

Application and assumptions used for deriving the BDL-based 2024 LTDLE factors in Lachlan River

Introduction

The NSW Government is responsible for updating the 2018 Long-Term Diversion Limit Equivalence (LTDLE) factors when a water resource plan (WRP) is accredited in a river valley or the baseline diversion limit (BDL) model is revised with agreed-upon corrections and refinements. The Lachlan River WRP was accredited in May 2024. A revised NSW BDL model with appropriate model updates, including improved calibration and representation of the Water Sharing Plan (WSP), was used in the WRP.

This report details how NSW has updated 2024 LTDLE factors for the Lachlan River Valley. LTDLE factors reference the following:

- Consultation paper: NSW updated factors for water recovery (June 2018)
- Water reform technical report: Derivation of LTDLE factors in NSW (May 2018) (refer to this document for all inputs related to calculating the LTDLE factors including the reference files)

Data sources

Entitlements

The entitlements under BDL conditions (generally 30 Jun 2009) were reviewed, considering sources from the Water Information Reporting and Extraction (WIRE) system, General Purpose Water Accounting Report (GPWAR), and BDL scenario report of 'Lachlan Surface WRP' (Attachment B to Schedule F).

The WIRE system and GPWAR reporting were used to correct known errors and movement of entitlements in the first water year of the water sharing plan. The WIRE system has the longest historical records from 2004/2005 to the present day and has corrected known errors found in previous reports, therefore, entitlements in WIRE will be used in the calculation of updated LTDLE factors in the Lachlan River, as shown in Table 1.

Table 1: Lachlan River entitlements (BDL and current conditions)

Entitlement type	Shares (BDL WRP) (30 Jun 2009) ¹	Shares (WIRE) (30 Jun 2009) ²	Shares (GPWAR) (30 June 2010) ³
Domestic and stock	12,970	14,131	14,131
Local water utility	15,545	15,545	15,545
High security	27,682	26,775.1	26,775
General security	591,137	592,816.4	592,726
Conveyance	17,950	17,911	17,911
Total	665,284	667,178.5	667,088

¹ Attachment B to Schedule F. Lachlan SW WRP: BDL Scenario Model - Lachlan Regulated River System (September 2020)

² LACH_WaterAccounts_LTDLE_Factors (Sheet "Shares") from WIRE

³ General_Purpose_Water_Accounting_Report_-_Lachlan_Catchment_2009-2010.pdf

BDL diversions

The revised NSW BDL model was used in the Lachlan River WRP. The new model has been recalibrated and updated to a newer version of IQQM that represents the WSP rules better. A full list of changes is documented in BDL scenario report of 'Lachlan Surface WRP' (Attachment B to Schedule F). The BDL model was adopted as the primary data source to describe long-term (1895–2009) diversions in the Lachlan River Valley. Historical usage is affected by significant trade between General and High Security licences. Diversions estimated from the BDL model and from historical diversions are shown in Table 2.

Table 2: Lachlan River BDL diversions 1895–2009

Entitlement type	Diversions 1895–2009 (GL/y)	Average historical diversion from WIRE (2004–2024) (GL/y)
Domestic and stock	5.53	4.46
Local water utility	7.99	6.58
High security	10.33	49.48
General security	235.74	85.31
Conveyance	15.2	10.01
Total	274.79	155.84

Historical utilisation rates

The historical utilisation rate is calculated by summing the average available determination and the net temporary trade for each class of entitlement to give the total allocation account volumes available by class. The recorded usage by each entitlement class is divided by the total allocation account volume available to that class to give the level of activation by that class. The historical allocation account balance summary was from the WIRE. Table 3 shows the details of average historical account usage and the activation factors. The historical period was extended to 2004/2005 to 2023/2024 for better demonstration of the diversions over a wider range of climate conditions.

Table 3: Lachlan River allocation account balance summary (average 2004/2005 to 2023/2024)

Entitlement type	Share	AWD	Trade in	Trade out	Net trade	AWD+Net	Account usage	Use / (AWD+Net)
Domestic and stock	13,313	11,452.9	55.4	17.2	38.2	11,491.1	4,445.1	0.387
Local water utility	15,638	14,145.9	24.7	98.1	-73.4	14,072.5	6,583.3	0.468
High security	27,178	22,784.0	62,806.0	30,532.4	32,271.6	55,055.6	49,477.4	0.899
General security	590,297	324,843.6	58,470.8	88,605.7	-30,134.8	294,708.8	85,313.2	0.289
Conveyance	17,911	15,378.0	4.0	2,105.5	-2,101.5	13,276.5	10,010.0	0.754

Allocation reliability

The Murray–Darling Basin Authority (MDBA) has agreed that the allocation reliability indicated by the BDL model in the WRP represents the best available information to describe the reliability of allocations made to entitlements under the BDL conditions, as shown in Table 4.

