

WATER REFORM TECHNICAL REPORT

Derivation of LTDLE factors in NSW

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Glossary

Term	Definition
2011 factors	Long-term diversion limit equivalence (LTDLE) factors v2.05, at November 2011, as agreed by the Murray–Darling Basin Ministerial Council
2018 factors	Long-term diversion limit equivalence (LTDLE) factors determined by the NSW Government that reproduce the share of the Basin Plan 2012 BDL for each class of entitlement in each valley
BDL	Baseline diversion limit under the Basin Plan
Cap	The Murray Darling Basin Ministerial Council cap on diversions
DAWR	Department of Agriculture and Water Resources
MDB	Murray–Darling Basin
MDBA	Murray–Darling Basin Authority
SDL	Sustainable diversion limit
WRP	Water resource plan
WSP	Water sharing plan

Introduction

When the Basin Plan was established in 2012, it was agreed that an annual average of 2,750 gigalitres (GL) of water needed to be recovered and provided to environmental water holders for use, to restore the health and sustainability of the river system. At the time, this water was used for townships, stock, domestic supply and irrigated agriculture. Each catchment had its own rules around entitlements and allocations, and there remain over 150 different types of entitlements across the Basin.

Long-term diversion limit equivalent factors (LTDLE factors), known under the current system as the 'cap factors', were developed and subsequently agreed by the Murray–Darling Basin Ministerial Council in 2011. LTDLE factors are a method for comparing each entitlement so that they can be considered on equal terms. The LTDLE factors adopted in 2011 enabled planning for future recovery and are now being used to determine that the entitlements recovered meet targets.

The 2011 factors have known weaknesses. They are out of date, are generally not based on the modelling period used to develop the Basin Plan (1895–2009), and they do not use a consistent set of assumptions about contemporary water use. All Basin states are working to update the 2011 factors.

This report details how NSW has developed new 2018 factors. New information is included in the 2018 factors to ensure they are accurate and fit to compare different entitlement types for water recovery purposes.

Purpose of this report

The purpose of this report is to support consultation on the proposed 2018 factors. These factors were developed as part of the preparation of NSW water resource plans (WRPs) under the Basin Plan. This report is supported by *Consultation paper: NSW updated factors for water recovery* (June 2018), which explains the purpose of the factors, their impact on water recovery, and the issues on which the NSW Government and the Murray–Darling Basin Authority (MDBA) are seeking feedback.

This report:

- sets out the methodology used to develop the proposed 2018 factors for the NSW Murray–Darling Basin
- compares, for each NSW sustainable diversion limit (SDL) resource unit, the difference in the value of entitlements under the baseline diversion limit (BDL) between the 2011 factors and the 2018 factors
- describes, for each NSW SDL resource unit, the change in estimated water recovery to achieve the reduction volume when using the 2018 factors.

Planning assumptions – What they are used for

Planning assumptions are an essential component of developing WRPs. The Basin Plan sets out the requirements that all WRPs must meet but does not prescribe how the requirements must be met. Settling the planning assumptions that will be incorporated into WRPs is a consultative process to document how key parts of the Basin Plan relating to a particular WRP area will be applied in the associated WRP.

Examples of planning assumptions include:

- the historical usage of allocations, including carryover that will be assumed to reflect expected usage over the life of the WRP
- the historical climate conditions used to model water availability and use (the Basin Plan's historical climate sequence in 1895–2009)
- water trade patterns
- the rules governing water access in each WRP area.

The planning assumptions that are adopted for a particular WRP will determine the LTDLE factors associated with the different classes of water entitlement in the affected WRP areas. In this context, the planning assumptions are critical to assessing when water recovery has achieved the Basin Plan reduction volume for the SDL resource units in the WRP area.

Planning assumptions are vital to how the WRP can demonstrate that the method being used to determine annual permitted take will achieve the SDL over the long term.

Introduction to LTDLE factors

A water entitlement gives a defined share of any available volume in a water year. As the water availability (e.g., announced allocation percentage) varies every year, so does the volume of water used. An LTDLE factor is the proportion of one unit of an entitlement regarding its long-term water use.

An LTDLE factor is a means to estimate the long-term average water use associated with a class of water entitlement in a valley. For example, an average entitlement of 100 unit shares with an LTDLE factor of 0.8 would be expected to use $100 \times 0.8 = 80$ megalitres (ML) of water per year in the long term.

An LTDLE factor depends upon the type of an entitlement; it can vary from 0 to 1, and in most cases will be less than 1. LTDLE factors do not place any limit on the use of allocated water. They are representative of the average behaviour of all users of a particular class of entitlement.

LTDLE factors allow a consistent accounting treatment for different types of entitlements to a common measure: the equivalent long-term water use volume. LTDLE factors are used to inform the recovery of water entitlements. They provide an estimate of the long-term use associated with entitlements that are recovered to achieve the Basin Plan reduction volume.

The calculation of LTDLE factors requires knowledge of several variables including:

- the volume of each type of entitlement in an SDL resource unit, based on official records
- the total long-term diversion limit volume, estimated using models

- the degree of utilisation of entitlements, based on data or assumptions.

These variables may change for genuine reasons such as having better data or changes in the way water users manage their water.

Variation in LTDLE factors has implications for the governments intending to recover entitlements for environmental water use under the Basin Plan. If an LTDLE factor for an entitlement type that has already been recovered for environmental purposes increases, the water volume recovered is more than earlier estimated and accounted.

The 2011 factors were based on limited available material and were inconsistently derived using different assumptions and data sets (e.g., long-term climate sequences) and models representing different development scenarios (e.g., cap versus BDLs). They were used on a 'without prejudice' basis to commence recovery.

In 2015, the Ministerial Council agreed that each Basin state would propose both planning assumptions and LTDLE factors for consideration by the MDBA in the context of meeting WRP requirements under the Basin Plan.

NSW has derived a new set of 2018 factors using a consistent suite of peer-reviewed models, data and assumptions. These factors will be used in preparing the WRPs for accreditation under the Basin Plan. As the 2018 factors are somewhat different from the 2011 factors, there are some implications for estimates of water recovery.

Need for a new set of LTDLE factors

Rationale for revised factors

A consequence of the limitations in the 2011 factors is that when existing entitlements in various valleys are multiplied with those factors, it results in total water use volumes that are very different to the BDLs in the Basin Plan. Table 1 uses the values for the Peel Valley to illustrate the variance between each entitlement class's share of the BDL as per the Basin Plan 2012 and the corresponding share of BDL based on the 2011 factors.

Table 1: Peel entitlements, 2011 factors and share of BDL by entitlement class

	Entitlements for BDL run (ML)	2011 factors	Share of BDL (ML/y)
Domestic and stock	471	0.850	400
Local water utility	16,400	0.850	13,940
High security	601	0.850	511
General security	30,091	0.259	7,794
	47,563		22,645

Basin Plan BDL (ML/y)	15,267
Error in share of BDL due to 2011 factors (ML/y)	7,378
Error in share of BDL due to 2011 factors (%)	48%

Under the Basin Plan, water management in each SDL resource unit must ensure that the SDL is achieved for each unit over the long term. WRPs that set out the rules for water sharing and the methods for determining annual permitted take are the mechanisms to achieve this.

The Australian Government has committed to bridging the gap between the BDLs and the SDLs in the Basin Plan by recovering water entitlements through irrigation infrastructure efficiency projects and direct purchase from willing sellers. The intent is that by reducing BDLs to SDLs through water recovery, the reliable allocation of water entitlements will not be eroded by the Basin Plan.

The SDLs are a reduction from the BDLs. If the 2011 factors cannot reproduce the BDL for an SDL resource unit, the planning assumptions that produce those factors cannot be used to prepare a WRP that complies with the requirements of the Basin Plan and achieve the SDL. Also, the 2011 factors cannot be used to accurately assess whether the reduction volume needed to move from the BDL to the SDL for a particular SDL resource unit has been achieved. A revised set of LTDLE factors is required that is consistent with the BDL level of use. The 2018 factors are BDL based and fit to assess whether recovery is now complete.

Bringing forward 2018 factors ahead of the 2019 commencement of WRPs and management to the SDL are intended to promote a full and open discussion.

Underlying principles

The following key principles were used for the derivation of the 2018 factors in this report:

1. They are based on a set of approved models that are consistent with the Basin Plan level of baseline data, conditions and assumptions that informed the 2012 Basin Plan reduction volume (2,750 GL).
2. The process used is repeatable, transparent and auditable.
3. The best available data was used. Where data was not available, assumptions made are clearly defined.
4. All entitlements for each type are treated equitably and consistently.
5. The water recovery target to achieve the SDLs reflects the full effect of the 605 GL adjustment resulting from the operation of the SDL adjustment mechanism and the 70 GL adjustment from the Northern Basin Review.¹

Data and knowledge need

The derivation of LTDLE factors for a catchment requires the following data and knowledge:

- A. the long-term BDL that comes from a hydrological model
- B. for each type of entitlement:
 - entitlement volume
 - long-term average level of water allocation (from the model)
 - long-term average usage of allocated water (model or historical data or assumption for likely future usage rate)
 - priority of sharing available water among different entitlement types while limiting total use to the BDL.

A change in any of the variables listed above may change the value of LTDLE factors. Because of this, it is vitally important that the same set of models, data and assumptions are used in deriving LTDLE factors for a related purpose. For example, (1) water recovery to bridge the gap between SDLs and BDLs; (2) preparation of WRPs; and (3) assessing the compliance of WRPs with their respective SDLs for accreditation – all should use the same LTDLE factors.

Approach

NSW has derived a new set of BDL-based 2018 factors collaboratively with MDBA. The method used is described in this section. A detailed application of the method and description of key assumptions and considerations is provided in Appendix 1.

