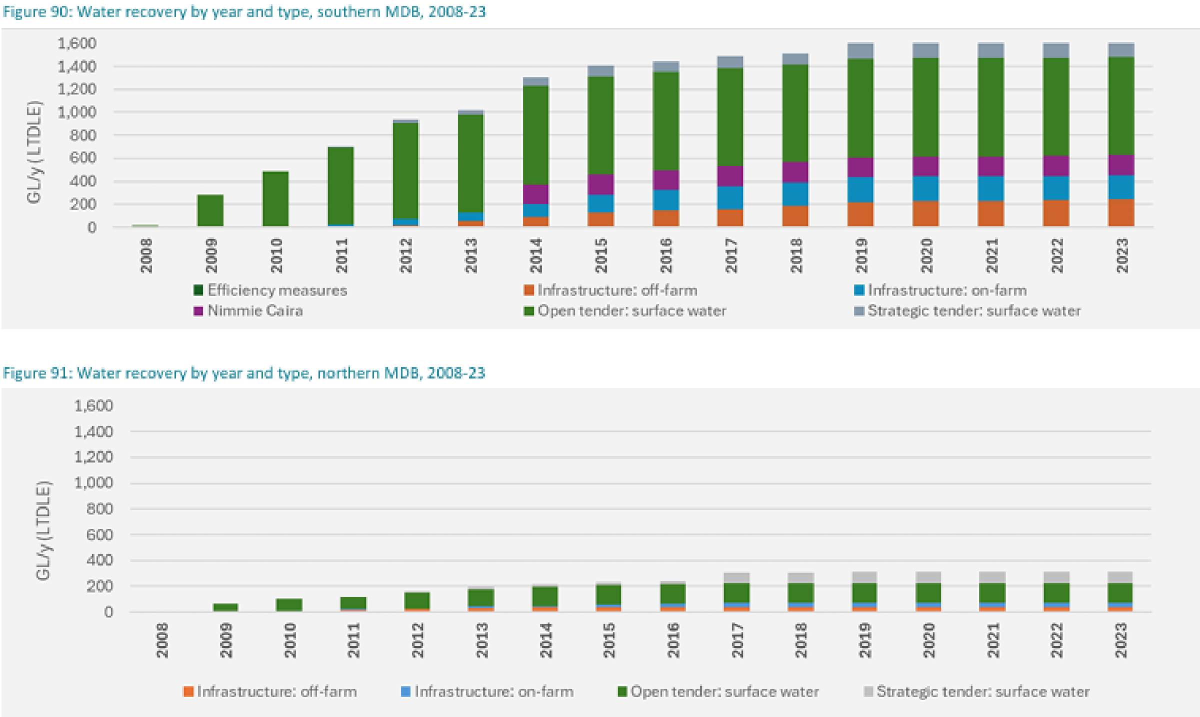
Firstly, we note that the $100m item at the end of the list is for further buyback, and is not separate funding of transitional assistance as per the other programs in the list.

Secondly, the timing and magnitude of these programs is significantly disjointed as compared to the timing and magnitude of water recovery — especially buyback — and it is difficult to view them as helping to manage transitions experienced in irrigation communities.

This is evidenced by the disjoint between the timing of buyback recovery volumes (with most buyback occurring prior to 2012 - see Figure 10) whereas transitional assistance related to Economic Development occurred in 2019–2023.

MJA (2025) notes that the recently announced Sustainable Communities Program (2024) commits $300 million for Basin States to work directly with MDB communities affected by voluntary water purchase, on investments that create and support local jobs and businesses. However, our understanding is that the Sustainable Communities Program[47] has not yet been implemented in Victoria, although agreements are in place in NSW and SA.

Figure 10: Water recovery by year and type, southern and northern MDB



Source: MJA 2025, figures 90 and 91.

The Basin Plan Evaluation (p.191) claims:

> *Communities and industries impacted by the Basin Plan reforms since 2012 acknowledge the significance and importance of the **adjustment programs** that have benefited participants and their regional economies (DCCEEW 2024b).* [emphasis added]

However, this citation does not accurately reflect the statement by DCCEWW[48] finding that relates to Basin Plan water reforms more broadly:

> *There are mixed social and economic effects of the programs the Commonwealth has been investing in to deliver Basin Plan water reforms. **The case studies presented in this report, identify a range of positive and negative social and economic effects for participants in programs, and for their local communities and regional economies. On balance, the case studies show the social and economic effects of the Basin Plan are generally positive and have been benefiting participants in the respective programs and their local communities and regional economies**.* [emphasis added]

The Basin Plan Evaluation (p.191) also notes:

> *However, communities also question who determines the timeframes that are considered adequate for adjustment and transition (MDBA 2024i).*

Further, DCCEEW Matter 3 report says (p.33): "In 2023, the Productivity Commission (2023a) considered that where water purchase has contributed to Basin community adjustment pressures, transition adjustment assistance can help those communities better adapt to the

47 https://www.dcceew.gov.au/water/policy/programs/open/sustainable-communities

48 DCCEEW%202024-matter-3-report, page 1

change. In 2020, the Sefton Review concluded that past funding to support Basin communities impacted by water reform had not been targeted effectively (Sefton et al 2020).” And “The Productivity Commission (2023a) advised that for communities where assistance programs are needed, the programs are more effective if they leverage the competitive strengths of the local community and are well-integrated with prevailing regional development strategies and frameworks. It emphasised the effectiveness of programs would be increased by involving affected community members in the development of transition assistance programs which would also help to build a sense of ownership and trust in the program.”

