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MURRAY–DARLING BASIN AUTHORITY

Transition Period Water Take Report 2012–13 to 2015–16

Report on Cap compliance and transitional SDL accounting

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GPO Box 1801, Canberra ACT 2601

1800 230 067

engagement@mdba.gov.au

mdba.gov.au

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Acknowledgement of the Traditional Owners of the Murray–Darling Basin

The Murray−Darling Basin Authority pays respect to the Traditional Owners and their Nations of the Murray−Darling Basin. We acknowledge their deep cultural, social, environmental, spiritual and economic connection to their lands and waters.

The guidance and support received from the Murray Lower Darling Rivers Indigenous Nations, the Northern Basin Aboriginal Nations and our many Traditional Owner friends and colleagues is very much valued and appreciated.

Aboriginal people should be aware that this publication may contain images, names or quotations of deceased persons.

Cover image: Grain harvesting with rice crop in the foreground. Coonoong Station near Jerilderie, New South Wales

Foreword

Sustainable diversions limits (SDLs) are the key element of the Basin Plan.

The SDLs that are set in the Basin Plan provide a new balance between consumptive and environmental water uses in the Basin. They come into effect in 2019 and thus we are now in a seven-year transition period through to the implementation of these new limits.

Critical to the implementation and enforcement of the SDLs is a system of accounts to keep track of how much water is taken from the rivers, valleys and groundwater systems of the Basin and how this compares with the limits specified in the Basin Plan, as they apply in the year in question.

This report presents a set of accounts for the water use in the Basin for the first four years of the transition period (2012–13 to 2015–16). While there are no compliance consequences during the transition period, for the first time, accounts consistent with Basin Plan arrangements have been assembled for surface water and groundwater use. For groundwater, this is the first set of comprehensive accounts at the Basin scale ever assembled.

These accounts keep track of the water recovery in the Basin as efforts to 'bridge the gap' to the SDLs continue. Diversion limits for each year have been adjusted to reflect this progress with water recovery.

The report shows that surface water diversions were within the limits that would have applied given the progress with water recovery. There may be some interest in the 'credits' that appear to be accruing in these accounts, though this should be tempered by the considerations raised in the report. In any case, more accurate methods for generating the annual limits will emerge from the water resource plans now under preparation and the formal compliance account will commence with a balance of zero come 2019.

For groundwater, diversions were within the limits in the Basin Plan. One issue that arises in New South Wales can be explained from a more detailed examination of the situation in that groundwater system. This usefully provides further insight into the development of water resource plans for groundwater.

The report also serves to benchmark the extent of metering in the Basin. For surface water, 70% of water used was metered. For groundwater, 78% of water used was metered. This benchmark provides a basis from which improvements in metering accuracy and extent can now be tracked. Reducing the proportion of unmetered take is an area where further improvements in these accounts can be made, recognising the need for cost effectiveness considerations in relation to certain forms of take (e.g., runoff dams) and a number of recommendations are made in relation to this issue. The report also benchmarks the extent to which various forms of water use are estimated on an annual basis. Again, this provides a baseline from which we can improve.

The report serves as a 'dress rehearsal' for the formal Register of Take that will commence with the 2019–20 water year following the accreditation of water resource plans, and comes three years ahead of when such accounts are formally required.

The report also provides an assessment of current state compliance with the Murray–Darling Basin Cap on surface water diversions. This assessment expands on the Cap Register maintained and published separately by the MDBA (Murray–Darling Basin Authority).

Finally the report provides a comprehensive account of all the Held Environmental Water throughout the Basin for the first time.

I would like to thank each of the Basin states and the Commonwealth Environmental Water Holder for their contribution to this important work which represents a major step forward in Basin Plan implementation.

The Hon Neil Andrew AO
Chair

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Executive summary

This report summarises diversions from the Murray–Darling Basin (the Basin) for the water years 2012–13 to 2015–16 inclusive, as reported by the Basin states[1] under two frameworks: the existing Cap on surface water diversions, and the broader scope of the *Water Act 2007* (Cth) and the 2012 Murray–Darling Basin Plan (the Basin Plan). It also reports on environmental water held and used for that period.

The report also sets out the Murray–Darling Basin Authority's (MDBA) assessment of Basin state compliance with the Murray–Darling Basin Cap on surface water diversions for the water years 2012–13 to 2015–16 inclusive. The assessment has been conducted in accordance with the requirements of Schedule E to the Murray–Darling Basin Agreement. In this regard, this report provides the assessment of state compliance with the Cap previously published by the MDBA in the Water Audit Monitoring Reports.

The report also sets out for the same water years, the results of an ongoing trial of the water accounting and compliance arrangements — including with respect to the reporting of environmental water — that will be in place from 1 July 2019 under the Basin Plan. The trial has no compliance status as the sustainable diversion limits (SDLs) on which the trial is based do not come into force until 1 July 2019. The commencement of the SDLs is subject to the accreditation of Basin state water resource plans.

Water is a limited resource in the Basin. There are many demands on the available water coming from agriculture, industry, towns, individuals and the environment. Robust and transparent water accounting and compliance is essential to ensure:

- the volume of water actually taken from the Basin does not exceed the volume of water permitted to be taken
- water is used in accordance with the relevant rules
- rights to water are protected
- investment certainty for irrigated agriculture
- outcomes from environmental water recovery investments are realised
- the water needs of water dependent ecosystems can be met.

Water accounting and compliance has been applied at a Basin-wide scale since 1995.

In 1995, the Murray–Darling Basin Ministerial Council introduced the Murray–Darling Basin Cap on surface water diversions (the Cap) to protect and enhance the riverine environment and protect the rights of water users. The Cap introduced long-term limits on how much water could be taken from rivers in 24 designated river valleys (Cap valleys).

The Cap accounting relates to surface water diversions from the main stem of watercourses (regulated and un-regulated rivers and streams). In most cases, the long-term Cap limit for each valley is determined in reference to the 1993–94 level of development in that valley (that is, the diversions through the water infrastructure and rules in place at that time).

[1] The term 'Basin states' refers to Queensland, New South Wales, the Australian Capital Territory, Victoria, and South Australia.

The Cap requires Basin states to limit the volume of surface water diverted from designated valleys so that the relevant long-term Cap limit is not exceeded. States must report annually to the MDBA on the volumes of water that were permitted to be taken under annual Cap targets and the volumes that were actually taken. The annual accounts of use against the Cap limits are formally recorded in a Cap Register which is maintained and published by the MDBA.

