

WENTWORTH GROUP

OF CONCERNED SCIENTISTS

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Advice on Basin Plan Amendment Instrument 2017 (No. 1)

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Summary of Advice

The Murray-Darling Basin Plan (the Basin Plan) provides for the Murray-Darling Basin Authority (the Authority) to conduct research and investigations to inform amendments to the Basin Plan, including changes to Sustainable Diversion Limits (SDLs; s6.06 (1)). Following reviews of SDLs in the northern Basin and groundwater diversion limits in 3 zones in the Basin, a legislative amendment was tabled in the Senate on 4 November 2017. The amendment included a 70GL increase in SDLs in the northern Basin (from 390GL to 320GL recovery), and an increase of 160GL to SDLs in three groundwater areas.

The Wentworth Group is committed to reforms in the Murray-Darling Basin which secure the environmental, social and economic future of the Murray-Darling Basin as a whole. We also support an adaptive plan which is reviewed and improved on the basis of targeted and efficient monitoring, new science and evolving knowledge of the opportunities and risks that may affect that future.

The Wentworth Group does not however support this amendment because, in its current form, it will undermine the objectives of the Basin Plan and render the Basin Plan inconsistent with the Water Act requirement to develop the Basin Plan “on the basis of the best available scientific knowledge and socio-economic analysis.” This is because:

- 1. The amendment does not adequately protect important flow events (e.g. environmental flows, low flows) from being diverted by irrigators.** Environmental water recovered in the northern Basin under the Basin Plan can continue to be legally diverted by irrigators in valleys including the Barwon-Darling and the Balonne. Furthermore, the amendment fails to prevent irrigators from extracting important flow events which would otherwise supply the river, downstream communities and businesses with water (e.g. Wilcannia, Broken Hill, Lower Darling), particularly during low flow periods including drought.¹
- 2. The Authority ignored recommendations to mitigate impacts of water recovery on communities, and instead lowered environmental standards of the Basin Plan to avoid assumed impacts.** In reviewing SDLs in the northern Basin, the Authority failed to consider recommendations of the statutory Northern Basin Advisory Committee to mitigate adverse impacts of water recovery on communities. The only option presented to communities is an amendment which lowers environmental targets in attempt to avoid assumed socio-economic impacts, affecting sites including the Ramsar-listed Macquarie Marshes, and the Condamine-Balonne floodplain where the proposed flow targets are no longer consistent with Basin Plan objectives.
- 3. Environmental outcomes are likely to be worse than modelled because necessary policy measures are not guaranteed in legislation.** The Authority’s recommendation to increase surface and groundwater limits is contingent on policy measures which are not guaranteed under the current amendment (e.g. coordinating environmental watering, recovering water strategically, effective compliance). Governments have not yet demonstrated they are willing to and capable of implementing these measures to a standard consistent with model assumptions.
- 4. States have not demonstrated they are capable of managing risks of increased groundwater extractions.** Risks resulting from increasing the SDLs are likely to be significant in the Eastern Porous Rock and Goulburn-Murray SDL units where groundwater is well connected to surface water, and in the Western Porous Rock units where four large mines have been proposed.

5. **Supporting this amendment will further erode the public trust in governments to successfully implement reforms**, in the context of serious management failures, including alleged water theft and inadequate compliance and enforcement as revealed by ABC's Four Corners, the Matthews Review in New South Wales, ongoing NSW ICAC inquiries involving the Barwon-Darling, a court case concerning a farmer in the Barwon-Darling, an investigation by the Queensland Major Organised Crime Squad in the Border Rivers, a Basin-wide Compliance Review and the South Australian Royal Commission.

We recommend that Parliament does not support any changes to the Basin Plan until COAG agrees on a sufficiently robust strategy that is capable of delivering the Basin Plan in full and on time (see five recommendations in [Review of Water Reform in the Murray-Darling Basin](#)).