Looking forward — we suggest that timely and sufficient transition support is required if further water recovery by buybacks is to occur. This would support sustainable communities under the future of the Basin Plan. Any smoothing of buybacks and adjustment over time would also be expected to aid consolidation and to give confidence to communities and industries to adjust.

3 MDBA modelling for the Basin Plan Review

The MDBA's modelling for the Basin Plan Review underpins the analysis in the discussion paper. The modelling is a foundational input that is relied on to assess whether current Basin Plan settings remain fit-for-purpose, particularly Sustainable Diversion Limits (SDLs).

This section comments on:

- Scenarios — the MDBA scenarios used, plus additional scenarios that could be tested and the policy questions they would inform
- Assumptions — in particular, the assumption of full use of water under SDLs.

3.1 MDBA scenarios and potential additional scenarios

The MDBA identifies and models two Basin Plan implementation scenarios:

- (1) a current management baseline that includes existing SDL settings, current environmental water holdings and current operational and regulatory constraints, and
- (2) a Full Basin Plan implementation scenario that assumes all "on-track" SDL Adjustment Mechanism (SDLAM) projects are completed and operational plus 300 GL of water recovery to address the anticipated SDLAM shortfall, completion of water recovery programs delivering 450 GL of additional water (about 100 GL in the northern Basin and 350 GL in the southern Basin), and no relaxation of physical or operational constraints on river flows.

We consider the MDBA's analysis could be strengthened by setting out additional alternative scenarios and the policy questions they would inform. For example:

- A mid-step scenario aligned with the originally legislated 2,750 GL Basin Plan SDLs, assuming "on-track" SDL Adjustment Mechanism (SDLAM) projects are completed and operational plus 300 GL of water recovery to address the anticipated SDLAM shortfall, but not assuming the additional 450 GL. This may also assume no relaxation of constraints.
- A 2,750 GL Basin Plan scenario, as above, that also assumes constraints have been relaxed to improve delivery of environmental water.
- A scenario that goes further than the Full Basin Plan implementation scenario (i.e. +450 GL) and also assumes relaxation of constraints.

In our view, these would provide a valuable addition to the MDBA's lines of enquiry. For example,

- Consideration of the 2750GL Basin Plan scenario (no relaxation of constraints) would examine if the original SDL volume, considered with the improved understanding of e-water management, is capable of being the Environmentally Sustainable Level of Take (ESLT) in some systems.
- Stepping to the 2750GL Basin Plan scenario (with relaxation of constraints) would consider if mechanisms to address the timing of flow and facilitate 'water on to the floodplain' could achieve the further improvement of environmental outcomes and reach ESLT. We consider that this scenario would provide valuable insights into how constraints relaxation can address remaining risks in ways that additional water recovery cannot.

- Going beyond the Full Basin Plan implementation scenario to one that assumes the relaxation of constraints provides insights that are hinted at in the SDL assessments. Can the risk that environmental outcomes for flows and connectivity, ecosystem functions and native fish are not being met be addressed by relaxation of constraints and alter the pattern of flow, or are further interventions (such as VMFRP) required to sufficiently deliver water to the floodplains?

This analysis informs important policy questions for Basin Plan implementation:

- The types of environmental outcomes that are expected if the additional 450GL is fully recovered.
- The types of environmental outcomes that are expected if the relaxation of river constraints is implemented to current scope.
- Comparison of these outcomes would also inform phasing or what may best manage environmental risks if we must prioritise and have one without the other, for an intervening period.

This analysis could for example inform whether:

- the MDBA's current scenario for 'Full Basin Plan implementation' is expected to best manage environmental risks, with constraint relaxation being deferred into the next decade.
- the funds currently earmarked for water recovery should be redirected to facilitate constraint relaxation as a priority — if that best contributed to environmental outcomes by directly enhancing management for factors affecting the identified environmental risks (flow patterns and constraints on lateral (floodplain) connectivity, particularly limits on delivering bankfull and overbank flows — as noted in many SDL assessments).

In our view, the scenarios adopted by the MDBA do not clearly demonstrate the environmental outcomes attributable to important components of the response (300GL SDLAM, finalising 450GL, and constraints). Rather, future policy modelling is limited to the single scenario that maximises water recovery in the absence of work which may address identified risks from flow regimes and lateral connectivity (which may be benefited by constraints relaxation and other water management initiatives).

Additional scenarios would provide a more transparent basis for sequencing and prioritisation of potential policy interventions.

We note it may not be feasible for the MDBA modelling to examine other opportunities to more directly manage identified risks from flow regimes and lateral connectivity (see section 4.1), such as bulk environmental water delivery arrangements and infrastructure projects — however the potential value of these are discussed further in section 4.2.

We also note that, given seasonal variability, it is difficult for MDBA modelling to consider the environmental outcome implications of SDLAM extensions (enabling additional potential projects to contribute to the offset), or of gradual and strategic buybacks (if the SDLAM shortfall and 450GL volumes are to be secured) rather than full implementation by 2027 — however it would be expected that any actions to smooth water buybacks over time or facilitate alternatives to buyback would reduce the socio-economic impacts of water recovery.

