# Application and assumptions used for deriving the BDL-based 2024 LTDLE factors for the Barwon–Darling 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 Barwon–Darling Rivers WRP was accredited in June 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 Barwon–Darling.

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) (please refer to this document for all inputs related to calculating the LTDLE factors, including the reference files)

## Background

### Origins of past BDL entitlements

BDL conditions for the Barwon–Darling are defined as Cap conditions by Schedule 3 of the Basin Plan. The Barwon–Darling was once thought to be in breach of cumulative Cap accounting; NSW responded by reissuing all entitlements as an individual share of the valley Cap (198,000ML), approximating one-third of the original size of entitlement shares. This unique approach applied to only the Barwon–Darling valley ensured that each entitlement share equals 1ML of long-term use when allocations are fully utilised.

### Inclusion of metering factors in BDL for WRP

Re-issued entitlements were based on the accredited Cap model, which used historical extraction data over a 10-year period 1995/96 to 2004/05 to calibrate and establish the model. However, there has been ongoing concern about the accuracy of the water extraction data upon which the Cap volume was based.

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The best available information to describe the true level of diversions occurring under Cap levels of development is now based on a pairwise relationship between typical daily pumping rates as demonstrated by newer and more accurate meters, versus the daily pumping rates demonstrated by older meters used to calibrate the model where pumping infrastructure is unchanged.

Supporting work performed by Alluvium Consulting (2021) included a spreadsheet of the ratio between new and old meters on a per meter basis for 19 major farms and 52 metering points on the Barwon–Darling. These ratios cannot be directly applied within the model as the model aggregates the total pumping capacity at a farm to a single daily pumping rate.

Recorded diversions per pump were manually extracted from the water accounting system and used to pro-rata individual pump ratios to an aggregate farm scale factor. These calculations are contained in the spreadsheet DPE (2021).

The per-farm factor was applied as factors within the post-processing tool '*listquan*' parameter file when the accredited BDL for WRP was calculated. Hence LTDLE factor for metered A, B and C class diversions will need to account for the adjustments made for the metering correction.

These pump correction factors are accredited as part of the BDL method in the Barwon–Darling Water Resource Plan as the best available information at the time of the plan. NSW has an ongoing work program to update and refine these factors. Any changes ultimately adopted will require a WRP resubmission.

## Data sources

### Entitlements

The entitlements under BDL conditions (generally to 30 Jun 2009) and Current Conditions were reviewed considering sources from the BDL scenario report of 'Barwon–Darling River Surface WRP' (Attachment A to Schedule F) and the previous Derivation of LTDLE factors in NSW (May 2018) report. The accredited Cap model used to calculate shares originally estimated 173GL/yr of entitlements. However, this figure was later revised to 198GL/yr.

The Water Information Reporting & Extraction (WIRE) system was used to download the entitlements and used in the calculation of updated LTDLE factors in the Barwon–Darling, as shown in Table 1 below.

Table 1 Barwon–Darling entitlements (BDL and Current conditions) (GL/yr)

| Entitlement type | Shares (BDL WRP) (30 Jun 2009) | Shares (WIRE) (30 Jun 2013) | Shares (WIRE) (30 Jun 2015) | Shares (WIRE) (June 2024) |
|---|---|---|---|---|
| **Unregulated River (A, B, C class)** | 186.1 | 173.1 | 188.7 | 188.7 |
| **Unregulated Streams** | Part of S&D | 1.4 | 1.4 | 1.4 |
| **Floodplain Harvesting** | **11.5** ^ | n/a | n/a | 51.3 |
| **Local water utilities** | Not included | 5.3 | 5.3 | 5.3 |
| **Domestic and stock (S&D)** | Not included | 0.98 | 0.98 | 0.96 |
| **Total** | **198*** | **180.9** | **196.5** | **247.8** |

* Basin Plan 2012 Schedule 3 rounded this volume to 198 GL/year.

^ 11.5GL/yr of Floodplain harvesting was never provided as an entitlement to license holders. It was part of the modelled Cap figures and includes the take from Thalaba creek (4G) and Warrego (Toorale) that was counted at the time towards the floodplain total.

