Application and assumptions used for deriving the baseline diversion limit-based 2024 LTDLE factors for the Border Rivers

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 Border Rivers WRP was accredited in February 2024. A revised NSW BDL model that merged appropriate model updates and increased model resolution features was used in the WRP. This report details how NSW has updated 2024 LTDLE factors for the Border Rivers Valley.

LTDLE factors reference:

- *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)

Supporting files for the updates

- Confluence Reference (with working notes)
- Held environmental water licences register

Data Sources

Entitlements

The entitlements under BDL conditions (generally 30 Jun 2009) were reviewed considering data from the BDL scenario report of 'Border Rivers Surface WRP' (Attachment A to Schedule F) and the previous *Derivation of LTDLE factors in NSW (May 2018) report*.

The Water Information Reporting & Extraction (WIRE) system and General Purpose Water Accounting Report (GPWAR), were used to correct known errors and movement of entitlements in the first water year of the water sharing plan. Decisions have been made that the WIRE system has the longest historical records from 2004–05 to current, and already have corrected known errors found in previous reports, therefore, entitlements in WIRE will be used in the calculation of updated LTDLE factors in the Border Rivers, as shown in Table 1.

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Table 1. Border Rivers entitlements (BDL and Current conditions)

Entitlement type (ML)	2009 Shares (BDL[1])	2010 Shares	2024 Shares
Domestic and stock	1,275	1,013	1,001
Local water utility	620	640	640
High security	1,500	1,500	1,500
General security (Class A)	22,114	22,007	22,027
General security (Class B)	242,123	241,211	241,211
Supplementary water	120,000	120,001	120,001
Floodplain harvesting (including non-exempt rainfall runoff harvesting)	Na	Na	51,665[2]
Total	386,372	387,632	438,025

Border Rivers_WaterAccounts_LTDLE_Factors_v02.xlsx (Sheet "Shares") from WIRE

[1] INT20 373660 FINAL Attachment A to Schedule F. NSW Border Rivers SW WRP -Modelling -BDL Scenario Report - Update2022090.docx

[2] FPH Entitlements issued 21/02/2022

BDL Diversions

The revised NSW Government BDL model was used in the Border Rivers WRP. The new model has been recalibrated and redeveloped in the eWater Source package. The BDL model was adopted as the primary data source to describe long-term (1895-2009) diversions in the Border Rivers valley. The average of recorded historical diversions was used instead, where the model does not represent usage by a class of entitlement or a portion of a class of entitlement and a model result is therefore not available. This was done for domestic and stock, high security and general security (Class A). Domestic and stock and high security use are not explicitly modelled due to the use of an individual

[1] *INT20 373660 FINAL Attachment A to Schedule F. NSW Border Rivers SW WRP -Modelling -BDL Scenario Report - Update2022090.docx*

[2] *FPH Entitlements issued 21/02/2022*

supply point; therefore, recorded historical diversions were used. The difference between modelled and observed for these entitlement types, which used recorded historical diversions, was placed onto general security (class B) diversions. Table 2 presents these diversions.

Table 2. Border Rivers BDL diversions 1895-2009

Entitlement type	Corrected diversions 1895–2009 (ML/y)	Source of water usage data used for LTDLE calculation
Domestic and stock	595	Used average historical diversion from WIRE (2009–2024).
Local water utility	586	Modelled estimate from BDL WRP model.
High security	456	Used average historical diversion from WIRE (2009–2023).
General security (Class A)	11,158	Used average historical diversion from WIRE (2009–2023).
General security (Class B)	79,305	Modelled estimate from BDL WRP model. Adjusted with the difference between modelled and observed from Domestic and Stock, High Security and General Security (Class A).
Supplementary water	69,200	Modelled estimate from BDL WRP model.
Floodplain harvesting (including non-exempt rainfall runoff harvesting)	38,700	Modelled estimate from BDL WRP model.
Total	200,000	Na

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 2009–10 to 2023–24 for better demonstration of the diversions over a wider range of climate conditions. Sections 49 - 53 of the Water Sharing Plan for *the NSW Border Rivers Regulated River Water Source 2021*, view Floodplain Harvesting water access under one water management area, with permanent trades restrained to this area. For this reason, a single LTDLE factor can be used for Floodplain Harvesting.

Table 3. Border Rivers allocation account balance summary (average 2009/10 to 2023/24)

Entitlement type	Share	AWD	Trade in	Trade out	Net trade	AWD+Net	Account usage	Use / (AWD+Net)
Domestic and stock	1002.0	1020.7	13.2	0.0	13.2	1033.9	595	0.575
Local water utility	640.0	640	5.0	0.0	5.0	645.0	586[1]	0.909
High security	1500.0	1482.2	42.7	847.2	-804.5	677.7	456	0.673
General security (Class A)	22007.0	16202.9	946.6	5521.7	-4575.1	11627.8	11158	0.960
General security (Class B)	241211.0	83977	9821.3	14029.9	-4208.7	79768.3	73043	0.916
Supplementary water	120001.0	118001.2	8662.838	8674.525	-11.688	117989.5	69200[1]	0.586
Floodplain harvesting (including non-exempt rainfall runoff harvesting)	51665	51665	Na	Na	Na	51665	38700[1]	0.749

Border Rivers_WaterAccounts_LTDLE_Factors_v02.xlsx (Sheet "Average_ActivationFactor")

[1] Modelled diversions used due to missing/unreliable metered data

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. Border Rivers entitlements (BDL and Current conditions)

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.
General security (Class A)	0.937	The modelled long-term average allocation at the end of the water year is used.
General security (Class B)	0.672	The modelled long-term average allocation at the end of the water year is used.
Supplementary	1.000	These are fully available by definition and would only be cut by a growth in use compliance action.
Floodplain harvesting (including non-exempt rainfall runoff harvesting)	1.000	These are fully available by definition and would only be cut by a growth in use compliance action.