3.2 Modelling assumption — of full use of SDL

During stakeholder presentations on the Basin Plan Review discussion paper, MDBA staff noted that the SDL assessment modelling assumes the full use of water available under the SDL.

Similarly, Victoria's Northern Victoria Water Resource Plan (WRP)[49] also assumes 100% utilisation.

The WRP has been accredited to grant entitlements so the system remains within the Goulburn SDL. Under the 100% utilisation assumption, allocations to the existing set of entitlements would fully utilise the current SDL (before any adjustment). This is consistent with the WRP approach: 'For take from regulated rivers (excluding basic rights) and the modelled component of take from a watercourse (excluding basic rights), Victoria allocates water in a system based on an assumption of full use and meeting required reserves for the following water year. The total licensed volume of entitlements is included in the models used in the method and the models replicate allocation rules used in the seasonal determinations' (WRP, App C, Table 8(g), p.964).

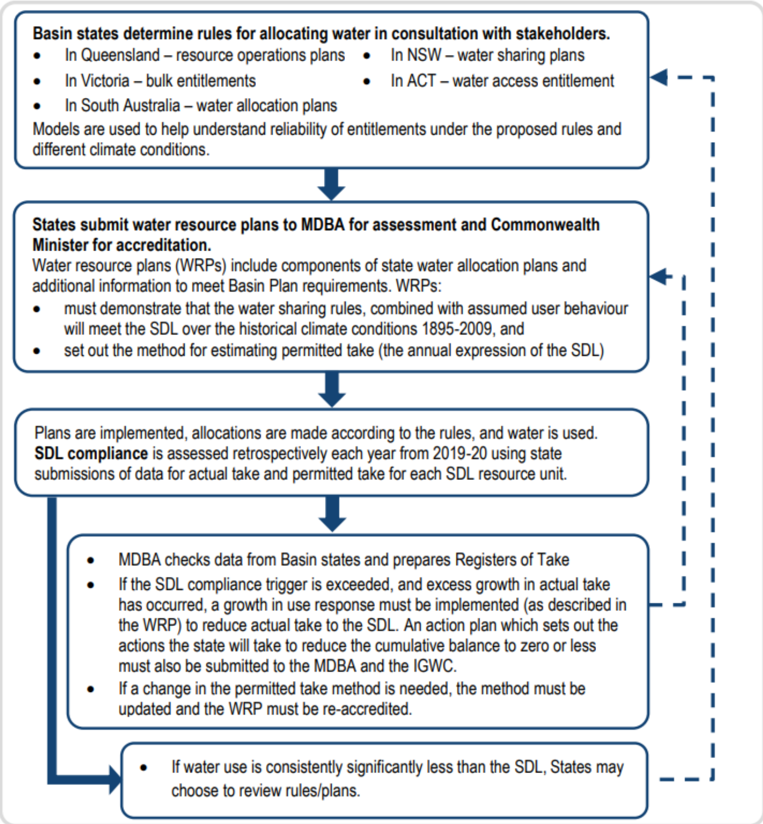
However, observed utilisation shows that not all allocated volumes are taken. As a result, take can be (significantly) less than the SDL—referred to as 'underuse' in MDBA terminology.

- The MDBA 2020 report *Trends in water use relative to the sustainable diversion limit in the southern Murray-Darling Basin* found there was an average trend of *under-use* of water relative to SDLs. However there is significant variability from year to year, and there was either an annual debit or an approximately zero credit observed in a number of years in the Goulburn. For the period 2012-13 to 2018-19, the average annual credit relative to average TDL was 115 GL/y (9% TDL). The largest credits (or underuse) accrue in the wettest years (i.e. 2013-14 and 2016-17) in which the largest spills occur.
- The underuse was driven by forfeitures from retail accounts, including spills from spillable accounts and carryover deductions for evaporation. The average total account balance forfeited each year over the 2012-13 to 2018-19 period was 82 GL/y (inclusive of spills) or 32 GL/y (exclusive of spills) of this, evaporation charges to account holders averaged 23 GL. This is water that was allocated but not used and could not be carried over.
- **Given that Victoria is entitled to full utilisation of entitlements up to SDLs, this means that there may be opportunities for Victoria to issue additional entitlements in the base case** if the model of permitted take was revised to more closely reflect water user behaviour. Last year's release by the MDBA[50], identified that if water use is consistently significantly less than the SDL, States may choose to review rules/plans (Figure 11).
- The value of these potential additional entitlements to Victoria are from the market/trading value of the water entitlements as well as the socio-economic benefits associated with their use.
- In our view, this approach may provide a useful policy change (rather than assuming 100% utilisation) given that WRPs 'must demonstrate that the **water sharing rules, combined with assumed user behaviour will meet the SDL** over the historical climate conditions 1895-2009 (Figure 11).
- Further, we note the WRP identifies that consideration of how a revised permitted take method will demonstrate SDL compliance and consider potential growth-in-use responses will inform the two-year review (WRP, App C, Table 8(g)).

49 https://www.mdba.gov.au/sites/default/files/publications/vic-north-and-murray-water-resource-plan-index-table-and-comprehensive-report-26-november-20190.pdf and https://www.mdba.gov.au/sites/default/files/publications/vic-north-and-murray-water-resource-plan-appendices-26-november-2019.pdf

50 MDBA 2025, Sustainable Diversion Limit Accounting and Reporting Framework, MDBA publication no: 15588, Feb.

Figure 11: How water resource plans meet Basin Plan requirements



Source: MDBA 2025, Figure 2.