In addition, we propose five further recommendations aimed at ensuring that future reviews fulfil their intended purpose and result in amendments that are consistent with the Basin Plan's objectives and the Water Act:

1. The Parliament should not consider any change to the sustainable diversion limits until statutory event-based protection of flows (including environmental flows and low flows) is clearly codified and transparent across all northern Basin rivers. Non-statutory based measures are not sufficient: statutory measures are necessary (e.g. via Water Resource Plans reviewed regularly), with interim protection prior to 2019.
2. The Murray-Darling Basin Authority must consider structural adjustment measures to mitigate impacts of water recovery on smaller communities in any review of sustainable diversion limits.
3. There should be no change to surface and groundwater sustainable diversion limits until statutory measures are in place which guarantee Basin governments will implement specific water management measures (e.g. coordination of environmental flows; strategic recovery of water entitlements; and effective compliance) in a way that is consistent with assumptions in the hydrological model.
4. Prior to any change in the sustainable diversion limits for groundwater, Victoria and New South Wales Governments must demonstrate to the Commonwealth Government they are capable of implementing water management rules which will enable risks of groundwater extractions to be managed to acceptable levels.
5. Monitoring, compliance and enforcement regimes should be implemented and properly resourced at both State and Commonwealth levels.

Basin Plan Amendment Instrument 2017 (No. 1): Key issues

Issue 1. The amendment does not adequately protect important flow events (e.g. environmental flows, low flows) from being diverted by irrigators.

In a Basin-wide compliance review released in November 2017, an independent panel found “a concerning systemic failure to protect low flows in unregulated rivers in the northern Basin. Further [...] there has been a failure to ensure that the in-stream water holdings are protected from take.”¹ The independent panel also found that there have been attempts by Basin governments to weaken rules for protecting environmental water over the past 10 to 15 years.¹

Under current arrangements, environmental water recovered under the Basin Plan is at risk of being lawfully extracted in the northern Basin including in the Barwon-Darling. Nine weeks before the Basin Plan was passed in 2012, the New South Wales Government made several changes to the Barwon-Darling Water Sharing Plan including¹:

- Allowing transfer of B and C Class licences to A Class conditions (meaning that large diverters can pump at lower river heights, previously reserved for stock & domestic or small holdings);
- Unlimited carryover of water from year to year;
- An individual take limit of 300% in any one year for some water entitlements;
- Not setting of individual daily extraction limits, although the plan does allow for limits to be set;
- A discretionary power to allow individual entitlement holders to continue pumping in defined circumstances once the cease to pump level has been reached; and
- Removal of pump size limits.

These changes give consumptive users the legal right to capture larger volumes of water, favouring irrigators, including two large agribusinesses with 70% of the Barwon-Darling holdings. Importantly, the rules allow irrigators to take advantage of river levels that are elevated as a result of environmental water recovered under the Basin Plan. For example, the rules allow Bengarang Ltd to pump larger volumes of water more quickly under A class licences using twelve pumps with a diameter of 600-660mm, a size that was restricted under the previous Water Sharing Plan. This water would have previously been left in the river for the environment and communities. Long term sustainable diversion limits are not sufficient. Without policy change, environmental flows recovered under the Basin Plan are at risk, and breaches of the sustainable diversion limits are more likely to occur as irrigators harness and expand the capacity of their infrastructure to capture and store water.

The second issue is that irrigators can legally extract low flows including flows below 2000ML/d at Bourke which are critical for water users (particularly stock and domestic), the environment and communities during dry periods. Rule changes have made available larger volumes of A Class licences which provide for extraction when river levels are low. Data recently gathered and analysed by the Murray-Darling Basin for rivers across New South Wales “indicates strongly that since the mid 2000s there has been significant loss of low flows, with low flows in some NSW river reaches completely disappearing.”¹ This Basin-wide compliance review found that “either or both state water rules and compliance action have been unable to protect low flows; much greater effort is required to protect this important part of the hydrograph.”

Despite the large body of evidence of the importance of low flows identified in the MBDA’s scientific review, the decision to increase sustainable diversion limits by 70GL in the northern Basin was based on hydrological modelling which failed to properly represent low flow indicators. This jeopardizes communities (e.g. Wilcannia, Broken Hill, Lower Darling), and is inconsistent with the Water Act requirement to use “best available scientific knowledge.”

