

# Application and assumptions used for deriving the BDL-based 2024 LTDLE factors in New South Wales Murray and Lower Darling Regulated 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 New South Wales Murray and Lower Darling Regulated Rivers WRP was accredited in May 2024. This report details how NSW has updated 2024 LTDLE factors for the New South Wales Murray and Lower Darling Regulated Rivers.

## Data sources

### Entitlements

The entitlements under BDL conditions (generally 30 Jun 2004) were reviewed considering sources from the BDL scenario report of ‘Source Murray Model (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. Entitlements as stated in the BDL report (Attachment A to Schedule F) will be used in the calculation of updated LTDLE factors in the New South Wales Murray and Lower Darling Regulated Rivers, as shown in Table 1 and Table 2.

Table 1 NSW Murray Regulated River entitlements (BDL and Current conditions)

| Entitlement Type   | Total Entitlements at Baseline (ML/y) | TLM (ML/y) | Water for Rivers – Snowy (ML/y) | Adaptive Environment (ML/y) | Consumptive Entitlement (ML/y) |
|--------------------|---------------------------------------|------------|---------------------------------|-----------------------------|--------------------------------|
| Domestic and Stock | 15,268                                | n/a        | n/a                             | n/a                         | 15,268                         |
| LWU                | 35,202                                | n/a        | n/a                             | n/a                         | 35,202                         |
| High security      | 212,106                               | 5,124      | n/a                             | 2,027                       | 204,955                        |

| Entitlement Type | Total Entitlements at Baseline (ML/y) | TLM (ML/y)     | Water for Rivers – Snowy (ML/y) | Adaptive Environment (ML/y) | Consumptive Entitlement (ML/y) |
|------------------|---------------------------------------|----------------|---------------------------------|-----------------------------|--------------------------------|
| General security | 1,672,695                             | 83,006         | 31,881                          | n/a                         | 1,557,808                      |
| Supplementary    | 252,362                               | 100,000        | n/a                             | n/a                         | 152,362                        |
| Conveyance       | 330,000                               | n/a            | n/a                             | 30,000                      | 300,000                        |
| <b>Total</b>     | <b>2,517,633</b>                      | <b>188,130</b> | <b>31,881</b>                   | <b>32,027</b>               | <b>2,265,595</b>               |

Table 2 NSW Lower Darling Regulated River entitlements (BDL and Current conditions)

| Entitlement Type   | Total Entitlements at Baseline (ML/y) | TLM (ML/y)    | Water for Rivers – Snowy (ML/y) | Adaptive Environment (ML/y) | Consumptive Entitlement (ML/y) |
|--------------------|---------------------------------------|---------------|---------------------------------|-----------------------------|--------------------------------|
| Domestic and Stock | 1,415                                 | n/a           | n/a                             | n/a                         | 1,415                          |
| LWU                | 10,135                                | n/a           | n/a                             | n/a                         | 10,135                         |
| High security      | 8,060                                 | 500           | n/a                             | n/a                         | 7,560                          |
| General security   | 79,155                                | 47,800        | n/a                             | n/a                         | 31,355                         |
| <b>Total</b>       | <b>98,765</b>                         | <b>48,300</b> | <b>0</b>                        | <b>0</b>                    | <b>50,465</b>                  |

## BDL diversions

The revised BDL model was used in the NSW Murray and Lower Darling WRP. The BDL model was adopted as the primary data source to describe long-term (1895-2009) diversions in the NSW Murray and Lower Darling Regulated Rivers valley. The average of recorded historical diversions was used instead of the model to work out the utilisation factor. This was done for Domestic and Stock, High Security, Local Water Utility, General Security and Conveyance. Both the controlled and uncontrolled portion are used in the total diversion under General Security and Supplementary. There are slight differences when the BDL model was rerun and processed, as detailed in Table 3 and Table 4 below (refer next page).