In our view, given that WRP allocation models are permitted to take into account user behaviour and this behaviour currently results in observed underuse, then there is room to adjust the SDL without compromising the allocation approach. This currently unallocated volume of entitlements could be transferred to the environment to contribute to water recovery efforts, although this comes at a cost to Victoria — namely, forgone entitlement value and forgone socio-economic benefit.

4 Environmental water use

key goal of environmental water use is to maximise outcomes from the water already recovered. The MDBA's SDL assessment reports are instructive in this regard, the finding that LoE1 and LoE2 deliver equivalent environmental outcomes, and that both are likely to satisfy the ESLT, carries a significant implication, that enough water has been recovered. The focus should therefore shift from further recovery toward optimising how existing environmental water entitlements are managed and deployed.

4.1 SDL assessments

The MDBA's Initial SDL Assessment summaries were prepared as part of the 2026 Basin Plan Review. Each summary assesses whether the existing SDL for a specific SDL Resource Unit continues to:

- reflect an ESLT, and
- support delivery of the Basin Plan's environmental outcomes under current, fully implemented, and future climate conditions.

The assessments are preliminary, framed as inputs to consultation and further technical work during the Basin Plan Review process.

All summaries of each SDL resource unit apply the MDBA's SDL *Assessment and Response Framework*[51], drawing on multiple Lines of Enquiry (LoE) to test whether environmental flow regimes are sufficient:

- LoE1 – current Basin Plan implementation (current level of water recovery)
- LoE2 – full Basin Plan implementation (recovery of 300GL SDLAM shortfall + full 450GL)
- LoE3 – future climate scenarios (2030s and 2050s).

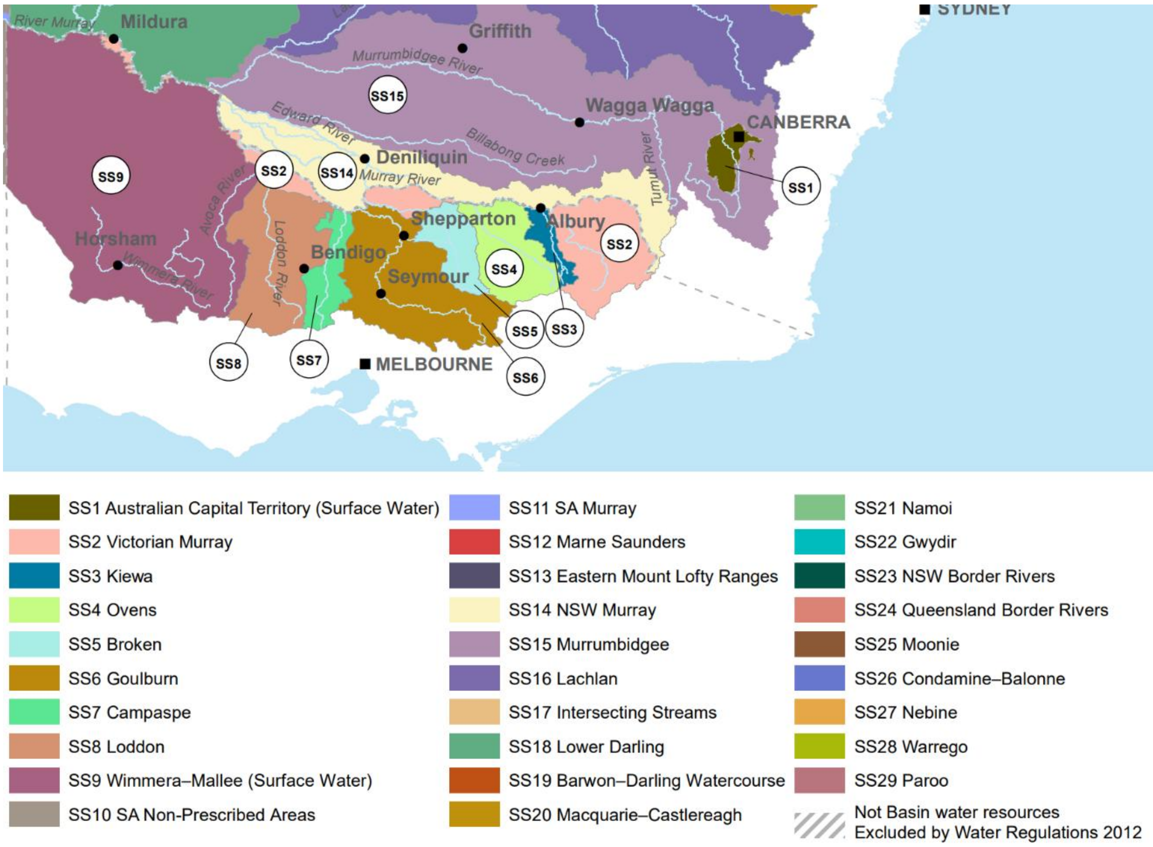
Each SDL resource unit is assessed across six ecological themes;

- flows and connectivity,
- ecosystem functions,
- waterbirds,
- native fish,
- native vegetation, and
- other species.