¹ It is noted that the full effect of the SDL adjustment mechanism will not be fully achieved until the first 62 GL of the 450 GL from efficiency measures has been recovered. Also, while amendments associated with the Northern Basin Review were disallowed in the Australian Parliament in February 2018, a Bill is currently before the Parliament to allow for the resubmission of these amendments. For the purposes of assessing progress with water recovery, it is assumed in this report that the Northern Basin Review amendments are in effect.

Method

The calculation for the LTDLE factors for each entitlement type can be expressed as:

$$LTDLE \text{ for an entitlement type} = \frac{\text{Long – term water usage by these entitlement types}}{\text{Volumetric share of these entitlement types}}$$

Details of the parameters used in this calculation are provided in Appendix 1. The 2018 factors have been determined from a combination of historical water usage data, and the BDL models (MDBA Model Run 871) used to develop the 2012 Basin Plan legislative instrument.

Historical recorded usage and trade data (2004 to 2017) for different entitlement types were used, as was modelled information describing the BDL, and reliability of entitlement types, and uses against supplementary entitlement types over the 1895–2009 climate sequence were adopted.

All entitlement data was extracted from NSW’s water allocation system for June 2009 conditions and in the case of the Lower Darling, Murray and Murrumbidgee river systems, it was corrected to account for water recovery under The Living Murray (TLM) and Water for Rivers initiatives.

The resulting BDL-based 2018 factors for each valley are provided in the following sections. The detailed calculation process and data sources used are in the appendices.

The impact of applying the 2018 factors to entitlements recovered to achieve the Basin Plan reduction volume (bridging the gap) are provided at the updated water recovery estimates section.

These estimated volumes may be refined further as part of ongoing improvements to the BDL estimate by NSW for developing WRPs. MDBA will subsequently review any changes.

Example of 2018 factors calculation

The following sets out a hypothetical example of the procedure used to calculate 2018 factors.

Hypothetical valley:

BDL = 250,000 ML/y (excluding floodplain harvesting and unregulated entitlements water use)

Entitlement classes and prioritisation:

- A. Domestic and stock
- B. Local water utility
- C. High security
- D. General security
- E. Supplementary

Step 1: The utilisation factor is calculated for entitlement types A to D from historical data between 2004 and 2017. The utilisation factor is calculated as:

$$Utilisation \text{ factor for an entitlement type} = \frac{\text{Average annual account usage}}{\text{AWD} + \text{net trade}}$$

A positive net trade represents an increase in available water for an entitlement type.

Step 2: The initial share of BDL (column 5 of Table 2) over the 1895–2009 climate is calculated by multiplying the utilisation factor (column 4 of Table 2), average reliability (column 3 of Table 2) and entitlement volume (column 2 of Table 2).

Step 3: The initial share of BDL for supplementary entitlement types is adopted from the BDL model run.

Step 4: A check is undertaken to ensure that diversions estimated using the derived 2018 factors equal the BDL defined under the Basin Plan. The example in Table 2 indicates that the proposed LTDLE factors resulted in diversions of 235,930 ML, which does not meet the valley BDL of 250,000 ML.

Step 5: The full value of supplementary use from the long-term model is assumed for each valley due to the opportunistic nature of this entitlement class being adequately represented in models.

Step 6: The 2018 factor of general security entitlement types is adjusted so that total diversions based on the LTDLE factors is equal to the BDL model run (column 6 of Table 2).

Step 7: The final 2018 factor (column 7 of Table 3.1) is calculated by dividing the share of the BDL (column 6 of Table 3.1) by the entitlement volume (column 2 of Table 2).

Table 2: A hypothetical example of LTDLE factor calculation

Entitlement type	Entitlement shares	Average reliability	Utilisation factor of entitlement	Initial share of BDL (ML/y)	Final share of BDL (ML/y)	2018 factors
(1)	(2)	(3)	(4)	(5)	(6)	(7)
A	2,000	1.00	0.85	1,700	1,700	0.85
B	3,000	1.00	0.85	2,550	2,550	0.85
C	50,000	0.97	0.88	42,680	42,680	0.85
D	350,000	0.60	0.90	189,000	153,070	0.44
E	150,000	-	-	-	50,000	0.33
	555,000			235,930	250,000	

Comparison of 2011 and 2018 LTDLE factors

The following sections briefly describe the 2011 factors and the differences between their accumulated BDL shares and the valley BDL estimates. In all cases, the 2011 factors in the following tables are v2.05 as agreed by Ministerial Council in 2011. The sections then summarise the derivation of the 2018 factors as previously described, and present these results side by side with the 2011 factors for ready comparison. The sections then present the difference, if any, these make to water recovery.

These results are presented for each valley.

Intersecting Streams

The Basin Plan BDL as at May 2018 for the Intersecting Streams is 3,000 ML.² Work is progressing on finalising the BDL factors for the Intersecting Streams valley. There will be further information published on this valley once these final values are available. Table 3 shows that the Commonwealth has recovered two classes of entitlement in this valley with a combined entitlement value of 17,826 ML. The LTDLE volume of these entitlements will be determined once the BDL factors are finalised. It is important to note that the 9,720 ML of special additional high flow is not currently reported under water recovery.

Table 3: Recovered entitlement values in the Intersecting Streams

Entitlement type	Environmental entitlements (ML)
Unregulated	8,106
Unregulated – special additional high flow	9,720
TOTAL	17,826

The Intersecting Streams are largely undeveloped, with nearly all consumptive water use occurring at the Toorale property that was purchased by the Commonwealth in 2008. There are no available records of historical usages or an existing BDL model scenario as used in the other systems.

NSW and MDBA have identified a series of reports that describe how water was managed on the Toorale property and are working collaboratively to estimate consumptive use as defined by the Basin Plan.

It is expected that the accepted BDL will be substantially increased, and a large proportion of the revised BDL will be recorded as recovered for environmental purposes.

² The BDL is an estimate that is described in Schedule 3 of the Basin Plan for surface water and Schedule 4 for groundwater. The way the Basin Plan BDLs have been derived is set out in the [Water resource assessments for without-development and baseline conditions, Murray–Darling Basin Authority technical report 2010/20 Version 2 \(MDBA 2011\)](#) for surface water and [The proposed Groundwater Baseline and Sustainable Diversion Limits: Methods report](#) (MDBA 2012) for groundwater. The BDL can change through the assessment of improved information about the limit of diversions as at 30 June 2009.

Barwon–Darling

BDL conditions for the Barwon–Darling are defined as Cap conditions by Schedule 3 of the Basin Plan. The Barwon–Darling was at one stage thought to be in breach of cumulative Cap accounting, and NSW responded by reissuing all entitlements as an individual share of the valley Cap, at around one-third of the original size of entitlement shares. This unique approach ensures that each entitlement share equals 1 ML of long-term use when the allocations are fully utilised.

2011 LTDLE factors

The Basin Plan BDL as at May 2018 for Barwon–Darling is 198,000 ML.³

2018 LTDLE factors

The Barwon–Darling 2018 factors have not changed because the value is defined rather than calculated. Previous estimates of recovery with 2011 factors used earlier estimates of Cap and BDL that have been updated to reflect better estimates of total Cap usage.

Table 4: Barwon–Darling entitlements, 2011 factors, 2018 factors derivation and BDL shares by entitlement class

Entitlement type	BDL entitlements (shares)	2011		2018			
		Factors	BDL share (ML/y)	Average reliability	Utilisation factor	Factors	BDL share (ML/y)
A class		1.000				1.000	
B class		1.000				1.000	
C class		1.000				1.000	
Unregulated stream		1.000				1.000	
TOTAL	198,000						198,000

Basin Plan BDL (ML/y)	198,000
Error in share of BDL due to 2011 factors (ML/y)	0
Error in share of BDL due to 2011 factors (%)	0

³ The BDL is an estimate that is described in Schedule 3 of the Basin Plan for surface water and Schedule 4 for groundwater. The way the Basin Plan BDLs have been derived is set out in the [Water resource assessments for without-development and baseline conditions, Murray–Darling Basin Authority technical report 2010/20 Version 2 \(MDBA 2011\)](#) for surface water and [The proposed Groundwater Baseline and Sustainable Diversion Limits: Methods report](#) (MDBA 2012) for groundwater. The BDL can change through the assessment of improved information about the limit of diversions as at 30 June 2009.

Updated water recovery estimates

There is no change to the water recovery volume within the Barwon–Darling (Table 5: Summary of Barwon–Darling environmental entitlements, the LTDLE volumes under the BDL factor and the difference between the BDL and 2011 factor volumes by entitlement class).

Table 5: Summary of Barwon–Darling environmental entitlements, the LTDLE volumes under the BDL factor and the difference between the BDL and 2011 factor volumes by entitlement class

	NSW environmental entitlements register (ML)	Other entitlements (ML) ^a	Total environmental entitlements (ML)	2018 factors	Recovery under 2018 factors (ML/y)	Recovery under 2011 factors (ML/y)	Change in recovery amount (ML/y)
A Class	73	-	73	1.000	73	73	-
B Class	16,111	-	16,111	1.000	16,111	16,111	-
C Class	12,498	-	12,498	1.000	12,498	12,498	-
Unregulated stream	1,488	2,412	3,900	1.000	3,900	3,900	-
	30,170	2,412	32,582		32,582	32,582	-

^a As nominated by MDBA and DAWR.

Border Rivers

2011 factors

The Basin Plan BDL as at May 2018 for the regulated component of the NSW Border Rivers is 189,026 ML/y.⁴ Based on the shares for each entitlement class and the 2011 factors, the long-term level of diversions under the BDL would be 150,541 ML (Table 6). This is 38,485 ML (or 20%) lower than the actual BDL estimate and reveals the scale of inaccuracy of the 2011 factors in this valley.