The Basin Plan set SDLs in accordance with the Water Act. SDLs represent the maximum long-term annual average volumes of water that can be taken on a sustainable basis from Basin water resources. To achieve the surface water SDLs, the Basin Plan requires that the baseline diversion limit (BDL) is reduced by a long-term average annual volume of 2,750 GL[2]. In contrast, the overall groundwater SDL is set higher than the BDL as there are some under-utilised groundwater systems where take may be increased sustainably and made available for future use[3].

The Australian Government has committed to achieve this reduction through investment in water recovery. This recovery, known as 'bridging the gap', is being prioritised through investment in irrigation infrastructure projects rather than direct purchase of entitlements from willing sellers.

Importantly, the Basin Plan SDL water accounting and compliance framework expands the Cap accounting to cover all forms of water take defined in the Basin Plan. That is, for surface water, water take from watercourses and regulated rivers, by runoff dams, by floodplain harvesting, by commercial plantations (net take) and under basic rights. The SDL water accounting and compliance framework also includes all groundwater use in the Basin which was not included under the Cap.

The making of the Basin Plan has set in train a seven-year process of transition (2012–13 to 2018–19) from Cap-based to SDL water accounting and compliance in the Basin. While some of the reporting components of the SDL water accounting and compliance framework commenced in 2012, the Cap remains the only Basin-wide water take compliance regime that is in force.

The SDL water accounting and compliance framework puts in place clear limits and establishes a foundation for enforcement to ensure that over time, annual actual take of Basin water resources for consumptive use does not exceed the SDLs. The Basin Plan specifies 29 surface water SDLs and 81 groundwater SDLs throughout the Basin. The resources covered by each SDL is known as an SDL resource unit.

The MDBA and Basin states are using the transition period to trial the types of water reporting, accounting and compliance methods and processes that will need to be in place from 1 July 2019 to ensure the arrangements will be fit for purpose on commencement. The trial is necessary because the scope of the change from Cap to SDL is substantial and the new approach is best 'bedded down' through a trial ahead of it applying formally.

Because the trial is presenting transitional SDL accounts based on the volume of change from the BDL toward the SDL, the report uses the term 'transitional diversion limits' (TDLs) rather than SDLs. The TDLs generally represent progress on bridging the gap as at the start of each water

[2] This volume is subject to change through amendments to the Basin Plan arising from the northern Basin Review and the operation of SDL adjustment mechanism.

[3] The methods on how groundwater SDLs were set can be found in report: *The proposed Groundwater Baseline and Sustainable Diversion Limits: Methods report*

year (1 July). TDLs are being used because in most cases the water recovery required under the Basin Plan is not yet complete so the SDL cannot be used under the trial.

Were an SDL resource unit to be fully recovered, the TDL would equal the SDL; were recovery yet to commence, the TDL would equal the BDL which generally represents 2009 levels of use adopted as the baseline for the Basin Plan.

The introduction to this report sets out the approach taken, a description of key concepts under both the Cap and the SDL water accounting and compliance framework, and the objectives of the trial. The Cap Register appears at the end of Part 2. The key data used for the trial assessment of water take at SDL resource unit level is included at Appendix 1 (surface water) and Appendix 2 (groundwater).

Summary findings

Cap compliance (refer to Part 1)

1. All Cap valleys in which a cumulative balance is the basis of compliance have remained compliant over the reporting period.

2. Cap compliance is assessed at the valley level however it is worth noting that at the Basin State scale, all states have maintained cumulative Cap credits.

3. Cap reporting data indicates an exceedance of the 2014–15 and 2015–16 annual Cap targets in the Queensland Moonie Cap valley. In accordance with Schedule E of the Murray–Darling Basin Agreement, the MDBA has established an Independent Audit Group to conduct a special audit into the potential non-compliance with the long-term Cap in this Cap valley.

4. Ten Cap valleys do not have an accredited Cap model in place. Compliance in these ten valleys is either being assessed against models that were provisionally accredited and have since lapsed or — in the case where a model has not been presented for accreditation — against existing arrangements in accordance with Schedule E of the Murray–Darling Basin Agreement. On the other hand, there are three valleys — Queensland Warrego, Paroo, and Nebine — that have an accredited SDL model in place.

Trial of the SDL water accounting and compliance framework (refer to Part 2)

Surface water

5. Over the four year reporting period, consumptive take from surface water averaged about 11,250 GL per year. Basin-wide, annual actual consumptive take decreased each year in response to increasingly dry conditions, reduced water availability (annual allocations plus carryover) and increases in held environmental water entitlements.

6. Over the reporting period, no surface water SDL resource unit recorded a cumulative balance that was greater than the compliance threshold of -20% or more of the relevant transitional diversion limit.

7. Across the Basin over the reporting period, between 64% and 73% of annual actual consumptive take from all forms of surface water take was metered. For watercourses and regulated rivers, between 89% and 92% of Basin-scale annual actual take was metered. The reported data does not indicate the type or standard of metering. Reducing the proportion of unmetered take is an area where further improvements in these accounts can be made, recognising the need for cost effectiveness considerations in relation to certain forms of take (e.g., runoff dams). This report makes a number of recommendations in relation to this issue (refer section 5.4).

8. The levels of metering varies between the northern and southern Basin: between 25% and 51% of all forms of surface water take was metered in the northern Basin, while between 77% and 84% was metered in the southern Basin. Despite this difference in proportion of metered take, the volume of unmetered water take is roughly similar in the northern and southern Basin due to the larger volumes used in the southern Basin.

9. Where actual take is not measured, it is reported using long-term average estimates. In almost all cases, the estimates are those set out in Schedule 3 of the Basin Plan or *Water resource assessments for without-development and baseline conditions (MDBA 2011)*. These estimates give no expression to observed annual weather conditions or water availability for the year in question. Basin-wide between 20% and 30% of actual take was reported using these long-term estimates.

Groundwater

10. Over the reporting period actual take from groundwater across the Basin averaged 1,430 GL per year. At the Basin scale, transitional groundwater annual credits over the reporting period were 2,220 GL in 2012–13, 2,030 GL in 2013–14, 1,846 GL in 2014–15 and 1,843 GL in 2015–16. The cumulative balance at 30 June 2016 was 7,939 GL.