The SDL Resource Units analysed were SS2, SS6, SS7, SS8, SS9, SS10 and SS14, as shown in Figure 12 for the broader southern MDB catchment. Across these units, the MDBA's initial SDL assessments suggest the current **SDLs either "confidently" or "likely" reflect an ESLT**, even where environmental outcomes are identified as being at risk.

[51] https://www.mdba.gov.au/sites/default/files/publications/Sustainable-Diversion-Limit-Assessment-and-Response-Framework.pdf

Figure 12: Surface Water SDL Resource Units



Sources: Geoscience Australia © Topo 250K data (Series 3), Geoscience Australia © Topo 2.5 million data (2003), Murray–Darling Basin Authority © Surface water SDL Resource Units. Map updated:2018.

However, achieving (or likely to be achieving) an ESLT in these Resource Units does not mean all environmental outcomes have been achieved. For example, for SS2 (Vic Murray) and SS14 (NSW Murray), ecosystem functions are rated poor. Outcomes for native fish are similarly rated poorly in the Goulburn, Campaspe and Loddon, and those for waterbirds are rated poorly in the Wimmera–Mallee. Where outcomes are not being met, the dominant driver is not total diversion volume, but rather:

- flow pattern,
- seasonality, and
- constraints on floodplain connectivity, particularly limits on delivering in bank and overbank flows.

The assessments also set out expected environmental outcomes under a fully implemented Basin Plan by comparing Line of Enquiry 1 (LoE1) and LoE2. The initial assessments compare the environmental outcomes between current SDL settings and full implementation of the Basin Plan (including additional water recovery). Overall, for SDL Resource Units SS6, SS7, SS8, SS9 and SS2, there is no material change in the likelihood of achieving outcomes between the two scenarios. As shown in Figure 13, moving from LoE1 to LoE2 (which represents an additional 300+450GL for the environment) does not increase the likelihood of supporting the objectives across ecological themes for the Victorian Murray SDL Resource Unit.

Figure 13: The likelihood that the pattern and volume of flow will support the objectives for each ecological theme in the Victorian Murray SDL resource unit

Theme	Line of enquiry	Very unlikely	Unlikely	About as likely as not	More likely than not	Likely	Very likely	Confidence
Flows and connectivity	LoE 1			●				●●○
	LoE 2			●				●●●
Ecosystem functions	LoE 1			●				●○○
	LoE 2			●				●○○
Waterbirds	LoE 1				●			●●○
	LoE 2				●			●●●
Native fish	LoE 1			●				●●○
	LoE 2			●				●●○
Native vegetation	LoE 1				●			●●●
	LoE 2				●			●●●
Other species	LoE 1				●			●●○
	LoE 2				●			●●○

Source: MDBA, Victoria Murray (SS02) SDL Assessment

Figure 13 above shows that the same ecological outcomes are indicated regardless of whether the additional water LoE1 to LoE2 is recovered. The indicators for current SDL levels (LoE1) and full Basin Plan implementation (LoE2) show the same likelihood of outcomes; the main difference is the confidence of the conclusions.

The SDL assessments find that the additional water from recovery of 300GL SDLAM shortfall the full 450GL does not change the likelihood of achieving environmental outcomes.

In our view, the initial SDL Assessments suggest that achieving stronger ecological outcomes requires a mixed response pathway, rather than an excessive reliance on volumetric SDL change.

The following section applies a consistent assessment framework to a selection of the relevant SDL Resource Units, examining:

- SDL status,
- ecological condition,
- "at risk" themes and drivers, and
- the implications of carrying out LoE2.

Across the observed units, MDBA's initial findings consistently indicate that SDLs are **confident** or **likely** reflect ESLT, while environmental risks are largely driven by flow patterns, delivery constraints, operational settings, infrastructure limits, non-flow pressures, and climate change, rather than insufficient water recovery alone.

This unit-level analysis clarifies why additional water, in isolation, is unlikely to resolve key ecological risks, and why complementary levers should feature prominently in MDBA's Basin Plan Review considerations.

Table 6: SDL Assessment Summary for selected resource units

	SS2 — Victorian Murray	SS6 — Goulburn	SS9 — Wimmera-Mallee
SDL Status	MDBA considers it "**likely**" SDL reflects ESLT but identifies risk to environmental outcomes. Further work with Victoria proposed through 2026.	MDBA considers it **"likely"** SDL reflects ESLT but identifies risk to environmental outcomes. Further work with Victoria proposed through 2026.	MDBA **"confident"** SDL reflects ESLT, proposes SDL is maintained. Notes additional recovery beyond June 2024 would yield improved benefits.
Ecological Status	**Ecosystem functions rated poor (data deficient); native vegetation rated good; other themes moderate.** Strong data collected over time with reliance on infrastructure at icon sites.	**Native fish rated poor; flows and connectivity rated good; others moderate.** Despite good unit-scale connectivity, risk is driven by delivery limitations in the lower Goulburn.	**Waterbirds rated poor; all other themes moderate**. Terminal lakes (Hindmarsh, Albacutya) rely on large natural flow events — environmental water cannot practically contribute to these outcomes. Environmental water primarily supports the Wimmera River as a corridor to wetlands.
LoE1 vs LoE2	**No material differences in likelihood of achieving ecological objectives across themes** — risks are driven by system and delivery factors, not SDL volumes.	**No material differences in likelihood of achieving ecological objectives across themes** — risks are driven by system and delivery factors, not SDL volumes.	**No material differences in likelihood of achieving ecological objectives across themes** — risks are driven by system and delivery factors, not SDL volumes.
At-Risk Themes & Drivers	**Flows and connectivity and native fish rated critical consequence; ecosystem functions rated high consequence**, affecting Ramsar and Living Murray assets. **Drivers: river regulation, reduced overbank inundation, flow pattern distortion, floodplain carbon accumulation and water quality risks.**	**Flows and connectivity, ecosystem functions and native vegetation assessed as about as likely as not supported.** Consequence rated high for all three, affecting Basin-wide objectives. **Drivers: delivery constraints limiting inbank and overbank flows, and unseasonal flow patterns from inter-valley transfers.**	**Waterbirds and native vegetation unlikely to be adequately supported; flows and connectivity roughly even.** Consequence rated low as affected values are beyond regulated delivery. **Drivers**: **river regulation, operating constraints, drying climate, limited overbank flow capacity**.