BRIV_BDL_Alloc.xlsx

Results

2018 factors

The Basin Plan BDL regulated component of the Border Rivers was 189,026 ML in the 2018 factors calculation. This is 10,974 ML (or 5%) lower than the revised Basin Plan BDL estimate (200,000 ML) in the Border Rivers WRP.

2024 factors

Table 5 sets out the basis for how the updated factors were determined in 2024. The revised Basin Plan BDL for the regulated component of the Border Rivers is 200,000 ML.

Key Differences between 2018 and 2024 factors

- The Border Rivers BDL model used, has been rebuilt and recalibrated in the eWater Source package.
- Floodplain harvesting (including non-exempt rainfall runoff harvesting) entitlement and diversions are now explicitly modelled and part of the BDL WRP runs. This would lead to less general security and supplementary access due to this explicit use of floodplain harvesting.
- Single factor for FPH – not a perfect representation due to changing utilisation between individuals but aligns with policy. Policy principle used is that if FPH Water Access Licence (WAL) is tradable, then take the average of that pool.
- All factors apart from local water utility and high security have decreased as shown in Table 5, the main reasons for this include:
    - New model in a new modelling platform. More details in internal document INT20/373660 FINAL Attachment A to Schedule F. NSW Border Rivers SW WRP - Modelling -BDL Scenario Report - Update20220902.docx
    - Explicit use of floodplain harvesting reduces the air space of the on-farm storage for other types of diversion. The model will fill storage from FPH first and then use other entitlements later.
    - No or small available water determination (AWD) in the majority of the water years following the 2018 factors (For example 2018-19 and 2019-20 were very dry water years leading to 0 AWD for general security (Class B)).
- Small decreases in entitlement shares from 2018 for domestic and stock, general security (Class A and B).
- 20 ML increase in entitlement shares for local water utility. This is due to a ministerial correction in 2017, changing WAL 16616 from a general security class A entitlement.

Table 5. Summary of 2018 and 2024 LTDLE Factors

Entitlement type	2018 LTDLE Factors	2024 LTDLE Factors
Domestic and stock	0.617	0.575
Local water utility	0.812	0.909
High security	0.603	0.673
General security (Class A)	0.976	0.899
General security (Class B)	0.337	0.286
Supplementary	0.697	0.586
Floodplain harvesting (including non-exempt rainfall runoff harvesting)	NA	0.749

Updated water recovery estimates

For a relative comparison, the environmental entitlements were from *Water reform technical report: Derivation of LTDLE factors in NSW (May 2018)*. As shown in Table 6 the new factors decrease the LTDLE volume of high security, general security (class b) and supplementary entitlements. This represents a net decrease of 309 ML (15%) in the LTDLE volume of recovery in the Border Rivers.

Table 6. Border Rivers entitlements, 2018 factors, 2024 factors derivation and BDL shares by entitlement class

Entitlement type	2018			2024				
	Entitlement shares	Factors	BDL share (ML/y)	Entitlement shares	Average reliability	Utilisation factor	Factors	BDL share (ML/y)
Domestic and stock	1,275	0.617	787	1013	1	0.575	0.575	583
Local water utility	620	0.812	504	640	1	0.909	0.909	581
High security	1,500	0.603	905	1,500	1	0.673	0.673	1009

Entitlement type	2018			2024				
General Security (Class A)	22,114	0.976	21,578	22,007	0.937	0.960	0.899	19,787
General Security (Class B)	242,123	0.337	81,610	241,211	0.672	N/A	0.286	68,959
Supplementary	120,000	0.697	83,642	120,001	1	0.586	0.586	70,380
Floodplain harvesting (including non-exempt rainfall runoff harvesting)	N/A	N/A	N/A	51665	1	0.749	0.749	38,700
Total	**387,632**	N/A	**189,026**	**438,037**	N/A	N/A	N/A	**200,000**

Border Rivers_WaterAccounts_LTDLE_Factors_v02.xlsx (Sheet "2024_Factors")

Table 7. Summary of Border Rivers environmental entitlements, the LTDLE volumes under the 2024 and 2018 factors, and the difference between the 2024 and 2018 factor volumes by entitlement class

Entitlement type	NSW environmental entitlements register[1] (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	0.617	0	0.575	0	0
Local water utility	0	0.812	0	0.909	0	0
High security	0	0.603	0	0.673	0	0
General security (Class A)	60	0.976	59	0.899	54	-5

Entitlement type	NSW environmental entitlements register[1] (ML)	2018 factor	Recovery under 2018 factors (ML/y)	2024 factor	Recovery under 2024 factors (ML/y)	Change in recovery amount (ML/y)
General Security (Class B)	2816	0.337	949	0.286	805	-144
Supplementary Water	1437	0.697	1014	0.586	853	-161
Floodplain harvesting (including non-exempt rainfall runoff harvesting)	0	0	0	0.749	0	0
Total	4313	Na	2022	Na	1712	-309

Border Rivers_WaterAccounts_LTDLE_Factors_v02.xlsx (Sheet "2024_Factor_Savings")

[1]As extracted from the NSW environmental entitlement register as of June 2025, it may not include contracted or otherwise unregistered entitlements