Table 3 NSW Murray Regulated Rivers modelled BDL diversions 1895-2009.

| Entitlement type   | Corrected Diversions 1895-2009 (GL/y) | Source of water usage data used for LTDLE calculation |
|--------------------|---------------------------------------|-------------------------------------------------------|
| Domestic and Stock | 10.6                                  | Modelled estimate from BDL WRP model.                 |
| LWU                | 17.3                                  | Modelled estimate from BDL WRP model.                 |
| High Security      | 165                                   | Modelled estimate from BDL WRP model.                 |
| General Security   | 1,102.80                              | Modelled estimate from BDL WRP model.                 |

| Entitlement type | Corrected Diversions 1895-2009 (GL/y) | Source of water usage data used for LTDLE calculation                                                                                                                                                                                |
|------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supplementary    | 124.8                                 | Modelled estimate from BDL WRP model.                                                                                                                                                                                                |
| Conveyance       | 270.7                                 | Modelled estimate from BDL WRP model, including both controlled and uncontrolled component.                                                                                                                                          |
| Sub-Total        | 1,691.20                              | Occasional model discrepancies between a water user's Total Water Supplied and the corresponding account debits have led to a small discrepancy between the total number (1691.2 GL/y) and the accredited BDL number of 1690.9 GL/y. |

Table 4 NSW Lower Darling Regulated Rivers modelled BDL diversions 1895-2009.

| Entitlement type   | Corrected Diversions 1895-2009 (GL/y) | Source of water usage data used for LTDLE calculation                                                                                         |
|--------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Domestic and Stock | 0.7                                   | Modelled estimate from BDL WRP model.                                                                                                         |
| LWU                | 6.6                                   | Modelled estimate from BDL WRP model.                                                                                                         |
| High Security      | 7                                     | Modelled estimate from BDL WRP model.                                                                                                         |
| General Security   | 22.7                                  | Includes subtraction of 14.57 GL/y trade from the Murrumbidgee to Tandou that was not subtracted from the accredited BDL number of 51.7 GL/y. |
| Sub-Total          | 37                                    | Model discrepancies between a water user's Total Water Supplied and the corresponding account debits.                                         |
| Total              | 1,728.20                              | n/a                                                                                                                                           |

## Historical utilisation rates

The historical utilisation rate is calculated by summing the average available determination and net trade and (including temporary assignments and tagged transfer) 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 and net trade to that class to give the level of activation by that class. The historical allocation account balance summary was from the WIRE. Table 5 and Table 6 show the details of average historical account usage and the activation factors. The historical period was extended to 2004/05-2023/25 for better demonstration of the diversions over a wider range of climate conditions.

Table 5 NSW Murray Regulated Rivers allocation account balance summary (average 2004/05 to 2024/25).

| Entitlement type   | Share     | AWD (ML/y) | Trade in (ML/y) | Trade out (ML/y) | Net trade (ML/y) | AWD+Net (ML/y) | Account usage (ML/y) | Use / (AWD+Net) |
|--------------------|-----------|------------|-----------------|------------------|------------------|----------------|----------------------|-----------------|
| Domestic and Stock | 17,027    | 16,701     | 15              | 3                | 12               | 16,714         | 10,486               | 0.627           |
| LWU                | 42,191    | 35,196     | 85              | 1,769            | -1,685           | 33,512         | 19,782               | 0.59            |
| High Security      | 192,947   | 175,089    | 63,873          | 118,596          | -54,723          | 120,366        | 106,568              | 0.885           |
| General Security   | 1,674,096 | 762,302    | 411,600         | 427,632          | -16,032          | 746,269        | 677,642              | 0.908           |
| Supplementary      | 252,579   | 253,691    | 1,184           | 1,159            | 25               | 253,716        | 63,434               | 0.25            |
| Conveyance         | 330,000   | 239,679    | 48,116          | 39,346           | 8,770            | 248,449        | 247,855              | 0.998           |

Table 6 NSW Lower Darling Regulated Rivers allocation account balance summary (average 2004/05 to 2024/25).