    The amount of groundwater take that was reported as metered was 78% across the Basin.

11. Over the reporting period, all groundwater SDL resource units but one recorded a cumulative balance that was less than the compliance threshold of -20% or more of the relevant transitional diversion limit.

    The New South Wales Lower Gwydir Alluvium SDL resource unit recorded a cumulative balance that was in debit by more than 20% of the relevant transitional diversion limit. Further analysis indicates that if the reporting period were extended to include data from 2016–17, the cumulative balance will return to a debit less than 20% as of 30 June 2017. This highlights the importance of states accounting for changes in annual actual take from SDL resource units in the development of the method for determining annual permitted take that will be applied in the relevant water resource plan.

Reporting and accounting methods

12. As part of the trial, improvements have been made to the methods used under Cap to adjust annual permitted take to account for environmental water recovery. These are an important step toward better protection of the long-term value of recovered entitlements. Further improvements are possible.

13. The processes used by Basin states to collect and report water take data and those used by the MDBA to receive and assess that data are predominantly manual, labour intensive, time consuming, and prone to human error. This contributes to the ongoing challenge that Basin states face in providing annual reporting data within the statutory time frames, which in turn delays the timely assessment of that reporting data. Potential improvements to these methods of collection and processing have been identified which will be pursued in the coming years.

Trial reporting of environmental water availability and use (refer to Part 3)

14. Under section 32 of the Water Act, the MDBA must identify and account for held environmental water in the Murray–Darling Basin each year. Part 3 of this report addresses this requirement.

Surface water

15. At a Basin scale, the total volume of available held environmental surface water increased from 1,880 GL (in long-term average volume terms) as at 30 June 2012 to 2,787 GL as at 30 June 2016.

    This volume includes both held environmental water recovered before 30 June 2009 as well as held environmental water that contributes to bridging the gap between the BDL and the SDL.

16. The volume of available held environmental surface water that contributes to bridging the gap and to determining the TDLs increased by 605 GL (in long-term average volume terms) between 1 July 2012 (1,087 GL) and 1 July 2015 (1,692 GL).[4]

17. The long-term diversion limit equivalence (LTDLE) factors being used to estimate the long-term average volumes of surface water recovered to bridge the gap are those adopted by the Murray–Darling Basin Ministerial Council in November 2011.

    These factors were derived from a number of sources and further work is required to ensure a consistent set of factors is used across the Basin. Accordingly, it is anticipated that some of the estimates of the long-term diversion limit equivalence of held environmental water will change based on the assumptions used by Basin states to prepare water resource plans for accreditation.

18. Annual environmental water authorised for use (allocation plus carryover) increased each year despite the annual decrease in total volumes of water authorised for use (consumptive plus environmental). This is a function of the increase in the total held environmental pool as a result of ongoing water recovery.

19. The volume of held environmental surface water used, increased each year.

20. Carryover of held environmental water allocations from one year to the next was a feature of environmental water use over the reporting period. At a Basin scale, available data indicates held environmental water that was carried over to the next water year was between 6% and 7% of water in storage, whereas consumptive carryover was between 23% and 26% of water in storage.

Groundwater

21. The total volume of held environmental groundwater increased from 0 GL as at 30 June 2012 to 8.96 GL at 30 June 2016.

22. Bridging the gap is only required in two groundwater SDL resource units: the Queensland Upper Condamine Alluvium (Central Condamine Alluvium) and Upper Condamine Alluvium (Tributaries). The total target recovery volume is 40.4 GL by 30 June 2019.

    The total volume of held environmental groundwater that contributes to bridging the gap was 2.36 GL as at 30 June 2016.

[4] The transitional diversion limit in a particular year is determined by subtracting held environmental water that contributes to bridging the gap available at 1 July of that year from the relevant BDL.

Recommendations

MDBA recommends that to prepare for the commencement of SDL water accounting and compliance from 1 July 2019, the following actions are prioritised.

1. Improving the methods for estimating volumes of annual permitted and annual actual take.

   The current use of long-term average estimates for up to 30% of take (i.e. take by floodplain harvesting, runoff dams, commercial plantations (net take) and under basic rights) provides a benchmark from which improvements can be made. Improvements in this area will enhance the integrity of the SDL water accounting and compliance framework.

   New methods that give some expression to annual weather conditions and water availability in the relevant SDL resource unit should be investigated over the remainder of the transition period so that they can be applied from 1 July 2019 wherever possible. Similarly, other lines of evidence that provide the ability to identify any growth in these forms of take should also be developed.

2. Increasing the proportion of actual take that is measured across the Basin to an agreed standard.

   The integrity of the SDL water accounting and compliance framework is enhanced wherever actual take is measured rather than modelled or estimated. Identifying and taking advantage of cost effective ways of increasing the proportion of measured take, particularly where that measurement is consistent with an agreed national standard, will increase the overall integrity of the framework as well the levels of public confidence in the accounting and compliance arrangements.

3. Improving the methods for adjusting annual permitted take to account for environmental water recovery.

   During the transition period, an improved methodology — as compared with that used for Cap purposes — has been developed to account for environmental water recovery in the annual permitted take volume. This methodology will be superseded by more sophisticated methods that are expected to be developed by Basin states in the preparation of their water resource plans (WRPs).

   The MDBA will work with Basin states throughout the transition period so that the best available methods for environmental water adjustment are incorporated into water resource plans.

   This is fundamental to maintaining the long-term value of the water that has been recovered to bridge the gap and hence achieve the SDLs. It is also essential in providing certainty to consumptive and environmental entitlement holders.

4. Adoption of automated reporting tools where possible to improve the timeliness, accuracy and efficiency of reporting and assessment.

   The MDBA is developing a new automated SDL reporting tool that will enhance the timeliness, accuracy and reporting outputs available from the annual assessment of state reporting data. Making data more readily accessible for further interrogation will also be progressed.

1. Introduction

1.1. About this report

This report summarises the diversion of water from the Murray–Darling Basin for the four water years[5] from 2012–13 to 2015–16 inclusive, as reported by the Basin states under two frameworks: the existing Cap on surface water diversions and the broader scope of the Water Act and Basin Plan. It also reports on environmental water held and used for that period.

The report sets out the Murray–Darling Basin Authority's (MDBA) assessment of Basin state[6] compliance with the Murray–Darling Basin Cap on surface water diversions.