Implications	**While additional water may improve outcomes, without addressing constraints and delivery patterns, Basin-scale floodplain reconnection cannot be achieved** — limiting the marginal benefit of further recovery alone	**Additional water alone cannot overcome physical and operational delivery limits**. Resolving environmental risk depends on constraints relaxation, operational reform and complementary works — water is an enabling input only.	**More water cannot achieve key terminal lake outcomes under current system constraints.** Gains from recovery are limited to artificially supplied wetlands — underscoring the need for objective setting and system adaptation over volume increases alone.

Source: Frontier Economics analysis of selected assessments from https://library.mdba.gov.au/group/sustainable-diversion-limit-assessments-surface-water

Across all three SDL units, the MDBA's own assessments point to the same conclusions, further water recovery alone will not resolve the environmental risks identified in the Basin. Whether assessed as "confident" or "likely" ESLT, LoE1 and LoE2 deliver equivalent environmental outcomes. The risks that remain are driven by system constraints, delivery limitations and operational factors, not SDL volumes. In Wimmera–Mallee, more water cannot reach the terminal lakes that need it most. In the Goulburn, physical and operational delivery limits are the binding constraint. In the Victorian Murray, lateral floodplain reconnection cannot be achieved without addressing flow patterns and river regulation, regardless of how much water is recovered.

This suggests that environmental outcomes may benefit little from additional buybacks, whereas other approaches that more directly support the achievement of environmental outcomes may be more appropriate (such as constraints relaxation, operational reform and enhanced water management).

4.2 Using environmental water: enhancing the toolkit

The discussion above highlights that SDLs are likely to reflect an ESLT, yet risks to environmental outcomes remain, largely relating to flow patterns, seasonality, and constraints on floodplain connectivity (particularly limits on delivering in-bank and overbank flows).

In our view, environmental water holders and river operators have become increasingly sophisticated in environmental water planning and delivery.

Nevertheless, we consider there is scope to enhance the environmental water management toolkit — including trading, delivery, constraints, infrastructure, and objectives — to better manage the identified risks to environmental outcomes.

4.2.1 Water trading

Water recovery for the Basin Plan has gone through an extensive accumulation phase, creating a large and diverse portfolio of environmental water holdings — totalling 2222.4GL.[52]

During this accumulation phase, the CEWH has been bound by the environmental purpose test in the Water Act 2007. Under section 106(2) of the Water Act, the CEWH may sell water only if:

[52] https://www.mdba.gov.au/sites/default/files/publications/Progress-on-water-recovery-as-at-31-December-2025.pdf

- the water is not required in the current water year to meet the Environmental Watering Plan; and
- the water cannot be carried over for use in future years, or would otherwise be forfeited or reduced.

There is also a re-investment test (under s106(3)) that allows the CEWH to sell if:

- all proceeds are used to:
  - buy other water, and/or
  - fund environmental activities (for allocations only); and
- the CEWH reasonably believes the sale improves the capacity of the portfolio to meet environmental objectives.

Commonwealth Environmental Water Trading Framework[53] (released in December 2025) clarified how water trades would be managed within these rules. To date[54], the CEWH has sold water allocations on five occasions, across three regions — there was also one intended trade action when no offers met the CEWH reserve price. Under the Framework, the CEWH publishes 'trade intentions' each quarter.[55]

Now that a large and diverse environmental water portfolio has been accumulated, and environmental water holders have developed and refined sophisticated approaches to plan and manage environmental deliveries, it may be timely for the CEWH to more actively manage held volumes through trade — similar to the opportunities available to other water users.

Given that many irrigation and environmental demands occur at different times, they may be complementary, with potential benefits from more active trade. We note, however, the broader context: under current arrangements, allocations can be accessed at any time within the water year and potentially carried over, subject to prevailing rules.

Trading of water entitlements may also assist the CEWH where accumulated holdings are larger in systems that require fewer additional flows than other systems, and where allocation trade between systems is limited or constrained.

Given the large and mature portfolio of water entitlements held by the CEWH, and the sophistication of other aspects of environmental water management, the limits on water trading may no longer be appropriate — and may be constraining the optimal management of risk to environmental outcomes.

