Lower Murray Shallow Alluvium (GS27a)

INITIAL SDL ASSESSMENT RESULT

The Authority is **confident** that the SDL continues to reflect an environmentally sustainable level of take and **proposes the SDL is maintained**.

It is recognised that the extent, nature of and planning for continued monitoring, evaluation and assessment is tailored by the New South Wales government for the management of local and site-specific areas of concern to maintain environmental outcomes.

It is important that the impacts of a changing climate continue to be actively considered for this SDL Resource Unit.

Figure 1: Lower Murray Shallow Alluvium (GS27a) SDL Resource Unit

The Authority is assessing whether the Sustainable Diversion Limit (SDL) for the Lower Murray Shallow Alluvium SDL Resource Unit (the **Unit**) continues to support environmental outcomes and reflect an environmentally sustainable level of take (ESLT).

This Assessment Summary provides an overview of the factors which are relevant to that work and the Authority's initial view. The summary draws on three 'Lines of Enquiry', engaging with the likelihood that environmental characteristics are met, the Authority's confidence in that assessment, and the consequence of an at risk finding. Line of Enquiry 1 – current Basin Plan implementation – has been considered as the primary line of evidence.

Information on the Lines of Enquiry and methodology used in this assessment is available in the *Summary of Assessment Approach* and the *SDL Assessment and Response Framework*. Information on the *Basin Plan Review Discussion Paper* and process for making a submission are available on the MDBA website.

About this Unit (as at June 2024)

Aquifer Storage/size (GL)	42,982
SDL as at June 2025 (GL/y)	81.9
Entitlement volume (GL)	77
Average annual take (2012/13–2022/23, GL/y)	6.1
Significant surface connections	NSW Murray (SS14)

The Water Resource Plan (WRP) that supports this Unit was commenced on 22 August 2023. The WRP includes the rules and arrangements that NSW are using to manage this Unit and maintain sustainability.

Utilisation at the time of the review

The pattern of use in this Unit varies. Given the SDL is a long-term average, the Authority expects variability every year depending on the climate, water availability, licence conditions, and individual water user decisions. Average annual actual take over the past 11 years is 7% of the SDL.

In this Unit, the initial assessment noted localised areas of environmental risk including potential impact of groundwater salinity on Groundwater Dependent Ecosystems and productive base. Risks are being managed through planned reductions in the groundwater table to prevent land salinisation and water logging.

Environmental outcomes at the time of the Review

Likelihood and confidence

Table 1 presents a compilation of the groundwater level and salinisation trend for this Unit, and the Authority's *confidence* in that assessment (i.e. low (L), medium (M) or high (H) surety of the finding).

Assessment characteristic	Short term (Past 12 years)			Long term (Past 40 years)		
	Rising/Stable	Declining	Confidence	Rising/Stable	Declining	Confidence
Groundwater Dependent Ecosystems (GDEs)	0%	0%	●○○	52%	32%	●●●
Surface water – groundwater connectivity	0%	0%	●○○	42%	22%	●●○
Productive base	0%	0%	●○○	54%	32%	●●●
Water quality	0%	0%	●○○	0%	2%	●○○

Table 1: Groundwater level and salinisation trend assessment over the past 12 and 40 years. A declining percentage of 30% or greater usually indicates a risk to groundwater levels supporting the relevant assessment characteristic. Regarding confidence, a single dot indicates low confidence in the trend data, two dots indicate moderate confidence, and three dots indicate high confidence.

As can be seen, there is insufficient data to assess groundwater trends over the past 12 years. Over the long term, two of the groundwater characteristics have been identified as having a declining trend of 30% or greater. Confidence in the assessment is high. Moderate groundwater level declines are observed in the area from the north-west of Swan Hill. However, the shallow groundwater beneath the River Murray is saline and poses a risk to GDEs and the declining trends are a positive outcome, due to risks from groundwater salinity potentially impacting productive base, rivers, and GDEs.

Noting there is limited monitoring data on changes in groundwater salinity, the assessment does not indicate risk to water quality.

Tables 2 and 3 below provide a summary of recharge information, and an assessment of the likelihood of full utilisation of the SDL. This information is relevant because it informs an assessment of recharge relative to take (current and by reference to the SDL) and how sensitive the Unit is to change in recharge (i.e. variability in conditions year to year) and increases in actual take.

In considering Table 2 below, note that:

- The 'proportions' can also be interpreted as a percentage. For example, a proportion of 1.29 indicates that the SDL is 129% of (or, 29% above) the recharge rate.

