

Report to the MDBA by the Review Panel of the Eastern Porous Rock Water Resource Plan Area in NSW

Introduction

The Basin Plan has set Sustainable Diversion Limits (SDLs) for all groundwater and surface water resource units across the Murray-Darling Basin. The SDLs define the long-term average volume of water that can be taken from the resource unit and will take effect on 1 July 2019.

SDLs have been set with the objective of establishing environmentally sustainable limits on the volume of water that can be taken for consumptive use from Basin water resources, having regard to social and economic impacts. Determining the SDL volume requires careful consideration of water availability, environmental objectives and requirements, socio-economic requirements and system constraints within a balanced policy position.

Information and knowledge used to inform the setting of SDLs can improve over time; for this reason, the Basin Plan includes a review mechanism. Under Section 6.06 of the Basin Plan, the Murray-Darling Basin Authority (MDBA) may, in consultation with the Basin States and other interested persons, or at the request of the Murray-Darling Basin Ministerial Council, undertake reviews of the Basin Plan, including in relation to whether there should be changes to the SDLs. The reviews must have regard to the management of climate change risks and include an up-to-date assessment of those risks, and consider all relevant knowledge about the connectivity of surface and groundwater, the outcomes of environmental watering and the effectiveness of environmental works and measures.

In setting SDLs, there were three groundwater resource units where differing views existed between the MDBA and Basin States as to the magnitude of the appropriate SDL that could not be resolved prior to the Basin Plan being made. These are the:

- Western Porous Rock SDL resource unit (NSW);
- Eastern Porous Rock Water Resource Plan area (NSW); and
- Goulburn-Murray Sedimentary Plan SDL resource unit (Victoria).

Accordingly, a mechanism was included in the Basin Plan under Section 6.06 (Clauses 6 to 9) that requires a review of the long-term average SDL and the Baseline Diversion Limit (BDL) for each of these resource units to be undertaken within two years of the commencement of the Basin Plan. The review(s) must consider all relevant information about the SDL resource unit, including modelling, State planning and policy arrangements and an evaluation of the appropriateness of any precautionary factors associated with setting the SDL. The Basin Plan also provides general guidance on the experts who should be invited to participate in the reviews as the Review Panel - the available members of the Independent Expert Scientific Committee on Coal Seam Gas and Coal Mining (IESC) as well as two individuals with expertise in groundwater or groundwater management nominated by the relevant State.

This report is the deliberations of the Review Panel appointed to the task of reviewing the Eastern Porous Rock Water Resource Plan (WPR) area (NSW).

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Review Panel Membership

The Review Panel membership was:

Malcolm Forbes (Independent Chair as agreed between MDBA and NSW Office of Water)
Professor Craig Simmons (IESC member; National Centre for Groundwater Research & Training)
Ms Jane Coram (IESC member; Geosciences Australia)
Dr Glen Walker (CSIRO, nominated by MDBA)
Michael Williams (NSW Office of Water)
Sue Hamilton (NSW Office of Water) by correspondence
Peter Hyde (MDBA)

The Panel was assisted by Ray Evans (Principal Hydrogeologist, SKM) as an independent expert, facilitator, and the prime author of the Synthesis Report (see below).

Essential Background Information

The MDBA, in collaboration with the NSW Office of Water, commenced the review for the Eastern Porous Rock WRP area by establishing the Review Panel and commissioning SKM to prepare a Synthesis Report. The Synthesis Report is a specially prepared report synthesising existing material to support the deliberations of the Review Panel. The *Eastern Porous Rock Water Resource Plan Area Review Synthesis Report* at Attachment A (the Synthesis Report) summarises currently available information on the Eastern Porous Rock WRP area including:

- hydrogeological characteristics of the Eastern Porous Rock WRP area;
- technical information relevant to the review (such as recharge, connectivity, groundwater quality); and
- technical information on how the SDL, BDL and State extraction limit have been determined, including information on methods, assumptions and precautionary/sustainability factors.

Review Panel Objectives

The objective of the review is “to review all available information relevant to the determination of SDLs and BDLs of the Eastern Porous Rock WRP area.” This should include a review of the science, methods and policies utilised by MDBA and NSW to determine the limits on groundwater take.

To achieve this, the Review Panel is tasked to provide recommendations to the MDBA on the determination of the SDL and BDL for the Eastern Porous Rock WRP area. These recommendations are to be based on the *Eastern Porous Rock Water Resource Plan Area Review Synthesis Report*, information presented during a review meeting and other relevant information.

Panel Deliberations

This report is a summary of the considerations and recommendations from the Review Panel. It should be read in conjunction with the detailed technical information contained within the Synthesis Report at Attachment A.