2018 factors

Table 6 sets out the basis for how the revised factors were determined.

The Basin Plan BDL for the regulated component of the NSW Border Rivers is 189,026 ML.

Table 6: Border Rivers' entitlements, 2011 factors, 2018 factors derivation and BDL shares by entitlement class

Entitlement type	BDL entitlements (shares)	2011		2018			
		Factors	BDL share (ML/y)	Average reliability	Utilisation factor	Factors	BDL share (ML/y)
Domestic and stock	1,275	0.850	1,084	1.000	0.617	0.617	787
Local water utility	620	0.994	616	1.000	0.812	0.812	504
High security	1,500	0.850	1,275	1.000	0.603	0.603	905
General security A class	22,114	0.850	18,797	0.997	0.979	0.976	21,578
General security B class	242,123	0.400	96,849	0.382		0.337	81,610
Supplementary	120,000	0.266	31,920			0.697	83,642
TOTAL	387,632		150,541				189,026

Basin Plan BDL (ML/y)	189,026
Error in share of BDL due to 2011 factors (ML/y)	-38,485
Error in share of BDL due to 2011 factors (%)	-20%

⁴ The BDL is an estimate that is described in Schedule 3 of the Basin Plan for surface water and Schedule 4 for groundwater. The way the Basin Plan BDLs have been derived is set out in the [Water resource assessments for without-development and baseline conditions, Murray–Darling Basin Authority technical report 2010/20 Version 2 \(MDBA 2011\)](#) for surface water and [The proposed Groundwater Baseline and Sustainable Diversion Limits: Methods report](#) (MDBA 2012) for groundwater. The BDL can change through the assessment of improved information about the limit of diversions as at 30 June 2009.

Updated water recovery estimates

As shown in Table 7, the 2018 factors result in a decrease in the LTDLE volume of recovery from high security entitlements, while increasing the LTDLE volume of general security class b and supplementary water access entitlements. This represents a net increase of 944 ML in the LTDLE volume of recovery in the Border Rivers.

Table 7: Summary of Border Rivers' environmental entitlements, the LTDLE volumes under the 2018 factor and the difference between the 2018 and 2011 factor volumes by entitlement class

	NSW environmental entitlements register (ML)	Other entitlements (ML) ^a	Total environmental entitlements (ML)	2018 factors	Recovery under 2018 factors (ML/y)	Recovery under 2011 factors (ML/y)	Change in recovery amount (ML/y)
Domestic and stock	-	-	-	0.617	-	-	-
Local water utility	-	-	-	0.812	-	-	-
High security	-	1,060	1,060	0.603	640	901	-261
General security A class	-	-	-	0.976	-	-	-
General security B class	3,576	200	3,776	0.337	1,273	1,510	238
Supplementary water access	1,437	1,912	3,349	0.697	2,334	891	1,443
	5,013	3,172	8,185		4,247	3,302	944

^a As nominated by MDBA and DAWR.

Gwydir

2011 factors

The Basin Plan BDL as at May 2018 for the regulated component of the Gwydir is 296,156 ML.⁵ Based on the shares for each entitlement class and the 2011 factors, the long-term level of diversions under the BDL would be 237,240 ML (Table 8). This is 58,916 ML (or 20%) lower than the Basin Plan BDL estimate and reveals the scale of inaccuracy of the 2011 factors in this valley.

2018 factors

Table 8 sets out the basis for how the revised factors were determined.

The Basin Plan BDL for the regulated component of the Gwydir is 296,156 ML.

Table 8: Gwydir entitlements, 2011 factors, 2018 factors derivation, and BDL shares by entitlement class

Entitlement type	BDL entitlements (shares)	2011		2018			
		Factors	BDL share (ML/y)	Average reliability	Utilisation factor	Factors	BDL share (ML/y)
Domestic and stock	2,788	0.850	2,370	1.000	0.432	0.432	1,205
Local water utility	3,836	0.850	3,261	1.000	0.578	0.578	2,217
High security	14,405	1.000	14,405	1.000	0.886	0.886	12,759
General security	509,403	0.360	183,385	0.438		0.380	193,659
Supplementary water access	178,000	0.190	33,820			0.485	86,317
TOTAL	708,432		237,240				296,156

Basin Plan BDL (ML/y)	296,156
Error in share of BDL due to 2011 factors (ML/y)	-58,916
Error in share of BDL due to 2011 factors (%)	-20%

⁵ The BDL is an estimate that is described in Schedule 3 of the Basin Plan for surface water and Schedule 4 for groundwater. The way the Basin Plan BDLs have been derived is set out in the [Water resource assessments for without-development and baseline conditions, Murray–Darling Basin Authority technical report 2010/20 Version 2 \(MDBA 2011\)](#) for surface water and [The proposed Groundwater Baseline and Sustainable Diversion Limits: Methods report](#) (MDBA 2012) for groundwater. The BDL can change through the assessment of improved information about the limit of diversions as at 30 June 2009.

Updated water recovery estimates

As shown in Table 9, the new factors result in a decrease in the LTDLE volume of recovery from high security entitlements, while increasing the LTDLE volume of general security and supplementary water access. This represents a net increase of 7,796 ML in the LTDLE volume of recovery in the Gwydir.

Table 9: Summary of Gwydir environmental entitlements, the LTDLE volumes under the 2018 factor and the difference between the 2018 and 2011 factor volumes by entitlement class

	NSW environmental entitlements register (ML)	Other entitlements (ML) ^a	Total environmental entitlements (ML)	2018 factors	Recovery under 2018 factors (ML/y)	Recovery under 2011 factors (ML/y)	Change in recovery amount (ML/y)
Domestic and stock	-	-	-	0.432	-	-	-
Local water utility	-	-	-	0.578	-	-	-
High security	4,508	-	4,508	0.886	3,993	4,508	-515
General security	106,617	-	106,617	0.380	40,532	38,382	2,150
Supplementary water access	20,891	-	20,891	0.485	10,131	3,969	6,161
	132,016	-	132,016		54,656	46,859	7,796

^a As nominated by MDBA and DAWR.

Peel

2011 factors

The Basin Plan BDL as at May 2018 for the regulated component of the Peel is 15,267 ML.⁶ Based on the shares for each entitlement class and the 2011 factors, the long-term level of diversions under the BDL would be 22,645 ML (Table 10). This is 7,368 ML (or 48%) higher than the Basin Plan BDL estimate.

2018 factors

Table 8.2 sets out the basis for how the revised factors were determined.

The Basin Plan BDL for the regulated component of Peel is 15,267 ML.

Table 10: Peel entitlements, 2011 factors, 2018 factors derivation and BDL shares by entitlement class

Entitlement type	BDL entitlements (shares)	2011		2018			
		Factors	BDL share (ML/y)	Average reliability	Utilisation factor	Factors	BDL share (ML/y)
Domestic and stock	471	0.850	400	1.000	0.282	0.282	133
Local water utility	16,400	0.850	13,940	1.000	0.525	0.525	8,617
High security	601	0.850	511	1.000	0.393	0.393	236
General security	30,091	0.259	7,794	0.976		0.209	6,280
TOTAL	47,563		22,645				15,267

Basin Plan BDL (ML/y)	15,267
Error in share of BDL due to 2011 factors (ML/y)	7,378
Error in share of BDL due to 2011 factors (%)	48%

⁶ The BDL is an estimate that is described in Schedule 3 of the Basin Plan for surface water and Schedule 4 for groundwater. The way the Basin Plan BDLs have been derived is set out in the [Water resource assessments for without-development and baseline conditions, Murray–Darling Basin Authority technical report 2010/20 Version 2 \(MDBA 2011\)](#) for surface water and [The proposed Groundwater Baseline and Sustainable Diversion Limits: Methods report](#) (MDBA 2012) for groundwater. The BDL can change through the assessment of improved information about the limit of diversions as at 30 June 2009.

Updated water recovery estimates

As shown in Table 11, the new factors result in a decrease in the LTDLE volume of recovery from general security entitlements. This represents a net decrease of 63 ML in the LTDLE volume of recovery in the Peel.

Table 11: Summary of Peel environmental entitlements, the LTDLE volumes under the 2018 factor and the difference between the 2018 and 2011 factor volumes by entitlement class

	NSW environmental entitlements register (ML)	Other entitlements (ML) ^a	Total environmental entitlements (ML)	2018 factors	Recovery under 2018 factors (ML/y)	Recovery under 2011 factors (ML/y)	Change in recovery amount (ML/y)
Domestic and stock	-	-	-	0.282	-	-	-
Local water utility	-	-	-	0.525	-	-	-
High security	-	-	-	0.393	-	-	-
General security	1,257	-	1,257	0.209	262	326	-63
	1,257	-	1,257		262	326	-63

Namoi (excluding Peel)

2011 LTDLE factors

The Basin Plan BDL as at May 2018 for the regulated component of the Namoi (excluding Peel) is 230,363 ML.⁷ Based on the shares for each entitlement class and the 2011 factors, the long-term level of diversions under the BDL would be 225,254 ML (Table 12). This is 5,109 ML (or 2%) lower than the Basin Plan BDL estimate.

2018 factors

Table 12 sets out the basis for how the revised factors were determined.

The Basin Plan BDL for the regulated component of the Namoi is 230,363 ML.