The failure to protect individual flow events is not confined to the Barwon-Darling – it is a systemic failure across rivers of the Northern Basin affecting the lower Balonne above Beardmore Dam and even regulated

rivers such as the Namoi River where there are attempts by New South Wales authorities to reduce environmental flow protection as part of the Water Resource Plan accreditation process under the Basin Plan.¹

Recommendation

- 1) The Commonwealth should not consider any change to sustainable diversion limits until event-based protections of flows for the environment and water users are codified, transparent and legislated across all northern Basin rivers in addition to long-term extraction limits. Non-statutory based measures are not sufficient: statutory measures are necessary (e.g. via Water Resource Plans), with interim protection prior to 2019.
 - a) Statutory measures can include individual and total daily extraction limits, embargoes on extractions during environmental watering events, limits on pump sizes, limits to on-farm storage capacity, adjustment of commence-to-pump and cease-to-pump thresholds and river operating rules.
 - b) Specific recommendations for protecting environmental water in the Barwon-Darling Water Sharing Plan (BD WSP) include:
 - i) The BD WSP must be amended to inter alia: limit access to A Class flows to 150mm pumps; introduce Individual Daily Extraction Limits and Total Daily Extraction Limits; remove continuous accounting in unregulated rivers;
 - ii) Best-practice compliance and enforcement and the aforementioned amendments to the BD WSP are crucial to protect low flows. Clauses 48, 49, 50 of BD WSP relating to irrigator access to no-flow and low-flow events when flows are imminent should be removed or replaced with provisions that better protect low flows. Access should be limited to stock and domestic use with some monitoring of this use;
 - iii) Growth in on-farm storage capacity should be restricted: WSP's without limits on on-farm storage capacity make it more likely that environmental flow events will be captured, and breaches of the SDL will occur in the future; and
 - iv) Stock and domestic access below Bourke – which has been compromised by the introduction of the BD WSP - must be guaranteed. This includes an assurance of adequate water quality. Best-practice compliance and enforcement and the aforementioned amendments to the Barwon-Darling WSP are crucial in this regard.
 - c) The test to ensure event-based protection is adequate is through adequate river gauging (including all inflows) combined with metering of all extractions (including floodplain harvesting) so that environmental watering events, low flows, and other important events can be tracked and assessed by experts to ensure consistency with the objectives in the Basin Plan and the Basin-wide environmental watering strategy. This should be combined with computer models that demonstrate that 'planned' environmental water is protected, both on an event-by-event basis and in the long term, and there is no net reduction in 'held' environmental water as per the Water Act.

Issue 2: The Authority ignored recommendations to mitigate impacts of water recovery on communities, and instead lowered environmental standards of the Basin Plan to avoid assumed impacts.

The Northern Basin Advisory Committee was established under s203 of the Water Act 2007 to advise the Authority on aspects of implementation of the Basin Plan. In the final advice to the Murray-Darling Basin Authority in 2016, the Northern Basin Advisory Committee recommended that the "Basin Plan will succeed only if [...] structural adjustment is provided."⁸ The amendment fails to take into account the recommendations of the statutory Northern Basin Advisory Committee for structural adjustment. Less than 1% of the \$13 billion investment in water reform is available for communities.

Ignoring structural adjustment means that the only alternative for governments is to reduce water recovery to mitigate adverse impacts on communities. Lowering water recovery volumes will reduce the achievement of environmental targets, expressed as site-specific flow indicators, from 49% under the current Basin Plan to 44% under the amended Basin Plan,² and the overall probability of achieving site-specific flow indicators will be lowered.

In the Condamine-Balonne river system, modelling shows that the frequency of flows on the inner Culgoa floodplain will only improve by 11% and there will be no improvement in the frequency of outer floodplain flows as compared to the 2009 baseline.³ This fails to meet the Murray-Darling Basin Authority's own target of "a 30 to 60% increase in the frequency of freshes, bank-full and lowland floodplain flows" in the Condamine-Balonne.⁴ As a result, "vegetation stress with increasing dry spell length likely to lead to changes in floodplain vegetation composition and condition, moving towards less water dependent species. This may also lead to loss of habitat for native fish and birds."