In addition it summarises the results of an ongoing trial of the SDL water accounting and compliance arrangements that will be in place from 1 July 2019 under the Basin Plan. This trial has no compliance status as the sustainable diversion limits (SDLs) on which it is based do not come into force until 1 July 2019. The commencement of the SDLs is subject to the accreditation of Basin State water resource plans.

Table 1 provides a comparison of the key features of Cap and SDL water accounting and compliance.

All methods and analysis have been undertaken consistent with the requirements of Schedule E to the Murray–Darling Basin Agreement and/or the 2012 Basin Plan. Any amendments to the Basin Plan that are made will be incorporated in subsequent reporting.

To avoid doubt, the amendments proposed to the Basin Plan in late 2016 to give effect to recent reviews of groundwater sustainable diversion limits and the Northern Basin Review are not incorporated into this report. Similarly, the amendments currently being progressed in relation to the operation of the SDL Adjustment Mechanism are not incorporated in this report.

The purpose of this report is to:

1. meet the MDBA's ongoing commitment to report on annual Basin state compliance with the Cap in accordance with Schedule E to the Murray–Darling Basin Agreement (see Part 1)
2. document the results of a trial assessment of the availability and take of water for consumptive use since commencement of the Basin Plan. The trial assessment uses the SDL water accounting and compliance rules that are due to be in force from 1 July 2019 (see Part 2)
3. document the trial reporting of availability and use of held environmental water and planned environmental water (see Part 3)

[5] For the purpose of Cap and SDL water accounting, a water year commences on 1 July and ends on the following 30 June.

[6] The term 'Basin states' refers to Queensland, New South Wales, the Australian Capital Territory, Victoria, and South Australia.

4. document progress made to date by the MDBA and the Basin states to put in place methods and processes to ensure monitoring and reporting of compliance with the SDL will be fit-for-purpose from 1 July 2019 (see Parts 2 and 3)

5. document the areas where further work is required to ensure the SDL water accounting and compliance rules can be implemented as intended from 1 July 2019 (see Part 4).

All views expressed in this report are solely those of the MDBA unless stated otherwise.

This report is set out under four parts:

Part 1: Current compliance under the Cap on surface water diversions.

Part 2: Trial assessment of annual water availability and take under the SDL water accounting and compliance framework.

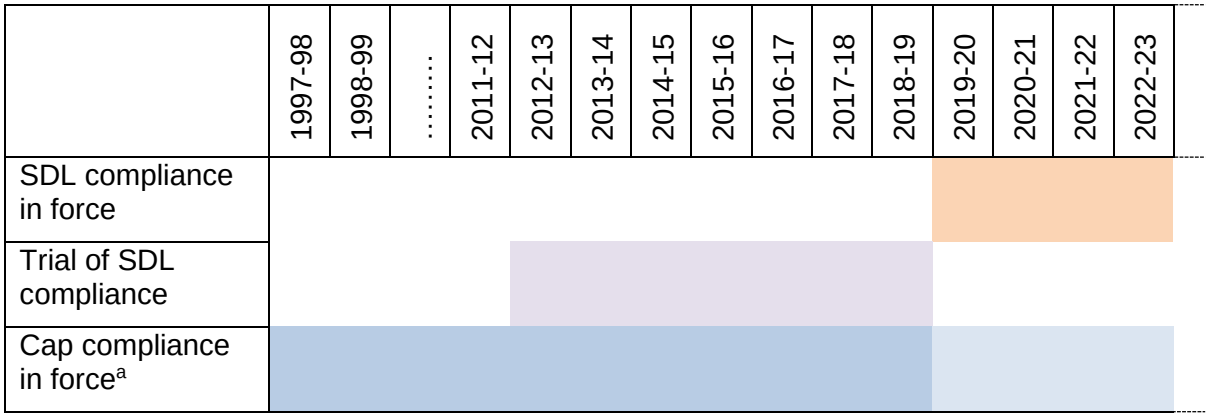
Part 3: Environmental water availability and use.

Part 4: Future work.

Table 1 Comparison of the key features of Cap and sustainable diversion limit water accounting and compliance

Key features	Cap on diversions	Sustainable diversion limit water accounting and compliance
Relevant statute	• Schedule E to the Murray–Darling Basin Agreement 2008	• *Water Act 2007* (Cth) and Basin Plan 2012
In force from	• 1994–95	• 2012–13 for reporting. • 1 July 2019 for compliance
Areas covered	• 24 Cap valleys — not all Basin areas included	• 29 surface water SDL resource units • 81 groundwater SDL resource units
Long-term limit	• Limited diversions to 1993–94 levels of development (some exceptions) for each Cap valley. Called 'long-term Cap Limit'	• Set at an environmentally sustainable level of take for each SDL resource unit. Called sustainable diversion limits (SDLs). • For the trial, transitional diversion limits (TDLs) are used. • TDL = baseline diversion limit (BDL) – bridging the gap water recovery as at 1 July each year.[7]
Annual limit	• Annual consumptive take limited by 'annual Cap target'	• Annual consumptive take limited by 'annual permitted take'
Type of water use affected	• Surface water that is diverted from regulated rivers and watercourses	• All forms of surface water take (watercourses, regulated rivers, runoff dams, floodplain harvesting, commercial plantations (net take) and basic rights) • Groundwater take
Accredited models/ methods	• Cap models prepared by states to determine annual Cap target • Model independently review • Model approved by MDBA subject to review outcomes	• SDL models/methods to determine annual permitted take developed by states consistent with Basin Plan requirements • Assessed by MDBA as part of water resource plan • Accredited by Commonwealth Minister for Water • For the trial, adjusted Cap models and long-term estimates are used
Compliance approach	• Annual diversions subtracted from annual Cap target • Annual debits or credits recorded in Cap Register • Annual debits/credits added each year to give cumulative balance (in most valleys) • Compliance investigation triggered if cumulative balance is a debit of 20% or more of long term Cap (in most valleys)	• Annual actual take subtracted from annual permitted take • Annual debits or credits recorded in Register of Take • Annual debits/credits added each year to give cumulative balance for all SDL resource units • Compliance investigation triggered if cumulative balance is a debit of 20% or more of SDL and state does not have a 'reasonable excuse'

[7] For the New South Wales Intersecting Streams SDL resource unit, TDL is being set at the SDL until issues with the long-term volume of water entitlements recovered in this resource unit are resolved.