Table 12: Namoi entitlements, 2011 factors, 2018 factors derivation and BDL shares by entitlement class

Entitlement type	BDL entitlements (shares)	2011		2018			
		Factors	BDL share (ML/y)	Average reliability	Utilisation factor	Factors	BDL share (ML/y)
Domestic and stock	2,636	0.850	2,241	1.000	0.435	0.435	1,148
Local water utility	2,421	0.850	2,058	1.000	0.349	0.349	845
High security	6,298	0.850	5,353	1.000	0.723	0.723	4,551
General security	254,502	0.770	195,967	0.782		0.753	191,573
Supplementary access	115,503	0.170	19,636			0.279	32,246
TOTAL	381,360		225,254				230,363

Basin Plan BDL (ML/y)	230,363
Error in share of BDL due to 2011 factors (ML/y)	-5,109
Error in share of BDL due to 2011 factors (%)	-2%

⁷ The BDL is an estimate that is described in Schedule 3 of the Basin Plan for surface water and Schedule 4 for groundwater. The way the Basin Plan BDLs have been derived is set out in the [Water resource assessments for without-development and baseline conditions, Murray–Darling Basin Authority technical report 2010/20 Version 2 \(MDBA 2011\)](#) for surface water and [The proposed Groundwater Baseline and Sustainable Diversion Limits: Methods report](#) (MDBA 2012) for groundwater. The BDL can change through the assessment of improved information about the limit of diversions as at 30 June 2009.

Updated water recovery estimates

As shown in Table 13, the new factors result in a decrease in the LTDLE volume of recovery from high and general security entitlements. This represents a net decrease of 271 ML in the LTDLE volume of recovery in the Namoi.

Table 13: Summary of Namoi environmental entitlements, the LTDLE volumes under the 2018 factor and the difference between the 2018 and 2011 factor volumes by entitlement class

	NSW environmental entitlements register (ML)	Other entitlements (ML) ^a	Total environmental entitlements (ML)	2018 factors	Recovery under 2018 factors (ML/y)	Recovery under 2011 factors (ML/y)	Change in recovery amount (ML/y)
Domestic and stock	-	-	-	0.435	-	-	-
Local water utility	-	-	-	0.349	-	-	-
High security	-	177	177	0.723	128	150	-23
General security	7,322	7,045	14,367	0.753	10,815	11,063	-248
Supplementary water access	-	-	-	0.279	-	-	-
	7,322	7,222	14,544		10,942	11,213	-271

^a As nominated by MDBA and DAWR.

Macquarie–Castlereagh

2011 factors

The Basin Plan BDL as at May 2018 for the regulated component of the Macquarie–Castlereagh is 381,965 ML.⁸ Based on the shares for each entitlement class and the 2011 factors, the long-term level of diversions under the BDL would be 312,407 ML (Table 14). This is 69,558 ML (or 18%) lower than the Basin Plan BDL estimate.

2018 factors

Table 14 sets out the basis for how the revised factors were determined.

The Basin Plan BDL for the regulated component of the Macquarie–Castlereagh is 381,965 ML.

Table 14: Macquarie–Castlereagh entitlements, 2011 factors, 2018 factors derivation and BDL shares by entitlement class

Entitlement type	BDL entitlements (shares)	2011		2018			
		Factors	BDL share (ML/y)	Average reliability	Utilisation factor	Factors	BDL share (ML/y)
Domestic and stock	6,000	0.850	5,100	1.000	0.290	0.290	1,741
Local water utility	18,805	0.850	15,984	1.000	0.681	0.681	12,799
High security	17,900	0.850	15,215	1.000	0.668	0.668	11,957
General security	632,400	0.420	265,608	0.605		0.516	326,070
Supplementary access	50,000	0.210	10,500			0.588	29,398
TOTAL	725,105		312,407				381,965

Basin Plan BDL (ML/y)	381,965
Error in share of BDL due to 2011 factors (ML/y)	-69,558
Error in share of BDL due to 2011 factors (%)	-18%

⁸ The BDL is an estimate that is described in Schedule 3 of the Basin Plan for surface water and Schedule 4 for groundwater. The way the Basin Plan BDLs have been derived is set out in the [Water resource assessments for without-development and baseline conditions, Murray–Darling Basin Authority technical report 2010/20 Version 2 \(MDBA 2011\)](#) for surface water and [The proposed Groundwater Baseline and Sustainable Diversion Limits: Methods report](#) (MDBA 2012) for groundwater. The BDL can change through the assessment of improved information about the limit of diversions as at 30 June 2009.

Updated water recovery estimates

As shown in Table 15, the new factors result in a decrease in the LTDLE volume of recovery from high security entitlements, while increasing the LTDLE volume of general security and supplementary water access entitlements. This represents a net increase of 19,947 ML in the LTDLE volume of recovery in the Macquarie–Castlereagh.

Table 15: Summary of Macquarie–Castlereagh environmental entitlements, the LTDLE volumes under the 2018 factor and the difference between the 2018 and 2011 factor volumes by entitlement class

	NSW environmental entitlements register (ML)	Other entitlements (ML) ^a	Total environmental entitlements (ML)	2018 factors	Recovery under 2018 factors (ML/y)	Recovery under 2011 factors (ML/y)	Change in recovery amount (ML/y)
Domestic and stock	-	-	-	0.290	-	-	-
Local water utility	-	-	-	0.681	-	-	-
High security	-	5,475	5,475	0.668	3,657	4,654	-996
General security	174,643	5,893	180,536	0.516	93,086	75,825	17,261
Supplementary water access	9,744	-	9,744	0.588	5,729	2,046	3,683
	184,387	11,368	195,755		102,472	82,525	19,947

^a As nominated by MDBA and DAWR.

Lachlan

2011 factors

The Basin Plan BDL as at May 2018 for the regulated component of the Lachlan (excluding Belubula entitlements) is 285,388 ML.⁹ Based on the shares for each entitlement class and the 2011 factors, the long-term level of diversions under the BDL would be 308,673 ML (Table 16). This is 23,285 ML (or 8 %) higher than the Basin Plan BDL estimate.

2018 factors

Table 16 sets out the basis for how the revised factors were determined.

The Basin Plan BDL for the regulated component of the Lachlan (excluding Belubula entitlements) is 285,388 ML.

Table 16: Lachlan entitlements, 2011 factors and share of BDL by entitlement class

Entitlement type	BDL entitlements (shares)	2011		2018			
		Factors	BDL share (ML/y)	Average reliability	Utilisation factor	Factors	BDL share (ML/y)
Domestic and stock	12,970	0.825	10,700	1.000	0.402	0.402	5,220
Local water utility	15,545	0.825	12,825	1.000	0.530	0.530	8,237
High security	24,557	1.000	24,557	1.000	0.927	0.927	22,772
Conveyance	17,950	0.686	12,314	0.852	0.979	0.834	14,972
General security	591,137	0.420	248,278	0.562		0.396	234,187
TOTAL	662,159		308,673				285,388

Basin Plan BDL (ML/y)	285,388
Error in share of BDL due to 2011 factors (ML/y)	23,285
Error in share of BDL due to 2011 factors (%)	8%

⁹ The BDL is an estimate that is described in Schedule 3 of the Basin Plan for surface water and Schedule 4 for groundwater. The way the Basin Plan BDLs have been derived is set out in the [Water resource assessments for without-development and baseline conditions, Murray–Darling Basin Authority technical report 2010/20 Version 2 \(MDBA 2011\)](#) for surface water and [The proposed Groundwater Baseline and Sustainable Diversion Limits: Methods report](#) (MDBA 2012) for groundwater. The BDL can change through the assessment of improved information about the limit of diversions as at 30 June 2009.

Updated water recovery estimates

As shown in Table 17, the new factors result in a decrease in the LTDLE volume of recovery from high and general security entitlements. This represents a net decrease of 2,856 ML in the LTDLE volume of recovery in the Lachlan.

Table 17: Summary of Lachlan environmental entitlements, the LTDLE volumes under the 2018 factor and the difference between the 2018 and 2011 factor volumes by entitlement class

	NSW environmental entitlements register (ML)	Other entitlements (ML) ^a	Total environmental entitlements (ML)	2018 factors	Recovery under 2018 factors (ML/y)	Recovery under 2011 factors (ML/y)	Change in recovery amount (ML/y)
Domestic and stock	-	-	-	0.402	-	-	-
Local water utility	-	-	-	0.530	-	-	-
High security	2,728	-	2,728	0.927	2,530	2,728	-198
Conveyance	-	-	-	0.834	-	-	-
General security	111,492	-	111,492	0.396	44,169	46,827	-2,657
	114,220	-	114,220		46,699	49,555	-2,856

^a As nominated by MDBA and DAWR.

Murrumbidgee

2011 factors

The Basin Plan BDL as at May 2018 for the regulated component of the Murrumbidgee is 2,116,997 ML¹⁰. Based on the shares for each entitlement class and the 2011 factors, the long-term level of diversions under the BDL would be 2,181,503 ML (Table 18). This is 64,506 ML (or 3%) higher than the Basin Plan BDL estimate.

2018 factors

Table 18 sets out the basis for how the revised factors were determined.

The Basin Plan BDL for the regulated component of the Murrumbidgee is 2,116,997 ML.

It is important to note that the Murrumbidgee includes an additional 40,300 ML/y of water recovery than has previously been published. This arises from the Nimmie-Caira system and adds an additional 40,300 ML/y to previously published recovery volumes of 132,600 ML/y.

Under the *Heads of Agreement: An Agreement supporting the Nimmie-Caira System Enhanced Environmental Water Delivery Project* the Commonwealth Government and NSW Government agreed to a review by MDBA of the Murrumbidgee SDL, taking into account the Nimmie-Caira entitlements. MDBA completed this review in 2018 and advised the NSW Government that all entitlements acquired under the Nimmie-Caira purchase agreement contribute to 'bridging the gap'. The result of this review also:

- increases the estimate for the Lowbidgee component of the Murrumbidgee BDL to about 279,000 ML/y
- increases the BDL for the Murrumbidgee SDL resource unit by about 64,000 ML/y
- increases the estimate of the SDL for the Murrumbidgee SDL resource unit by the same amount
- increases the estimate of water recovery in the Murrumbidgee SDL resource unit by about 40,300 ML/y.