In the Macquarie River, the Authority recommended a 14% reduction in water recovery (from 83GL to 71GL). This is despite an Article 3.2 notification by the Commonwealth Government to the Ramsar Convention on Wetlands in 2009 that the Macquarie Marshes were likely to experience a change in ecological character.⁵ In the Article 3.2 notice, the Government stated that 'the most significant action in place to help respond to the threats currently facing the Macquarie Marshes and other important waterways, is the Australian Government's AUD\$3.1 billion Restoring the Balance in the Murray-Darling Program'.

The combined effects of the Northern Basin Review (reduction of 70GL) and the SDL adjustment (proposed reduction of 605GL) on end-of-system flows has not been published, however the total surface water recovery with these policies in place is below the 2,400GL scenario which, according to MDBA modelling in 2011 "was insufficient to achieve a number of key environmental objectives for the River Murray" depriving many ecosystems including the Ramsar-listed Riverland and the Coorong, Lower Lakes and Murray Mouth from sufficient flows.

Recommendation

- 2) Any review of sustainable diversion limits should include structural adjustment measures to address adverse socio-economic impacts, as recommended by the Northern Basin Advisory Committee. This requires:
 - a) Assisting communities most affected by water recovery to restructure their economies to adapt to a future with less water; and
 - b) Linking public funding directly to the Basin Plan, by the Commonwealth working directly with community leaders, local government, regional development boards and natural resource management agencies to recover the water in a manner that optimises regional development opportunities for those communities.

Issue 3: Environmental outcomes are likely to be worse than modelled because necessary policy measures are not guaranteed in legislation.
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Hydrological modelling by the Authority included assumptions to improve the effectiveness of the water recovered in the northern Basin:

- Coordinating the release of environmental water from dams in the northern Basin with other river operations to achieve improved outcomes in the Barwon–Darling River, when in practice the watering strategies are still "undergoing development;"⁶
- Strategic targeting of water recovery in particular locations and for particular entitlement types, when in reality the water recovery program is based on voluntary participants from all valleys that is not necessarily targeted; and

- Effective compliance whereby the water minister intervenes promptly at every instance of non-compliance, when the Matthews Review found that “certain individual cases of non-compliance have remained unresolved for far too long.”⁷

The amendment provides no assurance that the Basin governments will implement these policy measures in a way that is enduring and consistent with the hydrological model to deliver expected outcomes. Without these measures in place, more environmental water would be required to deliver the expected environmental outcomes, leaving less water for extraction. It is not clear how much more environmental water would be required because the Murray-Darling Basin Authority has not published this scenario.

Failure to codify the necessary rules is inconsistent with the approach to establish sustainable diversion limits in 2012 in which clear ramifications were stipulated in the Basin Plan if states failed to deliver the “unimplemented policy measures” assumed in the hydrological modelling (s7.15 (1) (b) (ii)).

The Authority’s recommendation to increase sustainable diversion limits by 70GL in the northern Basin was based on the willingness and capacity of the New South Wales and Queensland Governments to implement specific policy measures. However in its current form, the amendment contains no statutory obligations to ensure that New South Wales and Queensland Governments will implement the necessary measures.

Recommendations

- 3) Key assumptions in the hydrological modelling are mandated in legislation and in effect in practice before there is any change to the sustainable diversion limit. This includes Toolkit measures recommended by the Northern Basin Advisory Committee⁸, particularly those related to environmental flows, subject to specified qualifications:
 - a) More targeted water recovery (not just the volume) especially through the Condamine–Balonne and Barwon–Darling river systems;
 - b) Event-based mechanisms to benefit some environmental assets, including the Narran Lakes and Lower Balonne Floodplain;
 - c) Statutory-based coordination of environmental releases from storages across the Northern Basin for improved environmental outcomes in the Barwon–Darling; and
 - d) Statutory-based environmental flow protection (including in the Condamine Balonne upstream of Beardmore Dam, see above).
- 4) Independent, peer-review of model assumptions is required,⁹ especially assumptions related to:
 - a) Coordination of tributary flows, to ensure that model assumptions are realistic given the statutory provisions; and
 - b) Long term cap breach (models currently assume that the Minister intervenes when breaches are identified, which is not current practise).
- 5) Any change in the sustainable diversion limits for the northern Basin must ensure that:
 - a) Model settings/assumptions are consistently applied across each of the water recovery scenarios;
 - b) All Water Resource Plans are accredited and sustainable diversion limits are reflected in accredited hydrological models;
 - c) Up-to-date estimates of floodplain harvesting are incorporated into models to assess sustainable diversion limits;
 - d) A public audit of all storages in the Northern Basin is undertaken and results incorporated into modelling;
 - e) Flow indicators represent the full range of ecologically important flows, including low flows in the Barwon-Darling, to ensure the ecological outcomes are adequately represented;