[a] Cap compliance will continue (indicated by pale blue shading) after 1 July 2019 subject to any decisions of the Murray–Darling Basin Ministerial Council.

Figure 1 Timing of compliance arrangements during transition period and beyond

This report uses best available data as submitted by Basin states, the River Management Division of the MDBA and the Commonwealth Environmental Water Holder (for held environmental water availability and use). Both the Cap Register in Part 2 of this report and the 'transitional assessment four-years-on-a-page' at Appendix 1 and 2, have been prepared using this data and are the primary data sources for this report.

1.2. Explanation of key concepts and terminology used

The following expands on the key features from Table 1 to describe in more detail, the fundamental concepts under both the Cap and sustainable diversion limit water accounting and compliance frameworks. These concepts will be referred to frequently in the report.

Specified geographical areas in which management of water resources must be undertaken in accordance with the relevant Basin-scale water accounting and compliance arrangements:

Referred to as 'designated river or Cap valleys' under the Cap and as 'water resource plan areas' and 'SDL resource units' under the sustainable diversion limit water accounting and compliance framework. These are the geographical areas defined under each framework that contain the water resources that are subject to the arrangements under each framework. There are 24 Cap valleys set out in Schedule E. There are a total of 110 surface water and groundwater SDL resource units across the Basin contained within 36 water resource plan areas. Maps of the surface water and groundwater SDL resource units are provided at Appendix 5 and 6.

Long-term average diversion limits:

Referred to as the 'long-term diversion Cap' under the Cap and as the 'sustainable diversion limit' under the sustainable diversion limit water accounting and compliance framework. The long-term average limits represent long-term average annual volumes of consumptive use that are not to be exceeded. The long-term reference period used for the Cap is generally the climatic conditions experienced over the period 1891 to 1997. For SDLs, the period 1985 to 2009 is used (known as the Basin Plan 'historical climate conditions').

Permitted take:

Referred to as the 'annual diversion target' or 'Cap target' under the Cap framework and as 'annual permitted take' under the SDL framework. Permitted take is the annual volume of water calculated according to the methods set out under either the Cap or SDL rules that was permitted to be used for consumptive purposes in a Cap valley or SDL resource unit in a given water year under the Cap or SDL arrangements. The volume is determined after the end of the water year as it needs to take account of things like the climate conditions of the year in question, water trade and environmental water recovery as well as the long-term limit and water access rules.

It is important to understand that permitted take under these compliance frameworks is not the same as the volume of water that is 'authorised' for use each year by the Basin states through things like available water determinations in New South Wales or seasonal determinations in northern Victoria. The Cap and also the SDL are limits on what is actually taken, not on what is allocated. This is discussed further in Part 2.

Actual take:

Referred to as 'diversions' under the Cap and as 'annual actual take' under the SDL framework. Actual take is the annual volume of water calculated according to the methods set out under either the Cap or SDL rules that was actually used for consumptive purposes in a Cap valley or SDL resource unit. It is also calculated after the end of the water year so that all water use in the relevant year can be accounted for.

Annual balance:

The annual balance is the difference between annual permitted take and annual actual take in a particular water year. Depending on whether it is positive or negative, it is referred to as an 'annual credit' or an 'annual debit' under both frameworks. For example, if permitted take for a Cap valley or SDL resource unit was 50 GL in a particular year and actual take in that year was 45 GL, the annual balance would be a credit of 5 GL. If permitted take was 45 GL and actual take was 50 GL the annual balance would be a debit of -5 GL.

Cumulative balance:

Referred to as 'cumulative Cap credits' or 'debits' under the Cap and as the 'cumulative balance' under the SDL framework.[8] The cumulative balance is the sum of each year's annual balance over time. For example, if the annual balances for a Cap valley or SDL resource unit over a four year period were 5 GL, 5 GL, -5 GL and 5 GL, the cumulative balance for each year — assuming the cumulative balance commences at zero in the first year — would be 5 GL, 10 GL, 5 GL, and 10 GL. The cumulative balance is an accounting tool, it does not represent an actual volume of water that is directly allocated for use in subsequent years.

For the Cap, the cumulative balance generally commences at zero in the 1997–98 water year (and thus 2015–16 represents the nineteenth year of accounts).[9] For the SDL, the cumulative balance will commence from the 2019–20 water year with a starting balance of zero. For the purpose of the trial Register of Take that is being maintained during the transition period, cumulative balances are calculated from 2012–13 for the sole purpose of illustrating how this feature of the account will operate from 2019.

Under the SDL water accounting and compliance framework, the cumulative balance for surface water is adjusted each year to reflect the net effect of any acquisition and disposal of held environmental water entitlements.

The cumulative balance is central to the compliance tests under both frameworks. In summary, if a Cap valley or SDL resource unit has a cumulative balance volume that is a debit of 20% or more of the long-term limit for that valley or SDL resource unit, it triggers the arrangements for determining if there has been non-compliance with the long-term limit. The different compliance tests are discussed further in Parts 1 and 2 of this report.

It is important to understand that neither the Cap nor the sustainable diversion limit water accounting and compliance framework are set up to identify the illegal take of water by individual water entitlement holders. For example, if an entitlement holder is stealing water by disconnecting their meter when pumping from the river, that water take will not be recorded and will not appear in the data reported by Basin states to the MDBA.

Also, if an entitlement holder is taking water outside their access conditions (for example pumping from the river when a flow trigger has not yet been met) this will not show up explicitly in these accounts as only annual totals are used. It is expected that both such circumstances would be managed under compliance procedures established by the Basin state, complemented by those of the MDBA.

[8] Some Cap valleys do not use a cumulative balance – e.g. Queensland Moonie – and Cap compliance is based on the annual credit/debit. Or, as in the case of the SA Metro-Adelaide and associated country areas Cap valley, compliance is based on a set volume over the most recent five-year period. Different compliance tests also apply for these Cap valleys

[9] Due to negotiations associated with establishing the Cap, some cap valleys started later (Murray–Darling Basin Council in 2007 agreed to apply Cap from 2007–08 in Queensland and the Australian Capital Territory's Cap was agreed by the Council in May 2008).