The Review Panel met on Friday 13th September, 2013 to discuss the various approaches and to formulate advice to the MDBA regarding the SDL volume currently proposed within the Basin Plan for the Eastern Porous Rock WRP area.

The Panel considered the information contained in the Synthesis Report at Attachment A and discussed various matters related to the technical detail.

The Panel noted that there were two major issues that required consideration. Firstly, the manner in which recharge had been assessed to derive the Sustainable Diversion Limit for each SDL resource

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unit in the WRP area. The Panel considered the recharge volumes as derived by both NOW and MDBA and concluded that, based on the level of uncertainty inherent in each estimate, that they were effectively similar. Further, the Panel concluded that there was little value to be gained in further refining the recharge rates or further investigating the technical basis of the recharge volumes, given that there were no independent studies of actual recharge rates in the Eastern Porous Rocks WRP area. The Review Panel then considered the manner in which the SDL volumes were derived from the recharge volume, noting that each agency, starting from an essentially similar position had derived significantly different sustainable extraction levels. Both agencies applied Sustainability Factors, however, the Panel noted that the approach MDBA had used was the more conservative and resulted in the lower estimate of SDL. This reflected MDBA's assessment of the risks associated with extraction from the water resource to the values of the Basin.

Secondly, the Panel considered the approaches used by each agency to derive the SDL volumes for the deep groundwater resource for both SDL resource units. NOW used a simple proportion of aquifer storage to derive an extraction volume available for use as a supplementary source of water as a one-off volume available for the life of the resource. Entitlements to water under the supplementary water (subcategory "storage") access licence would not be activated until there is no unassigned water available in the water source.

MDBA employed a different approach to deriving an SDL volume for the deep groundwater resource associated with both the Gunnedah-Oxley and Sydney Basins. Their method deducted from the total recharge the SDL volume for any SDL resource units overlying the deep groundwater resource, and then applied the RRAM approach to the residual water volume.

The Panel noted the NSW Office of Water derived long-term average annual extraction limit for the Eastern Porous Rock Groundwater Source is 266.1GL/year and that they have suggested to the MDBA a revised SDL for the Eastern Porous Rock WRP area of 146.6 GL/year (see later section). The Panel also noted that the MDBA derived SDL for the WRP area is 131.7 GL/year.

Local Area Management Rules

NSW has a number of avenues for managing local area impacts due to extraction. These are implemented either via the specific clauses of the relevant Water Sharing Plan or via State-wide Policy (such as the Aquifer Interference Policy). Together, these rules act to limit all impacts on agreed assets such as groundwater dependent wetlands, sites of cultural significance or other groundwater users to acceptable levels. The rules have the effect of further qualifying any extraction limit imposed by a WSP, but do so by managing the impacts of extraction as part of the outcome of the planning and management process. This approach is different from the Basin Plan in relation to groundwater.

The Basin Plan does not explicitly provide for these rules to be taken into consideration when deriving groundwater SDL volumes for resource units. This results in a situation where the Basin Plan may be proposing an approach that achieves a level of conservatism that is greater than that required if local area management rules were taken into consideration.

In the case of the Eastern Porous Rock WRP area, the relevant local area management rules are contained within Part 9 of the Water Sharing Plan and in Table 1 of the Aquifer Interference Policy. The assets that these rules protect are defined in Schedule 3 of the WSP.

The minimal impact considerations for aquifer interference (as detailed in the NSW Aquifer Interference Policy) for less productive groundwater sources for porous and fractured rock water sources are detailed as follows:

- 1) Water table

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- a) Less than or equal to 10% cumulative variation in the water table, allowing for typical climatic “post-water sharing plan” variations, 40m from any:
 - i) high priority groundwater dependent ecosystem; or
 - ii) high priority culturally significant site;listed in the schedule of the relevant water sharing plan. A maximum of a 2 m decline cumulatively at any water supply work.
 - b) If more than 10% cumulative variation in the water table, allowing for typical climatic “post-water sharing plan” variations, 40m from any:
 - i) high priority groundwater dependent ecosystem; or
 - ii) high priority culturally significant site;listed in the schedule of the relevant water sharing plan if appropriate studies demonstrate to the Minister’s satisfaction that the variation will not prevent the long-term viability of the dependent ecosystem or significant site.

If more than a 2m decline cumulatively at any water supply work then make good provisions should apply.
- 2) Water pressure
- a) A cumulative pressure head decline of not more than a 2m decline, at any water supply work.
 - b) If the predicted pressure head decline is greater than requirement (a) above, then appropriate studies are required to demonstrate to the Minister’s satisfaction that the decline will not prevent the long-term viability of the affected water supply works unless make good provisions apply.
- 3) Water quality
- a) Any change in the groundwater quality should not lower the beneficial use category of the groundwater source beyond 40m from the activity.
 - b) If condition (a) is not met then appropriate studies will need to demonstrate to the Minister’s satisfaction that the change in groundwater quality will not prevent the long-term viability of the dependent ecosystem, significant site or affected water supply works.