## BDL Diversions

The revised NSW BDL model was used in the Barwon–Darling River WRP. The new model has been redeveloped in IQQM. The BDL model was adopted as the primary data source to describe long-term (1895-2009) diversions in the Barwon–Darling River valley, as displayed in Table 2 below. Domestic and Stock and Local Water Utility use are unmodelled.

Table 2 Barwon–Darling BDL diversions 1895-2009

| Entitlement type | Estimated Diversions 1895-2009 (GL/yr) | Source of water usage data used for LTDLE calculation |
|---|---|---|
| **Unregulated River (A, B, C class)** | 205.3 | Modelled estimate from the BDL WRP model |
| **Floodplain Harvesting (including all non-exempt and exempt rainfall runoff harvesting)** | 23.0 | Modelled estimate from the BDL WRP model |

| Entitlement type | Estimated Diversions 1895-2009 (GL/yr) | Source of water usage data used for LTDLE calculation |
|---|---|---|
| **Local water utilities** | 2.33 | An agreed assessment with MDBA based on average historical water use where available. |
| **Domestic and stock** | 2.47[2] | Used shares from WIRE |
| **Total** | 233.2 | n/a |

1 This figure includes the diversion from Thalaba Creek and Warrego River. Although they are diversion from different water sources rather than floodplain harvesting, they were included in this total to maintain consistency between models.

2 Includes 0.981 GL/y for domestic and stock licences, and 1.488 GL/y which after Cap 1993/94 was converted to a separate *unregulated river access license,* which is now recognised as being entirely HEW.

## Floodplain harvesting utilisation rates

For floodplain harvesting, tradeable entitlements are treated as part of a pool of shares for the purpose of calculating historical usage. In the Barwon–Darling River valley, the Floodplain harvesting in the Barwon-Darling Unregulated water source describes permanent trade as not permitted between management zones, but permissible between river sections within zones, as displayed in Figure 1. The permanent trade of floodplain harvesting (unregulated river) access licences reflect the existing trade rules for unregulated river access licences. The trade rules for Barwon–Darling floodplain harvesting are described in the water sharing plan. This involves replicating the four river zones that currently exist in the Water Sharing Plan for the Barwon–Darling Unregulated River Water Source 2012, and restricting trade between those zones.

Figure 1 shows that there are four connected zones for trade of floodplain harvesting licenses, hence four factors will be derived for each zone as described in Table 3.