¹⁰ The BDL is an estimate that is described in Schedule 3 of the Basin Plan for surface water and Schedule 4 for groundwater. The way the Basin Plan BDLs have been derived is set out in the [Water resource assessments for without-development and baseline conditions, Murray–Darling Basin Authority technical report 2010/20 Version 2 \(MDBA 2011\)](#) for surface water and [The proposed Groundwater Baseline and Sustainable Diversion Limits: Methods report](#) (MDBA 2012) for groundwater. The BDL can change through the assessment of improved information about the limit of diversions as at 30 June 2009.

Table 18: Murrumbidgee entitlements, 2011 factors, 2018 factors derivation and BDL shares by entitlement class

Entitlement type	BDL entitlements (shares)	2011		2018			
		Factors	BDL share (ML/y)	Average reliability	Utilisation factor	Factors	BDL share (ML/y)
Domestic and stock	35,922	0.850	30,534	1.000	0.805	0.805	28,923
Local water utility	21,586	0.850	18,348	1.000	0.488	0.488	10,531
High security	357,651	0.950	339,768	0.980	0.998	0.977	349,592
High security (TWS)	19,769	-	-	0.980	0.998	0.977	19,324
Conveyance	371,468	0.950	352,895	0.973	0.894	0.870	323,276
General security	1,744,030	0.640	1,116,179	0.835		0.591	1,031,429
Supplementary water access	198,780	0.140	27,829			0.377	75,000
Lowbidgee entitlement – NC ^b	381,000	0.454	172,974			0.456	173,901
Lowbidgee entitlement – RN ^c	213,499	0.336	71,736			0.172	36,758
Lowbidgee entitlement – RS ^d	152,501	0.336	51,240			0.448	68,264
Unregulated	-	-	-			1.000	-
TOTAL	3,130,206		2,181,503				2,116,997

Basin Plan BDL (ML/y)	2,116,997
Error in share of BDL due to 2011 factors (ML/y)	64,506
Error in share of BDL due to 2011 factors (%)	3

^a 2011 factors v2.05 as agreed by Ministerial Council in 2011.

^b Nimmie-Caira net diversions.

^c Redbank North diversions.

^d Redbank South diversions (Yanga National Park).

Updated water recovery estimates

As shown in Table 19, the new factors result in a decrease in the LTDLE volume of conveyance, general security and Redbank North Lowbidgee entitlements. This is offset by increases in the LTDLE value of recovery from high security supplementary water and Nimmie-Caira Lowbidgee entitlements. This represents a net decrease of 11,296 ML in the LTDLE volume of recovery in the Murrumbidgee.

Table 19: Summary of Murrumbidgee environmental entitlements, the LTDLE volumes under the 2018 factors and the difference between the 2018 and 2011 factor volumes by entitlement class

	NSW environmental entitlements register (ML)	Other entitlements (ML) ^a	Total environmental entitlements (ML) ^b	2018 factors	Recovery under 2018 factors (ML/y)	Recovery under 2011 factors (ML/y)	Change in recovery amount (ML/y)
Domestic and stock	-	-	-	0.805	-	-	-
Local water utility	-	-	-	0.488	-	-	-
High security	10,866	5,124	15,990	0.977	15,630	15,191	439
High security (TWS)	-	-	-	0.977	-	-	-
Conveyance	29,545	16,317	45,862	0.870	39,912	43,569	-3,657
General security	301,888	9,799	311,687	0.591	184,333	199,480	-15,146
Supplementary water access	27,666	5,888	33,554	0.377	12,660	4,698	7,962
Lowbidgee entitlement – NC ^c	381,000	-	381,000	0.456	173,901	172,974	927
Lowbidgee entitlement – RN ^d	12,117	-	12,117	0.172	2,086	4,071	-1,985
Lowbidgee entitlement – RS ^e	-	-	-	0.448	-	-	-
Unregulated	164	-	164	1.000	164	-	164
	763,246	37,128	800,374		428,686	439,982	-11,296

^a As nominated by MDBA and DAWR.

^b General security entitlement volume of 7,656 ML purchased for the ACT shared reduction amount is not accounted for in this table.

^c Nimmie-Caira net diversions.

^d Redbank North diversions.

^e Redbank South diversions (Yanga National Park).

Murray (NSW)

2011 factors

The Basin Plan BDL as at May 2018 for the regulated component of the Murray (NSW) is 1,680,290 ML¹¹. Based on the shares for each entitlement class and the 2011 factors, the long-term level of diversions under the BDL would be 1,846,388 ML (Table 20). This is 166,098 ML (or 10%) higher than the Basin Plan BDL estimate.

2018 LTDLE factors

Table 20 sets out the basis for how the revised factors were determined.

The Basin Plan BDL for the regulated component of the Murray (NSW) is 1,680,290 ML.

¹¹ The BDL is an estimate that is described in Schedule 3 of the Basin Plan for surface water and Schedule 4 for groundwater. The way the Basin Plan BDLs have been derived is set out in the [Water resource assessments for without-development and baseline conditions, Murray–Darling Basin Authority technical report 2010/20 Version 2 \(MDBA 2011\)](#) for surface water and [The proposed Groundwater Baseline and Sustainable Diversion Limits: Methods report](#) (MDBA 2012) for groundwater. The BDL can change through the assessment of improved information about the limit of diversions as at 30 June 2009.

Table 20: Murray (NSW) entitlements, 2011 factors, 2018 factors derivation and BDL shares by entitlement class

Entitlement type	BDL entitlements (shares)	2011		2018			
		Factors	BDL share (ML/y)	Average reliability	Utilisation factor	Factors	BDL share (ML/y)
Domestic and stock	14,998	0.850	12,748	1.000	0.623	0.623	9,349
Local water utility	35,202	0.850	29,922	1.000	0.581	0.581	20,461
High security	204,955	0.950	194,707	0.991	0.881	0.873	178,899
Conveyance	300,000	0.784	235,200	0.919	1.000	0.918	275,522
General security	1,557,808	0.810	1,261,824	0.862		0.699	1,088,920
Supplementary water access	152,362	0.735	111,986			0.703	107,140
Unregulated	-		-			1.000	-
TOTAL	2,265,325		1,846,388				1,680,290

Basin Plan BDL (ML/y)	1,680,290
Error in share of BDL due to 2011 factors (ML/y)	166,098
Error in share of BDL due to 2011 factors (%)	10

Updated water recovery estimates

As shown in Table 21, the new factors result in a decrease in the LTDLE volume of recovery from high and general security and supplementary water entitlements, while increasing the LTDLE volume of conveyance and unregulated entitlements. This represents a net decrease of 41,533 ML in the LTDLE volume of recovery in the Murray (NSW).

Table 21: Summary of Murray (NSW) environmental entitlements, the LTDLE volumes under 2018 factors and the difference between the 2018 and 2011 factor volumes by entitlement class

	NSW environmental entitlements register (ML)	Other entitlements (ML) ^a	Total environmental entitlements (ML)	2018 factors	Recovery under 2018 factors (ML/y)	Recovery under 2011 factors (ML/y)	Change in recovery amount (ML/y)
Domestic and stock	-	-	-	0.623	-	-	-
Local water utility	-	-	-	0.581	-	-	-
High security	17,858	1,554	19,412	0.873	16,944	18,441	-1,497
Conveyance	12,340	9,883	22,223	0.918	20,410	17,423	2,987
General security	366,498	21,535	388,033	0.699	271,238	314,307	-43,069
Supplementary water access	211	4,121	4,332	0.703	3,046	3,184	-138
Unregulated	184	-	184	1.000	184	-	184
	397,091	37,093	434,184		311,822	353,355	-41,533

^a As nominated by MDBA and DAWR.

Lower Darling

2011 factors

The Basin Plan BDL as at May 2018 for the regulated component of the Lower Darling is 54,719 ML¹². Based on the shares for each entitlement class and the 2011 factors, the long-term level of diversions under the BDL would be 57,357 ML (Table 22). This is 2,638 ML (or 5%) higher than the Basin Plan BDL estimate.

2018 factors

Table 22 sets out the basis for how the revised factors were determined.

The Basin Plan BDL for the regulated component of the Lower Darling is 54,719 ML.

Table 22: Lower Darling entitlements, 2011 factors, 2018 factors derivation and BDL shares by entitlement class

Entitlement type	BDL entitlements (shares)	2011		2018			
		Factors	BDL share (ML/y)	Average reliability	Utilisation factor	Factors	BDL share (ML/y)
Domestic and stock	1,415	0.862	1,220	1.000	0.345	0.345	489
Local water utility	10,135	0.850	8,615	1.000	0.365	0.365	3,700
High security	7,560	0.838	6,335	0.982	0.747	0.734	5,547
General security	31,355	0.810	25,398	0.960		0.931	29,194
Use of inter-valley trade	20,000		15,790				15,790
TOTAL	50,465		57,357				54,719

Basin Plan BDL (ML/y)	54,719
Error in share of BDL due to 2011 factors (ML/y)	2,638
Error in share of BDL due to 2011 factors (%)	5%

¹² The BDL is an estimate that is described in Schedule 3 of the Basin Plan for surface water and Schedule 4 for groundwater. The way the Basin Plan BDLs have been derived is set out in the [Water resource assessments for without-development and baseline conditions, Murray–Darling Basin Authority technical report 2010/20 Version 2 \(MDBA 2011\)](#) for surface water and [The proposed Groundwater Baseline and Sustainable Diversion Limits: Methods report](#) (MDBA 2012) for groundwater. The BDL can change through the assessment of improved information about the limit of diversions as at 30 June 2009.