4.2.2 River constraints

The Murray-Darling Basin Authority is required to prepare a Constraints Relaxation Implementation Roadmap. The MDBA[56] notes:

> The combination of river regulation and land use developments on the floodplain, means that water managers currently have limited ability to release water from dams in a way that reconnects rivers to their floodplains as often, or as far, as is needed

[53] https://www.dcceew.gov.au/sites/default/files/documents/cew-trading-framework.pdf

[54] https://www.dcceew.gov.au/cewh/manage-water/water-trading/past-trades

[55] https://www.dcceew.gov.au/cewh/manage-water/water-trading/trade-intentions

[56] https://www.mdba.gov.au/water-management/basin-plan/relaxing-constraints

The Victorian assessment found that relaxing river operational constraints on regulated environmental flows has the potential to deliver environmental, social, cultural and economic benefits to the Victorian community within the focus areas.[57]

In South Australia, the constraints measures project includes developing a government framework to support the management of environmental water delivery and an on-ground works program to remove physical barriers inhibiting environmental water from reaching the floodplains and wetlands.[58]

The CEWH has commented that "Relaxing constraints in the Basin is vitally important to achieve sustained improvement in the health of the Basin's floodplains and wetlands".[59]

Relaxing river constraints in the MDB is essential for enabling higher environmental flows — allowing water to flow over banks onto floodplains and into wetlands that have become disconnected from the main river channels. By increasing the flexibility to deliver water from storage dams, these initiatives re-establish more natural seasonal flow regimes, which are critical for restoring ecosystem health in a drier climate.

4.2.3 Infrastructure to support environmental water delivery

There are opportunities for investment in works to facilitate delivery of water to the floodplains — to assist with environmental outcomes related to floodplain connectivity.

The use of infrastructure for environmental watering has a demonstrable impact, as seen through 15 years of Living Murray environmental works. For example, this can be observed through the comparison of two Living Murray sites - Gunbower Forest and Koondrook–Perricoota Forest.

As noted in the MDBA's '20 years of the Living Murray', the Gunbower regulators were finalised in 2013. These works allow the diversion of water from Gunbower Creek to disperse it through the forest to approximately 4,750 hectares of river red gums and wetlands before spilling back into the creek. The Koondrook–Perricoota regulators were built in 2013, however the use of the regulators, even at very small flow rates resulted in inundation and damage to private infrastructure — which has limited the use of the regulators to date.

The stark difference between the use (and non-use) of the regulators can be observed from the report cards on the sites' condition. As summarised in the figure below (with 2007-08 at the bottom of the report card and 2022-23 at the top), the Gunbower Forest reports show that environmental outcomes have improved since the regulators were finalised in 2013, despite many years of dry conditions. In contrast, Koondrook–Perricoota Forest reports shows that poor environmental outcomes have persisted and there has been limited the use of the regulators for environmental watering to date.

[57] www.water.vic.gov.au/__data/assets/pdf_file/0025/709522/Victorian-CMP-Feasibility-study-technical-report.pdf

[58] www.environment.sa.gov.au/topics/water-and-river-murray/projects-plans-security-and-legislation/water-projects/constraints-measures-project

[59] https://www.dcceew.gov.au/cewh/resources-media/news/cewh-welcomes-mdba-constraints-roadmap

Figure 14: Demonstrated impact of Living Murray environmental works

Past reports for Gunbower Forest

YEAR	WEATHER PATTERN	OVERALL RATING	VEGETATION	WATERBIRDS	FISH	OTHER
2022–2023	very wet	B	B	A	B	B
2021–2022	wet	A	B	A	A	-
2020–21	moderate	B	B	B	B	-
2019–20	dry	B	A	A	B	B
2018–19	dry	A	A	A	B	-
2017–18	dry	B	A	B	C	-
2016–17	very wet	B	A	B	B	-
2015–16	dry	B	A	B	B	-
2014–15	dry	B	A	A	B	-
2013–14	moderate	B	A	B	D	-
2012–13	moderate	B	B	A	C	-
2011–12	wet	C	C	B	C	B
2010–11	very wet	B	B	A	C	-
2009–10	dry	C	B	C	D	B
2008–09	dry	C	C	C	B	B
2007–08	dry	D	D	C	C	D

Past reports for Koondrook–Perricoota Forest

YEAR	WEATHER PATTERN	OVERALL RATING	VEGETATION	WATERBIRDS	FISH
2022–23	very wet	D	D	D	D
2021–22	wet	D	D	D	D
2020–21	moderate	D	D	D	-
2019–20	dry	D	D	D	D
2018–19	dry	D	D	D	D
2017–18	dry	D	D	D	D
2016–17	very wet	C	B	B	D
2015–16	dry	D	D	D	C
2014–15	dry	D	D	D	D
2013–14	moderate	D	D	D	D
2012–13	moderate	D	D	D	D
2011–12	wet	D	C	D	D
2010–11	very wet	D	D	D	D
2009–10	dry	D	D	D	-
2008–09	dry	D	D	D	-
2007–08	dry	D	D	D	-

Source: MDBA 2024, 20 Years of The Living Murray, www.mdba.gov.au/sites/default/files/publications/20-years-of-the-living-murray_1.pdf; MDBA 2024, Gunbower Forest Report Card 2022–23, www.mdba.gov.au/climate-and-river-health/water-environment/progress-and-outcomes/gunbower-forest-report-card-2022; MDBA 2024, Koondrook–Perricoota Forest Report Card 2022–23, www.mdba.gov.au/climate-and-river-health/water-environment/progress-and-outcomes/koondrook-perricoota-forest-report

Infrastructure works have been shown to be effective in the management of risks to environmental outcomes. There are opportunities for further such investments, such as Victorian Murray Floodplain Restoration Project (VMFRP) sites that were proposed under SDLAM but are yet to proceed.