Authorised [Allocated] water:

This refers to the amount of water made available each year by Basin states under state water planning frameworks through mechanisms such as available water determinations moderated by valley use limits where these apply (e.g. the limit placed on the crediting and debiting of water accounts in accordance with the relevant New South Wales water sharing plan).

Depending on the relevant Basin state arrangements, authorised water can include things like: the announced annual allocation volume and net carryover from the previous year in regulated systems, allocation against entitlements in unregulated systems and subsequent periods of access against those entitlements, floodplain harvesting, use of supplementary entitlements and allowances for losses in diversions from the river to a delivery point.

Volumes cited in the text of this report are measured in gigalitres for each year and in most cases have been rounded to the nearest whole number. Volumes cited in tables and figures are generally rounded to either one or two decimal places depending on the size of the smallest volume being reported.

In submitting their data for each water year covered by this report, Basin states also provided narrative reports. These reports provide the state view of the context for water availability and use for that year. These narrative reports can also be accessed from the MDBA web site.

1.3. Trial assessment of water take under the sustainable diversion limit water accounting and compliance framework

The trial of the sustainable diversion limit water accounting and compliance framework is discussed in Part 2. The trial is a 'proof of concept' to establish and test the types of arrangements that will need to be in place from 1 July 2019 to manage compliance with the SDLs.

The objectives of the trial are to:

1. Develop and test the arrangements that Basin states and the Commonwealth Environmental Water Holder (CEWH) will use to prepare and submit data to the MDBA as required under section 71 and 32 of the *Water Act 2007* and Matter 9 of Schedule 12 of the 2012 Basin Plan.
2. Develop and test the arrangements that the MDBA will use to receive, assess and report on the data submitted by Basin states and the CEWH. Noting that there are no compliance consequences during the trial.
3. Identify where current gaps or weaknesses in the test arrangements are and the improvements needed to enhance the overall integrity of the SDL water accounting and compliance framework.
4. Demonstrate what SDL compliance reporting might look like in terms of how data can be assessed and presented when the rules are fully in force.

Because the trial is a proof of concept, there may be instances where the data reported and conclusions drawn from that data change between years as better information becomes available. The trial should draw out instances where generating better information can improve reporting during the trial as well as the development of the accredited arrangements that will be applied from 1 July 2019. Consistent with this approach, future transitional water take reports will, where practical to do so, update data from previous years where new or more accurate data becomes available.

1.3.1. Data reporting methodology

Cap reporting is well established and the data reported by Basin states is usually generated using accredited Cap models and/or the output of observed (metered) or estimated water take.[10] However, Basin states are in the early stages of developing how to collect and report water take data under the SDL water accounting and compliance rules. The SDL water accounting methods that will apply under accredited water resource plans have — in all but one case — not yet been completed.[11]

[10] Not all Cap valleys have an accredited Cap model. See Section 2.4 for further details.
[11] The Queensland Warrego, Paroo, Nebine water resource plan was accredited by the Commonwealth Minister for Water on 15 June 2017. It includes a method for determining annual permitted and annual actual take under the sustainable diversion limit water accounting and compliance rules.

This means that in the trial assessment, the data reported for permitted and actual take under the SDL water accounting rules may be incomplete, based on estimates of long-term average volumes and/or the outputs of Cap models that have been adjusted as necessary to the relevant BDL. This is particularly so with data on permitted and actual take by interception activities and New South Wales basic landholder rights.[12] These forms of take have historically not been routinely estimated, modelled or measured. See Section 3.1.2 for more information.

MDBA considers that this an appropriate approach during the transition period as Basin states are still developing the SDL models that will be used to determine annual permitted take under accredited water resource plans. This approach represents use of the best available information.

[12] Interception activities include water take by runoff dams, floodplain harvesting, and commercial plantations (net take). NSW has estimates of basic landholder rights in all water sharing plans.

1.4. Trial reporting of availability and use of environmental water

Detailed discussion of the assessment of the volumes of environmental water available, authorised and used over the period is provided at Part 3.

There are five 'headline' held environmental water volumes dealt with in this report.

Available held environmental water

The total volume of entitlements as at 30 June in any year that have actually been transferred to an environmental water holder and are available to receive allocation. This volume includes three components: 1. entitlements recovered prior to the Basin Plan or entitlements recognised as providing environmental benefits when the baseline diversion limit (BDL) was set; 2. entitlements recovered after the BDL was established that are not gap-bridging because they do not form part of consumptive water; and 3. entitlements recovered to bridge the gap from BDL to SDL.

Held environmental water that contributes to bridging the gap

The component of *available held environmental water* that represents entitlements that have been recovered to bridge the gap between the BDL and the SDL. This is distinct from the volumes of held environmental water jointly reported by the MDBA and the Department of Agriculture and Water Resources as 'progress toward bridging the gap'. Those volumes include entitlements that have been secured under a contract but have yet to be transferred to the Commonwealth Environmental Water Holder.

Held environmental water that determines the transitional SDL (TDL)

The component of 'gap bridging' held environmental water that was available as at 1 July in each water year. This is the volume that is deducted from the relevant BDL to determine the TDL and hence annual permitted take for the relevant year of the trial.[13]

Held environmental water authorised for use

The volume calculated after the end of the water year that could have been used in the water year as a result of all allocations, announced periods of access, carryover available from the previous year etc.

Held environment water actual use

The component of held environmental water authorised that was actually used during the year in question.

As discussed earlier, TDLs are the long-term limits being used during the trial of the SDL water accounting and compliance framework. This approach provides for the calculation of the long-term diversion limits appropriate to the water year in question for each SDL resource unit during the trial. In turn, the TDL is then used as the basis for determining the annual permitted take for each SDL resource unit during the transition period.

[13] For the New South Wales Intersecting Streams SDL resource unit, TDL is being set at the SDL until issues with the long term volume of water entitlements recovered in this resource unit are resolved.

Comprehensive reporting of annual data on the availability and use of held environmental water under the requirements of the *Water Act 2007* and the Basin Plan was first provided for the 2013–14 water year. For surface water, the total long-term volume of available held environmental water had increased to 2,787 GL as at 30 June 2016.