Updated water recovery estimates

As shown in Table 23, the new factors result in a decrease in the LTDLE volume of recovery from high security entitlements, while increasing the LTDLE volume of general security. This represents a net increase of 2,290 ML in the LTDLE volume of recovery in the Lower Darling.

Table 23: Summary of Lower Darling environmental entitlements, the LTDLE volumes under the 2018 factors and the difference between the 2018 and 2011 factor volumes by entitlement class

	NSW environmental entitlements register (ML)	Other entitlements (ML) ^a	Total environmental entitlements (ML)	2018 factors	Recovery under 2018 factors (ML/y)	Recovery under 2011 factors (ML/y)	Change in recovery amount (ML/y)
Domestic and stock	-	-	-	0.345	-	-	-
Local water utility	-	-	-	0.365	-	-	-
High security	535	2,540	3,075	0.734	2,256	2,577	-321
General security	2,203	19,361	21,564	0.931	20,078	17,467	2,611
Use of intervalley trade	-	-	-	-	-	-	-
	2,738	21,901	24,639		22,334	20,044	2,290

^a As nominated by MDBA and DAWR.

Implications for water recovery estimates

The Basin Plan (2012) set local reduction amounts for each valley (SDL resource unit). In addition to the local reduction amount, s6.05(3) set shared reduction amounts across Basin zones. The default method to apportion the shared reduction amount to each valley is set out in s6.05(4). As detailed in Table 24, these values are combined to give a recovery target in each valley.

In 2018, amendments to the Basin Plan were proposed¹³. Table 25 details the changes to water recovery if these amendments are fully adopted. The shared recovery amount remains at the default level in this table, however, the proposed Northern Basin Review amendment allows the NSW Government to reapportion the shared reduction to other valleys, and this allows for over recovery in one valley to contribute to achieving the shared recovery target in another valley.

Assuming the adoption of the full suite of Basin Plan amendments and with the application of the 2018 LTDLE factors, only three valleys under-recovered. These valleys are the NSW Border Rivers, the Namoi and the Lachlan. It is important to note that the BDL for the Lachlan is being re-estimated as part of the development of the WRP. As a part of this process, there is a slight change to the ratio used to formulate the general security factor, which will remove the small shortfall in recovery reported in Table 25.

¹³ The SDL Adjustment Mechanism amendment was enacted on 14 February 2018. The Water Amendment Bill 2018 was tabled on 10 May 2018 and if passed will allow the previously disallowed Northern Basin Review amendment to be reintroduced.

Table 24: Water recovery targets at a valley scale under Basin Plan 2012 showing recovery volumes under the 2011 LTDLE factors and BDL factors

	As per Basin Plan 2012		
	Local reduction amount (ML/y)	Shared reduction amount (default) (ML/y) ^a	2750 GL recovery target by valley (ML/y)
Intersecting Streams	0	200	200
Barwon–Darling	6,000	11,100	17,100
NSW Border Rivers	7,000	11,700	18,700
Gwydir	42,000	18,300	60,300
Namoi	10,000	19,300	29,300
Macquarie–Castlereagh	65,000	23,900	88,900
Northern Basin sub-total	130,000	84,500	214,500
Lachlan	48,000	0	48,000
NSW Murrumbidgee	320,000	243,000	563,000
NSW Murray	262,000	208,000	470,000
Lower Darling	8,000	7,000	15,000
Southern Basin sub-total	590,000	458,000	1,048,000
Total NSW	768,000	542,500	1,310,500

^a s6.05(3) of the Basin Plan 2012 sets shared reduction amounts across Basin zones, s6.05(4) sets out a default method for apportioning the shared reduction.

Table 25: Water recovery targets at a valley scale under accepted and proposed Basin Plan amendments (2018) showing recovery volumes under the 2011 LTDLE factors and BDL factors

As per SDLAM amendment and proposed NBR amendments (Basin Plan 2018)									
	Local reduction amount (ML/y)	Shared reduction amount (default) (ML/y) ^a	Apportioned supply contribution (ML/y)	2075 GL recovery target by valley (ML/y) ^b	Recovery under 2011 factors (ML/y) ^c	Recovery under 2018 BDL factors (ML/y) ^c	Net change due to factors (ML/y)	Local recovery shortfall/excess (ML/y)	Shared recovery shortfall/excess (ML/y) ^a
Intersecting Streams ^d	0	0	0	0	8,106	8,106	0	0	
Barwon–Darling	32,000	3,200	0	35,200	32,582	32,582	0	0	
NSW Border Rivers	7,000	3,300	0	10,300	3,302	4,247	944	-2,753	
Gwydir	42,000	5,200	0	47,200	46,859	54,656	7,796	0	
Namoi	20,000	5,500	0	25,500	11,539	11,205	-334	-8,795	
Macquarie–Castlereagh	55,000	6,800	0	61,800	82,525	102,472	19,947	0	
Northern Basin	156,000	24,000	0	180,000	184,913	213,267	28,354		44,816
Lachlan ^e	48,000	0	0	48,000	49,555	46,699	-2,856	-1,301	
NSW Murrumbidgee ^{f,g,h}	320,000	243,000	-162,000	401,000	439,982	428,686	-11,296	0	
NSW Murray	262,000	208,000	-124,800	345,200	353,355	311,822	-41,533	0	
Lower Darling	8,000	7,000	0	15,000	20,044	22,334	2,290	0	
Southern Basin	590,000	458,000	-286,800	761,200	813,380	762,842	-50,538		1,642
Total NSW	794,000	482,000	-286,800	989,200	1,047,848	1,022,809	-25,040	-12,850	46,458

^a s6.05(3) of the Basin Plan 2012 sets shared reduction amounts across Basin zones, s6.05(4) sets out a default method for apportioning the shared reduction.

^b This report assumes that the full adjustment to the recovery volume resulting from the SDL Adjustment Mechanism supply measures and the Northern Basin Review is in effect. The requirement that 62,000 ML in SDL Adjustment Mechanism efficiency measures is achieved to enable the full 605,000 ML supply measure adjustment is assumed to have been met. While some projects are underway across the Basin to this effect, projects in NSW have yet to commence

^c Recovery values include water which is contracted but not yet delivered (estimated to be around 92,000 ML/y).

^d Pending finalisation of BDL factors for the Intersecting Streams, current reporting method is maintained – 9,720 ML special additional high flow entitlement is not reported.

^e The Lachlan is presented separately in this table as it is a terminal system and is not considered to be a part of either the northern or southern Basin for recovery purposes.

^f BDL determined with a revised agreed accounting for Nimmie-Caira recoveries – the entire LTDLE volume of this entitlement is now recognised for 'gap-bridging' purposes, adding an additional 40,300 ML/y to previously published recovery volumes of 132,600 ML/y.

^g BDL determined continuing the practice under cap arrangements, where defined in the Diversion Formula Register v6, of deducting return flows.

^h 4,900 ML/y LTDLE has been recovered in NSW for the ACT shared reduction amount and has not been reported in this table.

Conclusions

This report set out the method and results for the review of LTDLE factors in the NSW Murray–Darling Basin. The results demonstrate the discrepancies associated with using the 2011 factors in producing a result consistent with BDL estimates for the relevant valleys and the implications of these discrepancies for estimating water recovery.

The method and data used to recalculate the LTDLE factors were developed using a principle-based approach and applied in close consultation with MDBA. The results produced and documented in this report are transparent, robust and reliable, and produce an enhanced estimate of water recovery.

Appendix 1: Application and assumptions used for deriving the BDL-based 2018 LTDLE factors

Data sources

Entitlements

NSW Government has prepared updated BDL model scenarios that take into consideration improvements to the model software, updated calibration work, and a range of error corrections and general improvements that have occurred to the base models since they were supplied to MDBA.

NSW Government has recommended to MDBA that the updated BDL scenarios represented the best available information to describe BDL conditions and provided a BDL scenario report that describes the changes made in comparison to the existing BDL scenarios.

MDBA is currently reviewing both the reports and the supplied model parameters, but in the interim has agreed that the entitlements listed in the NSW BDL scenario reports represent the best available information to describe the entitlements on issue under BDL conditions (generally 30 June 2009).

In the Murray, Lower Darling and Murrumbidgee systems, entitlements have been adjusted to remove the effects of entitlements owned by The Living Murray (TLM) program and the Water for Rivers (WfR) program in cases where the model did not include an explicit representation of the effects of that recovery. Both TLM & WfR are considered to be existing recovery by the Basin Plan and are excluded from BDL diversions.

The relevant adjustments are supplied by MDBA and jointly agreed with NSW Government after inspecting the model configurations.

Valley	Entitlement type	Unit share adjustment
Murrumbidgee	Conveyance	-4,500 for WfR, not including the effects of Barren Box Swamp
	General security	-81,171 for TLM
	General security	-61,956 for WfR
Murray	High security	-5,124 for TLM -2,027 for TLM
	Conveyance	-30,000 adaptive environmental
	General security	-83,006 for TLM -31,881 for TLM
Lower Darling	High security	-500 for TLM
	General security	-47,800 for TLM (anabranh pipeline)
	Supplementary	-250,000 for TLM (purchased from Tandou)

BDL diversions

The current BDL model scenarios prepared by MDBA were adopted as the primary source of data to describe long-term (1895 to 2009) diversions in each major regulated valley. In a limited number of cases, the model does not represent usage by a class of entitlement or a portion of a class of entitlement, and in these cases, the average of recorded historical diversions was used instead.

In many valleys, modelled diversions describe diversion at a location that represents a group of entitlement classes. In these cases, historical diversion information was used to pro-rata assign the total modelled diversion between the relevant entitlement classes.