- f) Floodplain inundation model (e.g. CSIRO TVD) should be incorporated to improve understanding of all overbank environmental flow requirements.
- 6) Any future changes in modelled planning assumptions must be a result of a comprehensive review of planning assumptions across all valleys in the northern Basin (to avoid cherry-picking of only those valleys that result in a particular recovery outcome).

Issue 4: State governments have not demonstrated they are capable of managing risks of increased groundwater extractions.

The Authority's recommendation to increase groundwater sustainable diversion limits by 160GL in three zones across the Basin poses risks where aquifers are connected to groundwater dependent ecosystems and surface water bodies. The outcome of the proposed amendments to increase groundwater SDLs rests on how well state governments can manage the current and future impacts of use within the groundwater and surface water zones. Further assurance is needed that New South Wales and Victoria have adequate rules in place to ensure these risks are properly managed.

The proposed amendments would also allow 160GL of "additional water to be taken from three groundwater areas once the states demonstrate how they will limit impacts to acceptable levels" (MDBA 2017). Risks of increasing the SDLs are likely to be significant in the Eastern Porous Rock and Goulburn-Murray SDL units where groundwater is well connected to surface water. Future impacts of groundwater use are likely to increase with growth in mining activities. In the Western Porous Rock SDL resource unit, five mines located within the region use some of the 63GL of water which is extracted annually from the unit. Active exploration licences are expected to lead to a significant increase in mining activities and water use into the future. The NSW government informed the MDBA that future demand for water from four proposed mines in the Western Porous Rock SDL resource unit is estimated at 121.5GL/year.¹⁰

Recommendation

- 7) Prior to any change in the sustainable diversion limits for groundwater, Victoria and New South Wales Governments must demonstrate they are capable of implementing the water management rules to manage risks to acceptable levels. Future changes to groundwater SDLs should be conditional on:
 - a) The extent to which management plans address risks of groundwater use in the immediate area, the catchment, and the Murray-Darling Basin; and
 - b) Annual groundwater bore monitoring linked to adaptive extraction limits, such that extraction limits can only be increased if there is evidence that no long term depletion of the groundwater resource is occurring, while extraction limits can be reduced if there is evidence of long term depletion (this practice is routinely applied in setting fishing quotas).

Issue 5: Supporting this amendment in the context of serious management failures will further erode the public trust in governments to successfully implement reforms.

Following allegations of water theft in the Barwon-Darling River raised on the ABC's Four Corners program in July 2017, an independent investigation into New South Wales water management and compliance by Mr Ken Matthews (2017) found that "water-related compliance and enforcement arrangements in NSW have been ineffectual and require significant and urgent improvement." The Matthews review states⁷:

- "The overall standard of NSW compliance and enforcement work has been poor.
- Arrangements for metering, monitoring and measurement of water extractions, especially in the Barwon-Darling river system, are not at the standard required for sound water management and expected by the community.
- Certain individual cases of alleged non-compliance have remained unresolved for far too long.

- There is little transparency to members of the public of water regulation arrangements in NSW, including the compliance and enforcement arrangements which should underpin public confidence.”⁷

A subsequent 2017 Basin-wide compliance review by the Murray-Darling Basin Authority triggered by the Four Corners allegations in the northern Basin identified failures in the regulatory framework at the Commonwealth level. The review found “the MDBA has not given sufficient attention to compliance, has not provided a clear statement of its compliance role, and has not dealt adequately with allegations of compliance breaches.”¹ Water audit monitoring reports and reports by the independent audit group for assessing compliance with extraction limits have not been published by the Authority since 2010-11 after states withdrew funding for joint programs, and groundwater assessments are not publically available. There are also issues with the models that are used for assessing compliance: (1) use of three non-accredited models and four temporarily-accredited models,¹¹ (2) lack of up-to-date demand data in model calibration, and (3) possible overestimation of baseline and sustainable diversion limits.¹² More than 68% of water extractions in Queensland are unmetered each year on average, and 34% of extractions are unmetered in NSW.¹ As a result, it is not possible for anyone to have confidence that diversion limits are being complied with.