This volume is generally made up of three components:

- The first is the environmental water that has been modelled as available to the Basin under baseline conditions (that is, levels of development as at 30 June 2009) through a range of state-based and joint recovery programs (875 GL).
- The second is the water recovery completed up to the end of the reporting period to 'bridge the gap' between the baseline diversion limit and the sustainable diversion limit (1,709 GL being the proportion of the 2,080 GL that had been recovered and that was actually available for environmental purposes at the start of the 2015–16 water year).
- The third is the environmental water that has been recovered up to the end of the reporting period but that does not contribute to bridging the gap as it represents volumes of water that were not previously available to the consumptive pool (e.g. volumes recovered as a result of projects that reduce evaporation).

The 2012 Basin Plan sets the reduction volume from BDL to SDL at 2,750 GL for surface water diversions. The volume may change through the operation of the Sustainable Diversion Limit Adjustment Mechanism or through an amendment to the Basin Plan (as has been proposed to occur following the Northern Basin Review).

All held environmental water volumes quoted in this report are generally the long-term average volumes estimated using factors adopted by the Murray–Darling Basin Ministerial Council in November 2011. These factors were derived from a number of sources and further work is required to ensure a consistent set of factors is used across the Basin. Accordingly, it is anticipated that some of the estimates of available held environmental water will change based on the assumptions used by Basin states to prepare water resource plans for accreditation. This issue is discussed further at section 8.1.

Part 1:
Current compliance arrangements Implementation of the Murray–Darling Basin Cap on Diversion

2012–13 to 2015–16

2. The Murray–Darling Basin Cap on Diversions

Limits on water take at a Basin scale were first introduced in 1995 when the Murray–Darling Basin Ministerial Council agreed to introduce the Murray–Darling Basin Cap on Diversions of surface water (the Cap). Prior to this, any limits on take were a function of the relevant Basin State water sharing and allocation arrangements.

The Cap was introduced in response to increasing levels of take from the Basin's watercourses. It was recognised at the time that increases in the levels of take could not be sustained over the long term as they were impacting on the health of the riverine environment and undermining the reliability of existing entitlements.

As noted by the Ministerial Council in 2000:

> Since the original June 1995 decision of the Murray–Darling Basin Ministerial Council to introduce a Cap on diversions, all forms of consumptive [surface] water use in the Basin have been included under the Cap. However, in the initial phase of Cap implementation the focus was on the development of Cap management arrangements, including accounting of diversions, for the major extractive uses (e.g. river pumpers, gravity diversions).[14]

The Cap arrangements are set out under Schedule E to the Murray–Darling Basin Agreement 2008 and can only be changed through agreement by all members of the Ministerial Council.

The Cap accounting that has been developed thus far applies only to consumptive surface water diversions from watercourses (regulated and unregulated rivers). Expansion of Cap accounting arrangements to cover all forms of surface water diversions as per the original decision of the Ministerial Council will now be achieved through the implementation of the SDL accounting framework under the Basin Plan.

In most cases, the long-term Cap limit for a designated Cap valley is set as the long-term average volume of water that would have been diverted under the 1993–94 level of development. This includes the water sharing rules and infrastructure in place at that time.

2.1. How the Cap works

Schedule E identifies the designated Cap river valleys in each Basin state and the long-term Cap limit for each of those valleys. There are 24 Cap valleys in total.

The Cap arrangements require the Basin states and the MDBA (for the River Murray upstream of South Australia) to develop analytical models that will determine an annual Cap target for each valley. The models must demonstrate that the annual Cap targets, if run over the relevant historical climate sequence — usually 1 January 1891 to 30 June 1997 — will achieve the long-term Cap limit.

The analytical models must be independently reviewed. The MDBA then accredits these models based on the outcomes of the review and the ability of the models to 'fairly determine the relevant annual diversion (Cap) target given the climate conditions experienced in any year' (cl 11(5) of Schedule E). Basin states then use the models to inform water sharing arrangements for each

[14] Murray-Darling Basin Ministerial Council 2000. Review of the Operation of the Cap Overview Report, page 25. Available at: https://www.mdba.gov.au/sites/default/files/pubs/overview-report-mdbc-Aug-2000-w-4-companion-papers.pdf]

Cap valley that aim to ensure that over the long term, annual diversions will not exceed the long-term Cap limit. The status of Cap models is discussed at section 2.4 and Appendix 3.

To enable assessment of Cap compliance, Basin states are required to provide an annual report to the MDBA that includes, for each designated Cap valley, data relating to:

a) diversions made within and to the Cap valley

b) water entitlements, announced allocations of water and declarations which permit use of flows within the Cap valley and

c) trading of water entitlements/allocations within, to or from the Cap valley.

States must also report on their compliance with each annual Cap target for the relevant water year. The annual reporting data is required to be provided within four months of the end of each water year.

The MDBA uses the data provided by the Basin states to verify the Basin state assessment of Cap compliance. The MDBA first applies the relevant adjustments for trade in and out of a Cap valley and the agreed adjustments for environmental water recovery in the valley to the annual Cap target for each valley as determined by the relevant Cap model. State data on diversions is then compared against the adjusted annual Cap target.

If annual diversions are less than the adjusted annual Cap target, an annual credit is recorded in the Cap Register. If annual diversions are more than the annual Cap target, an annual debit is recorded. The Cap Register is the formal record of annual diversions and Cap compliance in the Basin and provides details for every designated Cap valley since 1997–98. The Cap Register for the period up to 30 June 2016 is provided at the end of Part 1 and is also available on the MDBA website https://www.mdba.gov.au/publications/mdba-reports/water-take-compliance-reports.

For most Cap valleys, the compliance assessment works on the basis that the annual debits and/or credits in each valley are added to those from the previous year to create a continuous cumulative balance.[15] For example, assuming the cumulative balance in a valley was zero at the start of a four-year period, if the annual credits/debits over that period were 5 GL, 5 GL, -5 GL and 5 GL, then the cumulative balance recorded at the end of year four would be a credit of 10 GL.

The cumulative balance is also recorded in the Cap Register and if that balance is a debit of 20% or more of the long-term Cap limit, Schedule E requires the MDBA to arrange for an independent audit of Cap implementation in the affected valley. If the independent audit confirms that actual take has exceeded the long-term Cap, the MDBA must make a declaration of the exceedance and advise the Murray–Darling Basin Ministerial Council of the breach.

The Minister of the state in which the breach occurred must then advise the Ministerial Council about how it will address the issue.

[15] Some Cap valleys do not use a cumulative balance – e.g. Queensland – Moonie, Warrego, Paroo and Nebine – and Cap compliance is based on the annual credit/debit. Or, as in the case of SA Metro-Adelaide and associated country areas Cap valley, compliance is based on a set volume over the most recent five-year period.