The Eastern Porous Rock Water Sharing Plan also sets out a series of sharing rules. These are:

- Total extractions in the groundwater sources are managed to the LTAAEL and the long term groundwater storage extraction limit;
- The plan includes a provision for review of recharge and long term average annual extraction limits during the fifth year of the plan;
- Aquifer interference;
- Protecting environmental values and groundwater dependent ecosystems;
- Managing connectivity and access rules;
- Available water determinations;
- Carryover and water accounts; and
- Trading of access entitlement.

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There are also a number of mandatory conditions applicable to each licence.

The Plan also sets out a series of adaptive management mechanisms that are used to manage the water resources of the resource unit. These include:

- The monitoring of plan performance;
- Setting plan performance indicators; and
- A mandatory review.

Section 43A(7) Notice

The Panel noted that NSW Office of Water had provided advice to MDBA as part of a Notice by the Murray-Darling Basin Ministerial Council under Section 43A(7) of the *Water Act 2007* on 6th August 2012 regarding a revision of the SDLs for a number of SDL resource units and WRP areas, and specifically, suggested a revised SDL for the Eastern Porous Rock WRP area of 146.6 GL/year.

Panel Conclusions

The Panel came to a number of conclusions as a result of its deliberations:

- The methods adopted by NSW Office of Water and MDBA have been applied to the Eastern Porous Rock WRP area in a manner that is consistent with each agency's policies;
- Though the levels of uncertainty associated with estimates of total rainfall recharge are not published by either agency, the panel was of the view that if MDBA and NOW estimated recharge volumes and had uncertainty values assigned to them, then the ranges of recharge determined by both approaches would essentially overlap – effectively, “different” results are harder to distinguish when realistic error bars are included. The science does not afford a greater level of precision.. The panel noted that no independent recharge studies exist and that the costs of obtaining further recharge information is high and the timeframe for obtaining such new information is outside the timelines of any decisions related to the adoption of SDLs for the Eastern Porous Rock WRP area under the Basin Plan;
- The determination of the volume of groundwater available from the deep groundwater resource is problematic in both cases. This means that the panel has no basis for concluding that either of the derived SDL values for the deep groundwater resource is more appropriate than the other;
- The current levels of extraction within the Spring Ridge area (representing the area where the majority of extraction is currently occurring within the WRP area) appear to be having little impact on resource performance. The Panel noted that these levels of extraction are of the same order of magnitude as the MDBA estimate of SDL for the outcropping area of the Gunnedah Oxley Basin SDL resource unit. The conclusion from this was that the MDBA approach may be too conservative, though it is acknowledged that the performance of the Spring Ridge area does not infer that any higher extraction rates will similarly have acceptable impacts;
- The choice of Sustainability Factor values for the shallow (outcropping) SDL resource units are dependent on interpretation of the risks associated with extraction; small changes in the perception of risk can introduce significant changes in the Sustainability Factor value, thus influencing the final SDL volume. The panel was of the view that the choice of Factor values was critical to the outcome and noted that large differences are possible in the final SDL volume derived based on two different (but essentially similar) approaches. Further, the panel was of the view that the Sustainability approaches and adopted Factor values are the dominant component driving the difference in final SDL volumes between the two approaches. The implications of this are that the final derived SDL volumes have a considerable level of uncertainty associated with them even though the two approaches are conservative;

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- Groundwater resources within NSW are managed within the constraints of individual WSPs and State-wide policies. These are designed to avoid unacceptable impacts as a result of any groundwater extraction;
- The Panel emphasises the importance of a rigorous monitoring, review and adaptive management regime to ensure the long-term sustainability of the resource where knowledge is limited. It is only through such a regime that greater knowledge of the system response will be gained and with it a greater level of confidence with the management of the resource through the Water Sharing Plan; and
- As a result, the only current justification for varying the SDL upwards would be on the basis of regulatory mechanisms to ensure that the groundwater system would be managed on an ongoing basis to ensure no adverse impacts on the system's key assets. The approach envisaged would be one of a statement of the high level outcomes that needed to be met, with a clear set of criteria that would need to be put in place to measure those outcomes.

Panel Findings

The Panel recommends that:

- (1) the MDBA could consider varying the SDL resource unit to 146.6GL as suggested by the NSW Office of Water once assurances were made by NSW that they can demonstrate that the resource will be managed via State policies and plans in such a way that impacts are limited to acceptable levels. These assurances would need to be explicit and would include a review of the assets listed in Schedule 3 of the WSP, an agreement on the criteria that would be used to define acceptable impacts and monitoring, compliance, review and decision making processes.