- If the SDL as a proportion of recharge is 1:1 they are equal, and if it is more than 0.9, risk is indicated because take is approaching the level of recharge.
- 'Buffering' relates to how big total aquifer storage is compared to recharge. An aquifer with a very large total storage will offer high buffering because it will take a long time for changes in recharge to affect overall groundwater levels. In that scenario, the aquifer is described as having 'low' sensitivity to changes in recharge. The reverse applies where total aquifer storage is relatively small. In that case it would have 'high' sensitivity to changes in recharge.

Recharge information					
Status of recharge knowledge base (modelled)	Proportion of SDL to recharge (modelled)	Proportion of aquifer storage to recharge estimate			Proportion of average annual take to recharge (modelled)
		Modelled	Buffering	Sensitivity	
Best available	0.24 No risk indicated	128	Moderate	Moderate	0.02

Table 2: Modelled recharge estimates as a proportion of the SDL, total aquifer storage and average annual actual take.

Potential *likelihood* of full utilisation of the SDL						
Very unlikely	**Unlikely**	**About as likely as not**	**More likely than not**	**Likely**	**Very likely**	**% Average annual take**
●						7

Table 3: Likelihood of take increasing to the SDL

Tables 2 and 3 reflect that SDL is less than recharge, that total aquifer storage provides a moderate degree of buffering against and moderate sensitivity to changes in re-charge. The assessment also shows that current average annual take is significantly less than half of the SDL and that full utilisation up to the SDL is *very unlikely*.

Environmental outcomes under a fully utilised SDL and climate impacted future

Full use of the SDL

It is important that the work of the review is conducted against the backdrop of a fully utilised SDL, reflecting that it is the SDL that must reflect an ESLT. As summarised in Tables 2 and 3, the initial assessment has considered a scenario where take increases and use reaches up to the SDL. This analysis considered new information about diffuse recharge as a proportion of the SDL, our knowledge of total aquifer storage and average annual actual take.

Climate change through to the 2036 Basin Plan Review and 2050

Table 4 presents a summary of the anticipated environmental impacts of climate change for the Unit by reference to the future recharge estimates.

SY2 climate scenario	Trend towards 2036		SY2 climate scenario	Trend towards 2050	
	Recharge greater than SDL **Low Risk**	Recharge less than SDL **High Risk**		Recharge greater than SDL **Low Risk**	Recharge less than SDL **High Risk**
Warmer and slightly wetter	●		Hotter and slightly wetter	●	
Warmer and drier	●		Hotter and drier	●	
Warmer and much drier	●		Hotter and much drier	●	

Table 4: Risk to assessment characteristics at full use of SDL using estimates of future recharge under future climate

Noting the low degree of certainty associated with the climate scenarios, this analysis showed low risk to groundwater levels across the six climate scenarios as recharge is greater than the SDL.

Initial Assessment

As noted, the assessment reflects low to medium rates of localised decline in groundwater levels that are largely related to operation of the salt interception scheme, which seeks manage risks to groundwater characteristics posed by land salinisation and water logging. The assessment also shows that average take is much lower than SDL and very unlikely to increase up to the SDL. Further, the assessment notes modelled recharge is currently greater than the SDL and there are no indications of any additional risks to assessment characteristics from the full use of SDL in any of the plausible future climate scenarios.

On the balance of all three Lines of Enquiry the Authority is **confident** that the SDL reflects an environmentally sustainable level of take at the resource unit scale and is supporting the Basin Plan's environmental outcomes under full implementation conditions.

It is recognised that ongoing monitoring, evaluation and assessment will be important, as will planning for and supporting maintenance of groundwater levels and quality.

Consideration of Response

The assessment considers that the localised risk to assessment characteristics that have been identified are being managed through the operation of the salt interception scheme.

It is recognised that ongoing monitoring, evaluation and assessment will be important to maintain environmental outcomes. The Discussion Paper engages with well-known challenges at a sub-Basin and Basin scale including river connectivity, salinity and groundwater re-charge.

Evidence summary

In addition to the standard evidence sources in the *Summary of Assessment Approach* available on the MDBA website, the following specific evidence sources were used to assess this unit:

- NSW Department of Climate Change, Energy, the Environment and Water (2024) Lower Murray Groundwater Source Groundwater annual report 2024, Lower Murray Alluvial Groundwater Sources PUB25/87
- NSW Department of Planning and Environment (2021) 2021 review of groundwater levels in alluvial groundwater sources of inland NSW. PUB22/15
- NSW Department of Planning, Industry and Environment (DPIE) (2019) Murray Alluvium Water Resource Plan – Groundwater Resource Description Appendix A INT17/227103
- Solar-Powered Desalination - Murray Irrigation Project