The BDL diversions are used directly in the calculation of supplementary factors and also to describe the total volume of BDL that is then distributed based on historical trade adjusted data for the remaining entitlement types.

WRP area (river valley) and entitlement type	Source of water usage data used for LTDLE calculation
<i>Intersecting Streams</i>	
Unregulated	LTDLE nominated as 1.0 by default. No model and no historical record available for estimating take.
Special additional high flow	LTDLE nominated as 1.0 by default. No model and no historical record available for estimating take.
<i>NSW Border Rivers</i>	
Domestic and stock	Not included in the model. Assumed to be used at the same rate as general security entitlements.
Local water utility	Modelled estimate from Run 871. Represents Ashford, Boggabilla and Mungindi. Type 3.0 nodes.
High security	Not included in the model. Used average historical diversion from 2009/10 to 2016/17.
General security A	Modelled estimate from Run 871. Total long-term average usage of 104,046 ML/y of "on allocation" from 8.1 nodes. Split into A and B components based on 2004 to 2017 average historical usage of 13,813 ML/y and 75,005 ML/y respectively.
General security B	Modelled estimate from Run 871. Total long-term average usage of 104,046 ML/y of "on allocation" from 8.1 nodes. Split into A and B components based on 2004 to 2017 average historical usage of 13,813 ML/y and 75,005 ML/y respectively.
Supplementary	Modelled estimate from Run 871. "Off allocation" from 8.1 nodes
<i>Gwydir</i>	

WRP area (river valley) and entitlement type	Source of water usage data used for LTDLE calculation
Domestic and stock	Domestic and stock usage is included in take by 8.1 nodes. Used average historical diversion from 2004 to 2017
Local water utility	Modelled estimate from Run 871. Type 3.0 nodes for Inverell, Bingara and Gravesend
High security	The single largest high security entitlement (a pecan farm) is modelled with an 8.2 node. The remaining high security entitlements are lumped with general security entitlements on 8.1 nodes. The remaining un-modelled high security entitlement is calculated by subtracting the pecan farm entitlement from the total high security entitlement model. The un-modelled volume of high security entitlement is then assumed to be active at the same rate as that of the pecan nut farm.
General security	Modelled by "on allocation" at type 8.1 nodes. BDL usage equals total general security usage minus historical domestic and stock minus the un-modelled high security usage component
Supplementary	Modelled estimate from Run 871. "Off allocation" from 8.1 nodes.
<i>Namoi</i>	
Domestic and stock	Modelled estimate from Run 871. Type 3.0 nodes with stock or domestic labels.
Local water utility	Modelled estimate from Run 871. Type 3.0 nodes for Manilla and Walgett
High security	Not modelled. Used average historical diversion from 2004 to 2017.
General security	Modelled estimate from Run 871. "On allocation" from 8.1 nodes.
Supplementary	Modelled estimate from Run 871. "Off allocation" from 8.1 nodes.
<i>Peel</i>	
Domestic and stock	Modelled estimate from Run 871. Type 3.0 nodes with stock or domestic labels.
Local water utility	Modelled estimate from Run 871. Type 3.0 node for Tamworth only.
High security	Modelled estimate from Run 871. Type 3.0 node (labelled as industrial in the model)
General security	Modelled estimate from Run 871. "on allocation" and "off allocation" from type 8.1 nodes

WRP area (river valley) and entitlement type	Source of water usage data used for LTDLE calculation
<i>Macquarie/Castlereagh</i>	
Domestic and stock	Not modelled. Used average historical diversion from 2002 to 2017.
Local water utility	Modelled estimate from Run 871. Type 3.0 nodes for Mudgee, Wellington, Dubbo, Nyngan, Cobar. Not Bathurst.
High security	Modelled estimate from Run 871. All type 8.2 nodes.
General security	Modelled estimate from Run 871. All type 8.0 nodes "on allocation".
Supplementary	Modelled estimate from Run 871. All type 8.0 nodes "off allocation".
<i>Barwon–Darling</i>	
Local water utility	LTDLE not calculated. As the use is conditioned, it is unlikely to be recovered.
Unregulated	Entitlements are issued as an individual share of Cap and BDL, so all LTDLEs equal 1.0 by definition
A class	Entitlements are issued as an individual share of Cap and BDL, so all LTDLEs equal 1.0 by definition
B class	Entitlements are issued as an individual share of Cap and BDL, so all LTDLEs equal 1.0 by definition
C class	Entitlements are issued as an individual share of Cap and BDL, so all LTDLEs equal 1.0 by definition
<i>Lower Darling</i>	
Domestic and Stock	Modelled and supplied by MDBA
Local water utility	
High security	
General security	
Use of inter-valley trade	
<i>Lachlan</i>	
Domestic and stock	Modelled estimate from Run 871. Type 3.0 domestic and stock nodes.
Local water utility	Modelled estimate from Run 871. Type 3.0 nodes for Cowra, Forbes, Condobolin, Willandra, Hillston and Booligal.

WRP area (river valley) and entitlement type	Source of water usage data used for LTDLE calculation
High security	Modelled estimate from Run 871. All type 8.2 nodes.
Conveyance	Lumped with general security. Not modelled separately. Used the historical diversion 2004 to 2017 to split.
General security	Modelled estimate from Run 871. All type 8.0 nodes. Equals total modelled general security usage less the conveyance usage.
<i>Murrumbidgee</i>	
Stock and domestic	Not modelled. Used average historical diversion from 2004 to 2017. 1,000 ML is deducted for WfR (estimate supplied by MDBA, Hay).
Local water utility	Modelled estimate from Run 871. 10 specific town nodes.
High security	The total for the valley uses the average historical value (2004/05–2016/17), which is then split between MIA, CIA and others in proportion to the entitlement held. 12,271 ML is deducted for returns at CIA and MIA (MDBA supplied estimate based on pro-rata split between high and general security and for all volumes returned: 94,579 ML).
High security (TWS)	Included in the MIA total node. Used average historical diversion from 2004 to 2017 to split out a portion.
Conveyance	Included in the MIA, CIA total nodes. Used average historical diversion from 2004 to 2017 to split and subtract from the relevant total nodes. 17,100 ML is deducted for WfR (estimate supplied by MDBA).
General security	Modelled (River Pumper General Security + Coleambally General Security + Murrumbidgee Irrigation General Security). Run 871 modelled MIA total has supplementary, conveyance, high security and high security TWS removed. The CIA total has supplementary, conveyance and high security removed. The total for river pumpers has the valley total supplementary that wasn't taken off either MIA or CIA removed. Historical without debit diversions are counted as general security diversion. 25,700 ML is deducted for WfR (estimate supplied by MDBA). 82,308 ML is deducted for returns at CIA and MIA (MDBA supplied estimate based on pro-rata split between high and general security and for all volumes returned: 94,579 ML).
General security – meeting ACT shared reduction amount	No diversion data is required. Entitlements held by the ACT are assumed to have the same factor as other Murrumbidgee general security entitlements.

WRP area (river valley) and entitlement type	Source of water usage data used for LTDLE calculation
Supplementary water	Modelled estimate from Run 871 of “off allocation” minus the historical without debit take which is counted instead as general security diversion
Lowbidgee entitlement – Nimmie-Caira net diversions	Modelled estimate from Run 871 is decreased by 11,000 ML for estimated returns (supplied by MDBA)
Lowbidgee Entitlement – Redbank North diversions	Modelled estimate from Run 871 for total Redbank is split by area: 35% North and 65% South
Lowbidgee Entitlement – Redbank South diversions (Yanga National Park)	Modelled estimate from Run 871 for total Redbank is split by area 35% North and 65% South
Unregulated	Not modelled. Assumed full usages LTDLE equals 1.0.
NSW Murray	
Domestic and stock	Not modelled. Used average historical diversion from 2004 to 2017.
Local water utility	Modelled and supplied by MDBA
High security	
Conveyance	
General security	
Supplementary water access	
Unregulated	Not modelled. Assumed full usage. So LTDLE equals 1.0

Historical utilisation rates

The planning models used for BDL scenarios were built to represent diversions taken at locations and were designed in an era when water entitlements were tied to locations. As such, they do not include an explicit representation of temporary trade that is increasingly important in many valleys.

When we use recorded historical diversions by entitlement class to sub-divide modelled long-term lumped diversions, failure to consider the effects of temporary trade can result in apparent low levels of utilisation, particularly of high security entitlements, because the proportion of allocations being used for purposes traditionally associated with high security entitlements, such as permanent plantings, is often not that high.

For the purpose of calculating LTDLE factors, we assume that temporary trade is a usage attributable to the source entitlement class. For example, the holder of a 100 ML high security entitlement uses 60 ML to water some vines and then sells the remaining 40 ML to his general security–based neighbour who grows rice. The neighbour has a 50 ML entitlement that he fully uses as well as is fully using the traded allocation. The model will represent this as a 60 ML usage on vines at location A and a 90 ML usage on rice at location B.

The historical diversions database will record 60 ML of use against a high security allocation of 100 ML occurred and that 90 ML of use against a general security allocation of 50 ML occurred, or put another way, that the high security entitlement was 60% used and the general security entitlement was 180% used.

If a temporary trade is counted as use against the source entitlement class instead, both entitlements instead become 100% used.

For each valley, the historical utilisation rate is calculated by summing the average available water determinations and the net temporary trade for each class of entitlement to give the total allocation account volumes available by class. The recorded usage by entitlement class is divided by the total allocation account volume available to that class to give the level of activation by that class.