4.2.4 Arrangement for bulk environmental water delivery

There are opportunities for improvements in arrangements for environmental water delivery and management.

A key challenge in achieving environmental outcomes is using environmental held water entitlements within the delivery/property arrangements that were originally designed for irrigators and other consumptive users. Mechanisms have been created under the Basin Plan to facilitate effective environmental water delivery (i.e. Pre-requisite Policy Measures), and the Southern Connected Basin Environmental Watering Committee (SCBEMC) supports the coordination of the delivery of water for the environment.

The processes and communication around environmental water management (namely between EWH and river operators) have improved greatly over time, providing an improved basis for forward planning and greater confidence. For example:

- The River Murray System Annual Operating Outlook (AOO) now includes assumptions on expected demands of water for the environment in the Southern Basin. These assumptions are based on consultation with the Commonwealth and state Environmental Water Holders (EWHs), through SCBEWC, on how water for the environment may be used.

- There are formal shortfall response plans, such as the River Murray Shortfall Response Plan (MDBA, with collaboration from NSW, VIC, SA) and the Victorian River Murray Shortfall Response Plan.
- There is a non-interruptible event list in Victorian systems (in the context of Place of Take approvals Framework) — where the Victorian Environmental Water Holder works with DEECA ahead of summer to identify any planned environmental watering actions that should be treated as uninterruptible in a shortfall, to avoid causing irreparable damage to the environment.[60]
- The ordering process for environmental water deliveries has been refined.

All this means that environmental information is better taken into account in system management, and that environmental planning for water delivery is strengthened.

However, additional improvements may further facilitate the management of risks to environmental outcomes. For example, the Objectives & Outcomes for River Operations (O&O) that guides river operators sets objectives on the MDBA involving balancing multiple requirements — including the objective "to contribute to the protection and, where possible, restoration of priority environmental assets and ecosystem functions within the system". Currently, there is limited guidance on how the MDBA should make decisions about trade-offs. There may be ways in which Basin Officials Committee (which produce the O&Os) could further direct river operators to manage environmental water delivery, especially in shortfall events or times of limited river capacity. This could further strengthen environmental planning for water delivery.

4.2.5 Realistic objectives

Consultation presentations by the MDBA communicated that Murray Mouth and end-of-system objectives are being re-thought and may not be realistic to achieve. Basin Plan sections 8.06(3)(d)[61] and (e)[62] are used as arguments against reliance on long-term dredging as a substitute for flows, and Schedule 5 of the Basin Plan (Enhanced environmental outcomes) requires that the mouth of the River Murray is open without the need for dredging in at least 95% of years, with flows every year through the Murray Mouth Barrages. However, the dredging of the Murray Mouth observed in 2002-2010 recommenced in January 2015 with two dredges operating in the Goolwa and Tauwitchere channels until the 2022–23 River Murray flood, Dredging then ceased in November 2022 and recommenced in November 2023.[63]

Recent studies have also found that constraints relaxation projects do not effectively contribute to Murray mouth environmental objectives. For example, the Victorian constraints feasibility study[64] found that the beneficial environmental impacts of relaxing constraints in the mid-Murray and Goulburn tend to decrease with increasing distance downstream of the Barmah Choke. The modelling suggests relaxing constraints would result in no change in the frequency of environmentally desirable higher flow rates in the Murray River at the South Australian border (and beyond).

[60] https://waterregister.vic.gov.au/images/documents/Victorian-Murray-Shortfall-Response-Plan-April-2026.pdf

[61] 8.06(3)(d) requires that: "the Murray Mouth remains open at frequencies, for durations and with passing flows sufficient to enable the conveyance of salt, nutrients and sediments from the Murray–Darling Basin to the ocean."

[62] 8.06(3)(e) requires that: "the Murray Mouth remains open at frequencies, and for durations, sufficient to ensure that the tidal exchanges maintain the Coorong's water quality within the tolerance of the Coorong ecosystems' resilience."

[63] https://soe.epa.sa.gov.au/environmental-themes/river-murray/state-of-the-murray/lower-lakes-and-murray-mouth

[64] www.water.vic.gov.au/__data/assets/pdf_file/0027/709524/Victorian-CMP-Feasibility-study.pdf

Our understanding is that many of the environmental challenges in the MDB arise from the regulation of water flows (and associated structures), rather than solely from the extraction of water for consumptive uses (as is being addressed via water recovery).

In our view, water recovery to pursue aspirational objectives does not represent good policy. Rather, environmental water managers should be given realistic objectives as well as the appropriate tools to best contribute to the achievement of these environmental outcomes.

4.2.6 Conclusion

Irrigators have become highly efficient — the environment needs to do the same.

There is scope to enhance the environmental water management toolkit, enabling improved environmental outcomes from better management of the large environmental water portfolio accumulated through water recovery to date.

Frontier Economics

Brisbane | Melbourne | Singapore | Sydney

Frontier Economics Pty Ltd
395 Collins Street Melbourne Victoria 3000

Tel: +61 3 9620 4488
www.frontier-economics.com.au

ACN: 087 553 124 ABN: 13 087 553 124