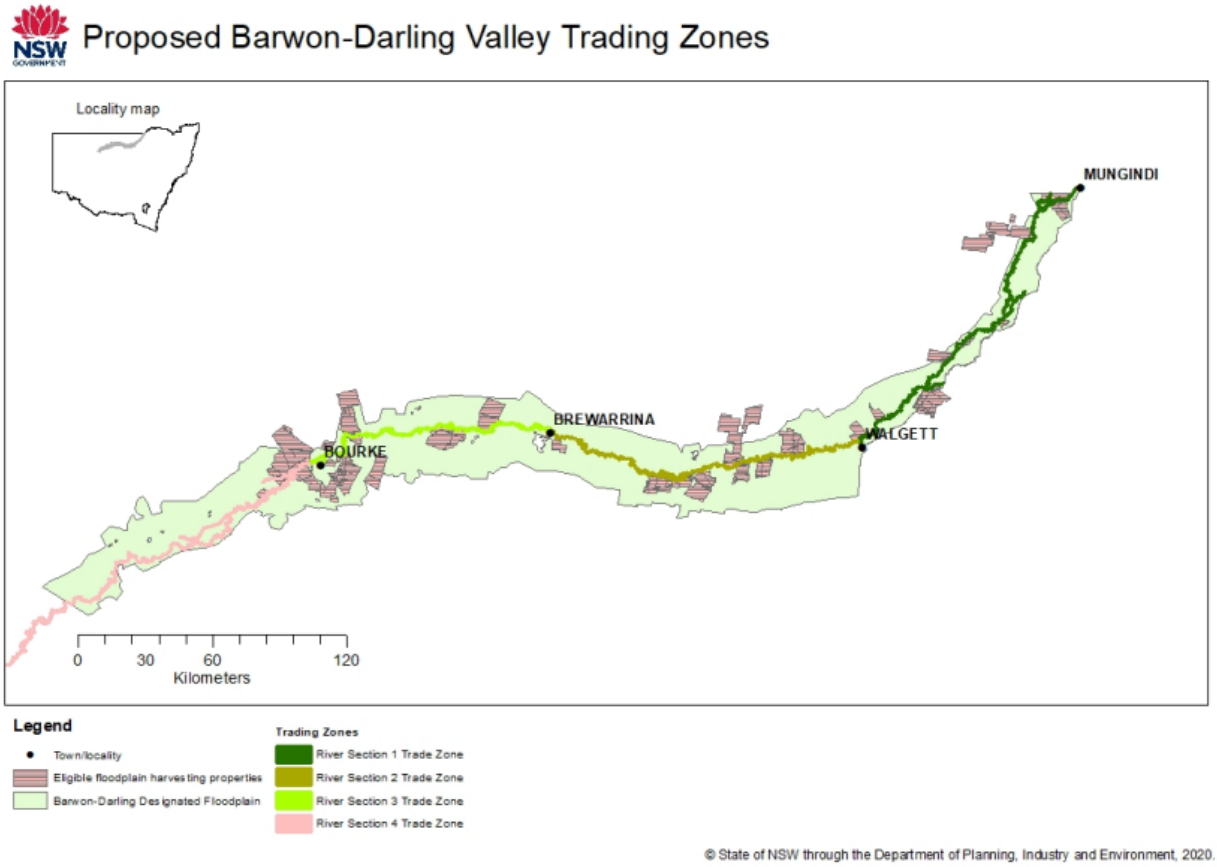


Figure 1: Visualisation of trading relationships for floodplain harvesting licences in the Barwon Darling River Valley

Table 3: Barwon Darling River floodplain harvesting trade zones for the purposes of LTDLE factors

| Zone | Floodplain Harvesting Management Zone |
|---|---|
| **Zone 1** | Mungindi to Walgett |
| **Zone 2** | Walgett to Brewarrina |
| **Zone 3** | Brewarrina to Bourke |
| **Zone 4** | Downstream of Bourke |

# Results

## 2018 factors

The Basin Plan BDL unregulated diversion of the Barwon–Darling River was 198GL in 2018. The factors did not change from 2011 for all unregulated diversions because the value is defined rather than calculated.

## 2024 factors

Table 5 outlines the basis for how the updated factors were determined in 2025.

The revised Basin Plan BDL estimate is now 233.2GL in the accredited Barwon–Darling River Water Resource Plan.

This changes the factor derivation from a definition to a modelled estimate, following the accreditation of the Barwon Darling Water Resource Plan. This results in an updated factor for Unregulated River (A, B, and C class) from 1 to 1.1013 as the modelled long-term use in the accredited WRP is larger than the original 198 GL.

## Key differences between 2018 and 2024 factors

- The accredited Barwon–Darling River BDL model was used. Since 2018, this model has been revised and upgraded.
- Floodplain harvesting (including non-exempt rainfall runoff harvesting) entitlement and diversions are now better represented in the model.
- Metering factors have been applied to Unregulated A, B and C Class diversions to account for adjustments made for the metering correction.

As shown in Table 4, a more complete set of entitlements is now provided with an LTDLE factor, and all factors are determined with the best available information.

Table 4 Summary of 2018 and 2024 LTDLE Factors

| Entitlement type | 2018 LTDLE Factors | 2024 LTDLE Factors |
|---|---|---|
| Unregulated river (A, B, C class) | 1 | 1.1013 |
| Local water utilities | n/a | 0.439 |
| Domestic and stock | n/a | 1.000 |
| Domestic and stock - unregulated streams | n/a | 1.000 |
| Floodplain harvesting Zone 1 | n/a | 0.889 |
| Floodplain harvesting Zone 2 | n/a | 0.111 |
| Floodplain harvesting Zone 3 | n/a | 0.468 |
| Floodplain harvesting Zone 4 | n/a | 0.539 |