| Entitlement type   | Share  | AWD (ML/y) | Trade in (ML/y) | Trade out (ML/y) | Net trade (ML/y) | AWD+Net (ML/y) | Account usage (ML/y) | Use / (AWD+Net) |
|--------------------|--------|------------|-----------------|------------------|------------------|----------------|----------------------|-----------------|
| Domestic and Stock | 1,336  | 1,260      | 0               | 0                | 0                | 1,260          | 363                  | 0.288           |
| LWU                | 422    | 8,651      | 0               | 1                | -1               | 8,650          | 2,864                | 0.331           |
| High Security      | 7,771  | 7,528      | 1,462           | 4,847            | -3,384           | 4,144          | 3,002                | 0.724           |
| General Security   | 79,507 | 47,042     | 55,921          | 40,690           | 15,232           | 62,274         | 58,496               | 0.939           |

## Allocation reliability

The 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 7 and Table 8 below.

Table 7 NSW Murray Regulated Rivers average allocation reliability.

| Entitlement type   | Average reliability from BDL model run | Method description                            |
|--------------------|----------------------------------------|-----------------------------------------------|
| Domestic and Stock | 1                                      | Outputs from BDL Source Murray Model run 9600 |
| LWU                | 1                                      | Outputs from BDL Source Murray Model run 9600 |
| High Security      | 0.991                                  | Outputs from BDL Source Murray Model run 9600 |
| General Security   | 0.834                                  | Outputs from BDL Source Murray Model run 9600 |
| Supplementary      | 1                                      | Outputs from BDL Source Murray Model run 9600 |
| Conveyance         | 0.903                                  | Outputs from BDL Source Murray Model run 9600 |

Table 8 NSW Lower Darling Regulated Rivers average allocation reliability.

| Entitlement type   | Average reliability from BDL model run | Method description                            |
|--------------------|----------------------------------------|-----------------------------------------------|
| Domestic and Stock | 1                                      | Outputs from BDL Source Murray Model run 9600 |
| LWU                | 1                                      | Outputs from BDL Source Murray Model run 9600 |
| High Security      | 0.982                                  | Outputs from BDL Source Murray Model run 9600 |
| General Security   | 0.962                                  | Outputs from BDL Source Murray Model run 9600 |

## Results

### 2018 factors

The Basin Plan BDL regulated component of the NSW Murray and Lower Darling Regulated Rivers were 1,680,290 ML and 54,719 ML respectively in the 2018 factors calculation. This is 10,936 ML (or 1%) lower and 17,744 ML (or 48%) higher than the model processed from the revised Basin Plan BDL estimate (1,691,226 ML and 36,975 ML) in the NSW Murray and Lower Darling WRP. The new estimate represents a 0.4% difference.

### 2024 factors

Table 9 and Table 10 set out the basis for how the updated factors were determined in 2024.

The revised Basin Plan BDL for the regulated component of the NSW Murray and Lower Darling Regulated Rivers is 1,690.9 GL and 51.7 GL respectively in the attachment A to Schedule F. However, a rerun of the latest model and processing indicates a slight difference, resulting in 1,691.2 GL and 37.0 GL for NSW Murray and Lower Darling respectively.

### Key differences between 2018 and 2024 factors

- The NSW Murray and Lower Darling Regulated Rivers BDL model used, has been updated and improved as described in the NSW Murray and Lower Darling BDL / SDL Report (Attachment A to Schedule F).
- Occasional model discrepancies between a water user's total water supplied and the corresponding account debits have led to a small discrepancy between the total number (1691.2 GL/y) and the accredited BDL number of 1690.9 GL/y. (refer next page)
- General Security use in the Lower Darling includes subtraction of 14.57 GL/y trade from the Murrumbidgee to Tandou that should have been subtracted from the accredited BDL number of 51.7 GL/y.
- The biggest differences between the 2018 and 2024 factors can be seen on NSW Murray Supplementary and Conveyance entitlements, and Lower Darling General Security entitlements. The 2024 factors are lower.