During the Northern Basin Review public consultation process from November 2016 to February 2017, the Authority withheld from the public the actual model scenario upon which their recommendation was based. It was not until November 2017, nine months after the community consultation process, when this model scenario was published.² In the 207-page report entitled ‘Hydrologic modelling for the Northern Basin Review’, the MDBA described up to 24 different modelling scenarios but acknowledged “[t]he 320 GL option recommended by the Authority is not provided as a model scenario in this report, but most of its aspects were drawn from existing scenarios.”¹³ Withholding key evidence from communities during the public consultation process is not transparent and undermines the scientific credibility of the northern Basin review. Full transparency in any review of the sustainable diversion limit is crucial if community confidence in Basin Plan implementation is to be restored.

Amending the Basin Plan in a context of these failures, combined with the level of community concern and lack of trust regarding water management, will further erode public confidence in the ability to implement successful reforms.

Recommendation

- 8) Monitoring, compliance and enforcement regimes should be implemented and properly resourced at both State and Commonwealth levels. In the context of the proposed amendments, this requires:
 - a) The method for determining breaches of the sustainable diversion limits is based on a robust system of metered diversions, in accordance with the recommendations by Matthews (2017); and
 - b) Estimates of consumptive use should be based on metered diversions against an accredited sustainable diversion limit model for a particular year, rather than modelled use for a particular year.
- 9) Any amendment to the Basin Plan must be based on best available knowledge, scientifically robust and transparent. This requires the Authority to publish all evidence justifying their decision, including a single, specific hydrological model run prior to any change to the legislation.

References

- ¹ MDBA 2017. Basin-wide Compliance Review: Report by the Independent Review Panel. Murray-Darling Basin Authority, Canberra
- ² Based on SFI results from Appendix A in MDBA 2017, Hydrologic Modelling for the Northern Basin Review – Interim Decision Scenario Addendum November 2017, Murray-Darling Basin Authority, Canberra.
- ³ Inner floodplain frequency based on a flow of 15,000 ML/d for 10 days at any time of the year at Brenda on the Culgoa River (CB7) occurring 1 in 7.1 years (baseline) and 1 in 6.3 years (320GL), and outer floodplain frequency based on a flow of 38,000ML/d for 6 days at any time of the year at Brenda on the Culgoa River (CB9) occurring 1 in 28.5 years (baseline) and 1 in 28.5 years (320GL).²
- ⁴ MDBA (2014). Basin-wide environmental watering strategy. Canberra, Murray-Darling Basin Authority. 20/14.
- ⁵ <http://www.environment.gov.au/water/topics/wetlands/database/pubs/28-art-3-2-notification-20090717.pdf>
- ⁶ MDBA 2016, Environmental outcomes of the Northern Basin Review. Murray-Darling Basin Authority, Canberra. P66
- ⁷ Matthews, K. 2017. Independent investigation into NSW water management and compliance. Interim Report, Prepared for New South Wales Department of Primary Industries.
- ⁸ NBAC, 2016. Finding the balance: Final report of the Northern Basin Advisory Committee, 9th October 2016.
- ⁹ Paid consultants do not meet this standard.
- ¹⁰ Evans, R. Murrphy, E. 2014. Western Porous Rock Groundwater Sustainable Diversion Limit Review: Interim Synthesis Report, Sinclair Knight Merz, Canberra.
- ¹¹ MDBA, 2015. *Annual Report 2014-15*. Murray-Darling Basin Authority: Canberra.
- ¹² Grafton, R.Q., 2016. *Water reform and planning in the Murray-Darling Basin, Australia*. Water Economics and Policy. **3**(3).
- ¹³ MDBA 2016. Hydrologic modelling for the Northern Basin Review. Canberra, Murray-Darling Basin Authority.