Table 4: Lachlan River average allocation reliability

Entitlement type	Average reliability from BDL model run	Method description
Domestic and stock	1.000	All NSW water sharing plans require that these entitlements are fully available each year. Defined as 100%.
Local water utility	1.000	All NSW water sharing plans require that these entitlements are fully available each year. Defined as 100%.
High security	1.000	The modelled long-term average allocation at the end of the water year is used.
Conveyance	0.918	The long-term average allocation at the end of the water year is used. Note, no direct output variable in the model. Conveyance allocations were calculated using modelled GS allocations and based on rules in the WSP 2003 as at 1 January 2006. The share component and allocation lookup table is shown in Table 5.
General security	1.021	The modelled long-term average total effective allocation at the end of the water year is used. Note, this figure is not directly used by the LTDLE factor calculation. Modelled GS allocations were used to calculate the conveyance allocations.

Results

2018 factors

The Basin Plan BDL regulated component of the Lachlan River was 285,388 ML in the 2018 factors calculation. This is 10,598 ML (or 3.9%) higher than the revised Basin Plan BDL estimate (274,790 ML) in the Lachlan River WRP.

2024 factors

Table 6 sets out the basis for how the updated factors were determined in 2024. The revised Basin Plan BDL for the regulated component of the Lachlan River is 274,790 ML.

Key differences between 2018 and 2024 factors

- The Lachlan River BDL model used has been recalibrated in new software.
- The Lachlan River BDL model has a better representation of the WSP.
- Increases in entitlement shares from 2018 for Domestic and stock, High security and General security licence classes. Decrease in entitlement shares for Conveyance.
- Increase in trade, particularly out of Conveyance and General security and into High security.

All LTDLE factors have decreased, as shown in Table 5.

Table 5: Summary of 2018 and 2024 LTDLE factors

Entitlement type	2018 LTDLE Factors	2024 LTDLE Factors
Domestic and stock	0.402	0.387
Local water utility	0.530	0.468
High security	0.927	0.899
Conveyance	0.834	0.692
General security	0.396	0.381

Updated water recovery estimates

For a relative comparison, the environmental entitlements as of 31 December 2017 are used. These are consistent with those from the Water reform technical report: Derivation of LTDLE factors in NSW (May 2018). As shown in Table 6, the new factors result in a decrease in the LTDLE volume of both general and high security entitlements. This represents a total decrease of 1,820 ML in the LTDLE volume of recovery in the Lachlan River.

Table 6: Lachlan River entitlements, 2018 factors, 2024 factors derivation and BDL shares by entitlement class

Entitlement type	2018 entitlement shares	2018 factors	2018 BDL share (ML/y)	2024 entitlement shares	Average reliability	Utilisation factor	2024 factors	2024 BDL share (ML/y)
Domestic and stock	12,970	0.402	5,220	14,131	1.000	0.387	0.387	5,466
Local water utility	15,545	0.530	8,237	15,545	1.000	0.468	0.468	7,272
High security	24,557	0.927	22,772	26,775.1	1.000	0.899	0.899	24,062
Conveyance	17,950	0.834	14,972	17,911	0.918	0.754	0.692	12,401
General security	591,137	0.395	234,187	592,816.4	1.021	N/A	0.381	225,588
Total	662,159	N/A	285,388	667,178.5	N/A	N/A	N/A	274,790

Table 7 Lachlan River entitlements, 2018 factors, 2024 factors derivation and BDL shares by entitlement class

Entitlement type	NSW environmental entitlements register – Jun 2025 (ML) ¹	Other entitlements nominated by MDBA & DAWR (ML)	Total environmental entitlements (ML)	2018 factor	Recovery under 2018 factors (ML/y)	2024 factor	Recovery under 2024 factors (ML/y)	Change in recovery amount (ML/y)
Domestic and stock	-	-	-	0.402	-	0.387	-	-
Local water utility	-	-	-	0.530	-	0.468	-	-
High security	2,728	-	2,728	0.927	2,530	0.899	2,452	-78
Conveyance	-	-	-	0.834	-	0.692	-	-
General security	111,492	3,333	114,825	0.396	45,471	0.381	43,748	-1,722
Total	114,220	-	117,553		48,001		46,200	-1,800