Table 9 Summary of 2018 and 2024 LTDLE Factors – NSW Murray

| Entitlement type   | 2018 LTDLE Factors | 2024 LTDLE Factors |
|--------------------|--------------------|--------------------|
| Domestic and Stock | 0.623              | 0.627              |
| LWU                | 0.581              | 0.59               |
| High Security      | 0.873              | 0.877              |
| General Security   | 0.699              | 0.697              |
| Supplementary      | 0.703              | 0.819              |
| Conveyance         | 0.918              | 0.901              |

Table 10 Summary of 2018 and 2024 LTDLE Factors – Lower Darling

| Entitlement type   | 2018 LTDLE Factors | 2024 LTDLE Factors |
|--------------------|--------------------|--------------------|
| Domestic and Stock | 0.345              | 0.288              |
| LWU                | 0.365              | 0.331              |
| High Security      | 0.734              | 0.712              |
| General Security   | 0.931              | 0.888              |

## Updated water recovery estimates

For a relative comparison, the environmental entitlements from the *Water reform technical report: Derivation of LTDLE factors in NSW* (May 2018) are provided below. As outlined in Table 11 and Table 12, the new factors and latest entitlements estimate increase the LTDLE volume of Stock and Domestic, High security and General security entitlements. The new factors and latest entitlements also represent a reduction of General security, Supplementary and Conveyance. This represents a net decrease of 1,992 ML (1%) in the LTDLE volume of recovery in the NSW Murray and Lower Darling Regulated Rivers.

# Application and assumptions used for deriving the BDL-based 2024 LTDLE factors in New South Wales Murray and Lower Darling Regulated Rivers

Table 11 NSW Murray and Lower Darling Regulated River entitlements, 2018 factors, 2024 factors derivation and BDL shares by entitlement class.

| River system             | 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) |
|--------------------------|--------------------|-------------------------|--------------|-----------------------|-------------------------|---------------------|--------------------|--------------|-----------------------|
| Murray                   | Domestic and stock | 14,998                  | 0.623        | 9,344                 | 15,268                  | 1                   | 0.627              | 0.627        | 9,579                 |
| Murray                   | LWU                | 35,202                  | 0.581        | 20,452                | 35,202                  | 1                   | 0.59               | 0.59         | 20,780                |
| Murray                   | High security      | 204,955                 | 0.873        | 178,926               | 204,955                 | 0.991               | 0.885              | 0.877        | 179,773               |
| Murray                   | General security   | 1,557,808               | 0.699        | 1,088,908             | 1,557,808               | 0.834               | 0.908              | 0.697        | 1,086,012             |
| Murray                   | Supplementary      | 152,362                 | 0.703        | 107,110               | 152,362                 | n/a                 | n/a                | 0.819        | 124,784               |
| Murray                   | Conveyance         | 300,000                 | 0.918        | 275,400               | 300,000                 | 0.903               | 0.998              | 0.901        | 270,299               |
| Murray                   | <b>Subtotal</b>    | <b>2,265,325</b>        | <b>n/a</b>   | <b>1,680,140</b>      | <b>2,265,595</b>        | <b>n/a</b>          | <b>n/a</b>         | <b>n/a</b>   | <b>1,691,226</b>      |
| Lower Darling            | Domestic and stock | 1,415                   | 0.345        | 489                   | 1,415                   | 1                   | 0.288              | 0.288        | 408                   |
| Lower Darling            | LWU                | 10,135                  | 0.365        | 3,700                 | 10,135                  | 1                   | 0.331              | 0.331        | 3,355                 |
| Lower Darling            | High security      | 7,560                   | 0.734        | 5,547                 | 7,560                   | 0.982               | 0.724              | 0.712        | 5,380                 |
| Lower Darling            | General security   | 31,355                  | 0.931        | 29,194                | 31,355                  | 0.962               | 0.939              | 0.888        | 27,831                |
| Lower Darling            | <b>Subtotal</b>    | <b>50,465</b>           | <b>n/a</b>   | <b>38,930</b>         | <b>50,465</b>           | <b>n/a</b>          | <b>n/a</b>         | <b>n/a</b>   | <b>36,975</b>         |
| Murray and Lower Darling | <b>Total</b>       | <b>2,315,790</b>        | <b>n/a</b>   | <b>1,719,070</b>      | <b>2,316,060</b>        | <b>n/a</b>          | <b>n/a</b>         | <b>n/a</b>   | <b>1,728,201</b>      |