Table 5: Barwon Darling entitlements, 2018 factors, 2024 factors derivation and BDL shares by entitlement class

| Entitlement type | 2018 Entitlement share (nominal GL) | 2018 Factors | 2018 BDL share (GL/y) | 2024 Entitlement share (nominal GL) | 2024 Factors | 2024 BDL share (GL/y) |
|---|---|---|---|---|---|---|
| Unregulated river (A, B, C class) | 186.1 | 1 | 186.1 | 186.1 | 1.103 | 205.3 |
| Local water utility | n/a | n/a | n/a | 5.3 | 0.439 | 2.33 |
| Domestic and stock | n/a | n/a | n/a | 0.962 | 1.000[#] | 2.45 |
| Domestic and stock - unregulated streams | n/a | n/a | n/a | 1.488 | n/a | n/a |

| Entitlement type | 2018 Entitlement share (nominal GL) | 2018 Factors | 2018 BDL share (GL/y) | 2024 Entitlement share (nominal GL) | 2024 Factors | 2024 BDL share (GL/y) |
|---|---|---|---|---|---|---|
| **Domestic and stock - unassigned** | n/a | n/a | n/a | 0.019# | n/a | 0.02 |
| **Floodplain harvesting Zone 1** | 11.5 | 1 | 11.5 | 9.28 | 0.889 | 8.26 |
| **Floodplain harvesting Zone 2** | n/a | n/a | n/a | 16.43 | 0.111 | 1.82 |
| **Floodplain harvesting Zone 3** | n/a | n/a | n/a | 11.73 | 0.468 | 5.49 |
| **Floodplain harvesting Zone 4** | n/a | n/a | n/a | 13.85 | 0.539 | 7.47 |
| **Total** | **197.6** | **n/a** | **197.6** | **245.1** | **n/a** | **233.12** |

# - a small number of stock and domestic licences that are attributed with usage under BDL conditions were subsequently surrendered and cancelled. The BDL value of the cancelled entitlements is recorded as unassigned to indicate that it is not associated with an entitlement class at present.

* The actual calculations are done with more precision before being rounded.

## Updated water recovery estimates

Table 6 below shows a relative comparison of the effects of the updated factors on the current recovery. The updated factors have increased the LTDLE volume of A, B and C entitlements with factors greater than 1. This represents a net increase of 5,073ML (17%) in the LTDLE volume of recovery in the Barwon–Darling, slightly above the targeted 32 GL of local recovery. This increase reflects the improved understanding of the real volumes of water that were being pumped historically, and hence the reduction in consumptive take that should be expected when entitlements are purchased by the environment. It also includes the addition of floodplain harvesting

recovery that occurred with the purchase of the Toorale property, which has recently been recognized with the issuing of a floodplain harvesting entitlement to the Commonwealth.

Table 6: Summary of Barwon–Darling 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 | Environmental entitlements # | 2018 factor | Recovery under 2018 factors (ML/yr) | 2024 factor | Recovery under 2024 factors (ML/yr) | Change in recovery amount (ML/yr) |
|---|---|---|---|---|---|---|
| A Class | 581 | 1.000 | 581 | 1.103 | 641 | +60 |
| B Class | 16,111 | 1.000 | 16,111 | 1.103 | 17,770 | +1,659 |
| C class | 12,498 | 1.000 | 12,498 | 1.103 | 13,785 | +1,287 |
| Unregulated stream | 1,488 | 1.000 | 1488 | 1.000 | 1,488 | 0 |
| Floodplain Harvesting - Zone 4 | **3812** | n/a | n/a | **0.539** | **2,055** | **+2,055** |
| Total | **34,490** | n/a | **30,678** | n/a | **35,739** | **5,061** |

# -as extracted from the NSW environmental water register on 22/08/2025

## References

Alluvium Consulting (2021). *Barwon -Darling Pump Recalibration Project report*- August 2021, Alluvium.

DPE (2021) Internal spreadsheet - *B-D_Pump Information v3.0 + cumulative metered usage per pump.xlsx*