Border Rivers (average 2009/10 to 2016/17)

<i>Entitlement type</i>	<i>Share</i>	<i>AWD</i>	<i>Trade in</i>	<i>Trade out</i>	<i>Net trade</i>	<i>AWD+Net</i>	<i>Account usage</i>	<i>Use/ (AWD+NET)</i>
Domestic and stock	1,042	1,038	26	-	26	1,064	657	0.617
Local water utility	620	623	6	-	6	629	511	0.812
High security	1,492	1,467	84	1,029	-945	522	315	0.603
General security class A	22,012	18,829	1,181	5,878	-4,697	14,132	13,835	0.979
General security class B	241,233	106,425	10,943	21,017	-10,074	96,351	75,019	0.779
Supplementary	120,001	120,001	9,302	9,325	-23	119,978	49,560	0.413

Gwydir (average 2004/05 to 2016/17)

<i>Entitlement type</i>	<i>share</i>	<i>AWD</i>	<i>Trade in</i>	<i>Trade out</i>	<i>Net trade</i>	<i>AWD+Net</i>	<i>Account usage</i>	<i>Use/ (AWD+NET)</i>
Domestic and stock	2,750	2,606	-	-	-	2,606	1,126	0.432
Local water utility	3,836	3,541	3	5	-2	3,539	2,045	0.578
High security	15,897	15,703	231	5,836	-5,605	10,098	8,944	0.886
General security	509,354	132,143	34,838	29,231	5,607	137,750	121,475	0.882
Supplementary	178,494	181,877	17,006	17,006	-	181,877	68,317	0.376

Peel (average 2010/11 to 2016/17)

<i>Entitlement type</i>	<i>Share</i>	<i>AWD</i>	<i>Trade in</i>	<i>Trade out</i>	<i>Net trade</i>	<i>AWD+Net</i>	<i>Account usage</i>	<i>Use/ (AWD+NET)</i>
Domestic and stock	171	163	-	-	-	163	46	0.282
Local water utility	16,400	15,697	-	-	-	15,697	8,248	0.525
High security	804	747	55	105	-50	697	274	0.393
General security	30,511	19,427	1,732	2,217	-485	18,942	5,416	0.286
Uncontrolled flow							1,075	

Lower Namoi (average 2004/05 to 2016/17)

<i>Entitlement type</i>	<i>Share</i>	<i>AWD</i>	<i>Trade in</i>	<i>Trade out</i>	<i>Net trade</i>	<i>AWD+Net</i>	<i>Account usage</i>	<i>Use/ (AWD+NET)</i>
Domestic and stock	2,023	2,028	2	9	-7	2,021	880	0.435
Local water utility	2,271	2,271	-	-	-	2,271	793	0.349
High security	3,904	3,904	2	2,936	-2,934	970	701	0.723
General security	246,227	86,994	19,861	13,721	6,140	93,134	85,538	0.918
Supplementary	115,471	114,386	1,057	1,057	-	114,386	37,225	0.325

Macquarie (average 2004/05 to 2016/17)

<i>Entitlement type</i>	<i>Share</i>	<i>AWD</i>	<i>Trade in</i>	<i>Trade out</i>	<i>Net trade</i>	<i>AWD+Net</i>	<i>Account usage</i>	<i>Use/ (AWD+NET)</i>
Domestic and stock	4,879	4,928	-	-	-	4,928	1,430	0.290
Local water utility	16,053	16,053	6	60	-54	15,999	10,889	0.681
High security	13,223	13,499	381	1,181	-800	12,699	8,483	0.668
General security	611,037	216,200	78,286	70,509	7,777	223,977	146,878	0.656
Supplementary	48,638	48,638	4,066	4,020	46	48,684	9,820	0.202

Lachlan (average 2004/05 to 2016/17)

<i>Entitlement type</i>	<i>Share</i>	<i>AWD</i>	<i>Trade in</i>	<i>Trade out</i>	<i>Net trade</i>	<i>AWD+Net</i>	<i>Account usage</i>	<i>Use/ (AWD+NET)</i>
Domestic and stock	13,914	10,757	85	26	59	10,816	4,353	0.402
Local water utility	15,545	13,393	38	69	-31	13,362	7,080	0.530
High security	23,873	20,424	50,135	25,879	24,256	44,680	41,432	0.927
Conveyance	17,911	9,597	6	864	-858	8,739	8,559	0.979
General security	587,163	214,572	48,198	71,623	-23,425	191,147	72,667	0.380

Murrumbidgee (average 2004/05 to 2016/17)

<i>Entitlement type</i>	<i>Share</i>	<i>AWD</i>	<i>Trade in</i>	<i>Trade out</i>	<i>Net trade</i>	<i>AWD+Net</i>	<i>Account usage</i>	<i>Use/ (AWD+NET)</i>
Domestic and stock	35,770	35,506	82	-	82	35,588	28,654	0.805
Local Water utility	23,674	23,583	62	312	-250	23,333	11,383	0.488
High security	347,410	340,275	15,429	76,848	-61,419	278,856	278,192	0.998
Conveyance	375,968	302,977	2,342	40,634	-38,292	264,685	236,665	0.894
General security	1,945,393	925,005	343,825	348,908	-5,083	919,922	791,852	0.861
Supplementary	196,530	196,978	23,877	23,954	-77	196,901	81,652	0.415
Nimmie	747,000	747,000	228,600	228,600	-	747,000	51,143	0.068
Uncontrolled flow							34,983	

Murray (average 2004/05 to 2016/17)

<i>Entitlement type</i>	<i>Share</i>	<i>AWD</i>	<i>Trade in</i>	<i>Trade out</i>	<i>Net trade</i>	<i>AWD+Net</i>	<i>Account usage</i>	<i>Use/ (AWD+NET)</i>
Domestic and Stock	16,867	16,481	20	-	20	16,501	10,286	0.623
Local Water Utility	33,497	31,998	125	2,166	-2,041	29,957	17,412	0.581
High Security	189,097	166,147	50,786	107,340	-56,554	109,593	96,500	0.881
Conveyance	330,000	223,780	49,929	31,980	17,949	241,729	241,704	1.000
General Security	1,669,723	759,111	274,200	335,832	-61,632	697,479	648,032	0.929
Supplementary	252,421	252,434	626	549	77	252,511	53,531	0.212
Uncontrolled flow							10,031	

Lower Darling (average 2004/05 to 2016/17)

<i>Entitlement type</i>	<i>Share</i>	<i>AWD</i>	<i>Trade in</i>	<i>Trade out</i>	<i>Net trade</i>	<i>AWD+Net</i>	<i>Account usage</i>	<i>Use/(AWD+NET)</i>
Domestic and stock	1,199	1,202	-	-	-	1,202	415	0.345
Local Water utility	10,135	9,979	-	2	-2	9,977	3,642	0.365
High security	7,456	7,379	836	3,322	-2,486	4,893	3,654	0.747
General security (inc. 47.8 GL TLM from 2008/09)	59,823	41,689	51,261	36,188	15,073	56,762	46,573	0.820
Supplementary	250,000	250,000	-	-	-	250,000	-	-

Allocation reliability

NSW Government has prepared updated BDL model scenarios that take into consideration improvements to the model software, updated calibration work, and a range of error corrections and general improvements that have occurred to the base models since they were supplied to MDBA.

NSW has recommended to MDBA that the updated BDL scenarios represent the best available information to describe BDL conditions and provided a BDL scenario report that describes the changes made in comparison to the existing BDL scenarios.

MDBA is currently reviewing both the reports and the supplied model parameters, but in the interim has agreed that the allocation reliability indicated by the proposed BDL model represents the best available information to describe the reliability of allocations made to entitlements under BDL conditions (generally 30 June 2009).

Entitlement class	Method description
Stock and domestic	All NSW water sharing plans require that these entitlements are fully available each year. Defined as 100%.
Local water utility	All NSW water sharing plans require that these entitlements are fully available each year. Defined as 100%.
High security	Most NSW water sharing plans require that these entitlements are fully available each year. Defined as 100%. In the Murrumbidgee, Murray and Lower Darling systems, the modelled long-term average allocation at the end of the water year is used.
Conveyance	The modelled long-term average allocation at the end of the water year is used.
General security	In valleys with an annual accounting system, the modelled long-term average allocation at the end of the water year is used. In valleys with continuous accounting, the modelled average annual sum of all AWD's made to general security entitlements is divided by entitlement share to determine an equivalent percentage. Note that this figure is not used by the LTDLE factor calculation.
Supplementary	All NSW supplementary entitlements receive an AWD of 100% each year. However this does not represent the availability of access to water which remains subject to the occurrence of surplus flow events. Type 9 nodes are able to output a time series of surplus flow volumes available to pump. Each day's estimate of available volume is then capped to the pump capacity of supplementary entitlement holders, and the average annual total is divided by entitlement share to determine an equivalent percentage. Note that this figure is not used by the LTDLE factor calculation.

Reference material

BDL Scenario for Water Planning in Border -21032018.docx

MDBA_BDL_Border_0321.xlsx

BDL Scenario for Water Planning in the Gwydir -APPROVED FINAL DRAFT -20170224.pdf

MDBA_BDL_Gwydir_0329.xlsx

MDBA_BDL-Namoi_0321.xlsx

MDBA_BDL-Peel_0321.xlsx

BDL Scenario for Water Planning in Macquarie -20170305 -FINAL DRAFT APPROVED.pdf

MDBA_BDL_Macq_0322_PA.xlsx

BDL Scenario for Water Planning in Lachlan -APPROVED FINAL DRAFT -v3 -07082017.docx

MDBA_BDL_LachlanOnly_0321.xlsx

BDL and PBP Scenario for Water Planning in Murrumbidgee - FINAL DRAFT_20170914

MDBA_BDL_Mbidgee_0329.xlsx

BDL Scenario for Water Planning in Murray and Lower Darling v1 -FINAL DRAFT -10102017 AK.docx