(please refer to next page)

## Application and assumptions used for deriving the BDL-based 2024 LTDLE factors in New South Wales Murray and Lower Darling Regulated Rivers

Table 12 Summary of NSW Murray and Lower Darling Regulated 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

| River system                    | Entitlement type   | NSW environmental entitlements register – Jun 2025 (ML) <sup>1</sup> | 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) |
|---------------------------------|--------------------|----------------------------------------------------------------------|--------------------------------------------------|---------------------------------------|-------------|------------------------------------|-------------|------------------------------------|----------------------------------|
| <b>Murray</b>                   | Domestic and stock | 0                                                                    | n/a                                              | 0                                     | 0.623       | 0                                  | 0.627       | 0                                  | 0                                |
| <b>Murray</b>                   | LWU                | 0                                                                    | n/a                                              | 0                                     | 0.581       | 0                                  | 0.59        | 0                                  | 0                                |
| <b>Murray</b>                   | High security      | 19,262                                                               | n/a                                              | 19,262                                | 0.873       | 16,815                             | 0.877       | 16,895                             | 80                               |
| <b>Murray</b>                   | General security   | 388,273                                                              | n/a                                              | 388,273                               | 0.699       | 271,403                            | 0.697       | 270,681                            | -722                             |
| <b>Murray</b>                   | Supplementary      | 211                                                                  | n/a                                              | 211                                   | 0.703       | 148                                | 0.819       | 173                                | 24                               |
| <b>Murray</b>                   | Conveyance         | 20,214                                                               | n/a                                              | 20,214                                | 0.918       | 18,556                             | 0.901       | 18,213                             | -344                             |
| <b>Murray</b>                   | <b>Subtotal</b>    | <b>427,959</b>                                                       | <b>0</b>                                         | <b>427,959</b>                        | <b>n/a</b>  | <b>306,923</b>                     | <b>n/a</b>  | <b>305,961</b>                     | <b>-961</b>                      |
| <b>Lower Darling</b>            | Domestic and stock | 0                                                                    | n/a                                              | 0                                     | 0.345       | 0                                  | 0.288       | 0                                  | 0                                |
| <b>Lower Darling</b>            | LWU                | 0                                                                    | n/a                                              | 0                                     | 0.365       | 0                                  | 0.331       | 0                                  | 0                                |
| <b>Lower Darling</b>            | High security      | 4,234                                                                | n/a                                              | 4,234                                 | 0.734       | 3,108                              | 0.712       | 3,013                              | -95                              |
| <b>Lower Darling</b>            | General security   | 21,564                                                               | n/a                                              | 21,564                                | 0.931       | 20,076                             | 0.888       | 19,140                             | -936                             |
| <b>Lower Darling</b>            | <b>Subtotal</b>    | <b>25,798</b>                                                        | <b>0</b>                                         | <b>25,798</b>                         | <b>n/a</b>  | <b>23,184</b>                      | <b>n/a</b>  | <b>22,154</b>                      | <b>-1,030</b>                    |
| <b>Murray and Lower Darling</b> | <b>Total</b>       | <b>453,757</b>                                                       | <b>n/a</b>                                       | <b>453,757</b>                        | <b>n/a</b>  | <b>330,107</b>                     | <b>n/a</b>  | <b>328,115</b>                     | <b>-1,992</b>                    |

<sup>1</sup> NSW HEW Register accessed on 24/06/2025: <https://water.dpie.nsw.gov.au/our-work/projects-and-programs/environmental-water-management-in-nsw/environmental-water-data/held-environmental-water-data/held-environmental-water-licences-register>

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