At the Basin scale, Figure 2 shows how annual Cap targets, annual diversions, annual credits/debits and the cumulative balance have progressed over the period 1 July 1997 to 30 June 2016.

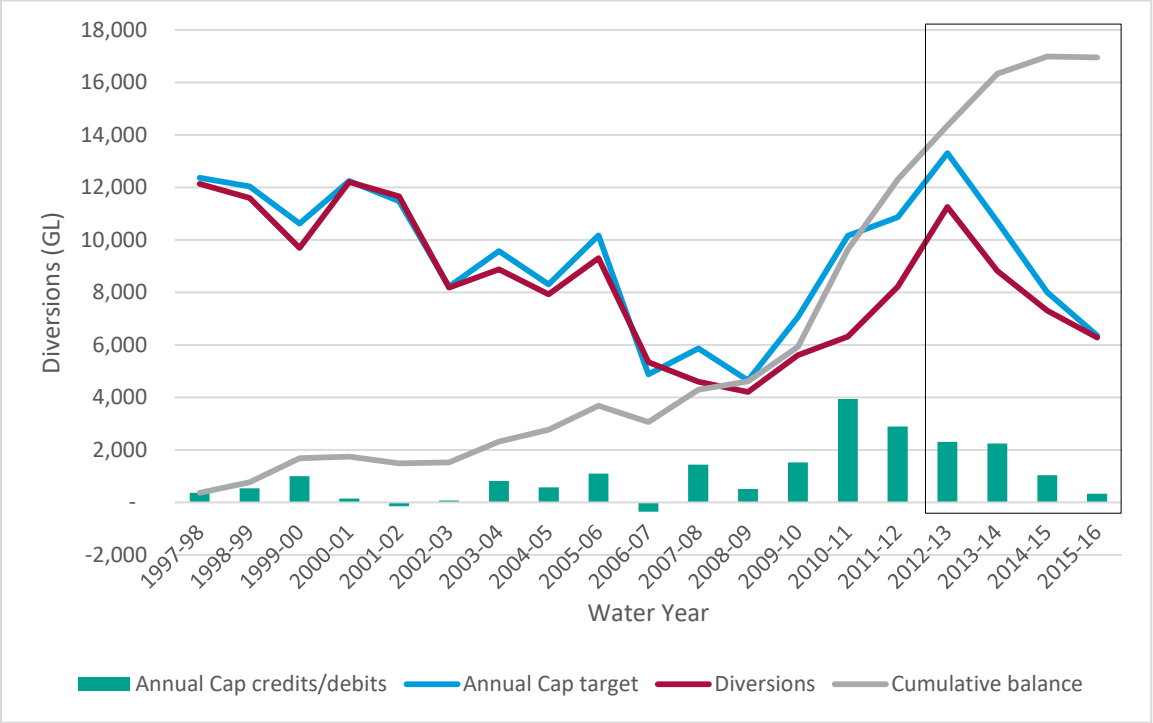


Figure 2 Basin scale annual Cap targets, annual diversions, annual and cumulative balances 1 July 1997 to 30 June 2016

2.2. Cap compliance reporting

The Cap took full effect from 1 July 1997. However, reporting on Cap implementation has been underway since 1994–95. Up to and including the 2011–12 water year, the outcomes of the annual assessment of Cap compliance by the MDBA (and previously by the Murray–Darling Basin Commission) were presented in annual Water Audit Monitoring Reports.

Annual reports on Cap implementation were also prepared by the Independent Audit Group established under Schedule E. Both sets of reports are available through the MDBA website at: https://www.mdba.gov.au/publications/mdba-reports/water-take-compliance-reports.

The annual reports of the Independent Audit Group also contain information about any special audits that were conducted and any recommendations for improvements to Cap implementation.

With the commencement of the Basin Plan, Transition Period Water Take Reports will replace annual Cap reporting through Water Audit Monitoring Reports. Cap compliance will continue to be reported for as long as the Cap is in place but will be combined with reporting on the trial of the SDL water accounting and compliance framework.

2.3. Compliance with the Cap

The Cap register at section 2.7 shows that diversions (annual actual take) have generally been below the annual Cap targets over each of the four years of the reporting period. There have been some instances where annual actual take has exceeded the annual Cap target. For most valleys, these annual debits have been offset by existing cumulative balance credits.

The one instance where this has not been the case is in the Queensland Moonie Cap valley. Section 2.3.1 discusses actions underway to assess possible non-compliance with the long-term Cap limit in that valley.

While Cap compliance applies at the valley scale, Table 2 shows that a state scale, all Basin states have maintained cumulative Cap credits over the period. Although Table 2 represents information for the period of this report (2012–13 to 2015–16), Cap credits/debits have accrued since 1997-98. As shown in Figure 2 the actual diversions were within a reasonable range of annual targets for the period prior to 2008–09. The growth in the cumulative balance (i.e. Cap credits) has been a feature of the period 2008–09 to 2014–15. The possible reasons for this pattern of usage are outlined in this section.

Table 2 Cumulative Cap balances (GL) by state as at 30 June for each year 2012–13 to 2015–16

State	Long-term Cap	Year	Annual Cap target	Diversions	Annual balance	Cumulative balance as at 30 June
Queensland[a]	1,068.69	2012–13	1,810.76	1,419.46	391.30	1,599.72
		2013–14	793.02	770.48	22.54	1,617.61
		2014–15	567.24	468.06	99.18	1,693.97
		2015–16	444.33	359.72	84.61	1,759.77
NSW	6,363.16	2012–13	7,332.07	6,319.81	1,015.57	6,101.74
		2013–14	5,937.97	5,062.60	878.68	6,980.42
		2014–15	3,644.80	3,731.75	-83.65	6,896.78
		2015–16	3,181.11	2,820.38	364.05	7,260.82
ACT	40.5	2012–13	45.25	18.66	26.60	169.28
		2013–14	45.23	18.76	26.47	195.75
		2014–15	43.40	16.99	26.41	222.16
		2015–16	46.86	20.10	26.76	248.92
Victoria	3,902.59	2012–13	3,539.90	2,969.95	569.95	5,072.61
		2013–14	3,444.69	2,517.38	927.31	5,999.92
		2014–15	3,214.64	2,579.09	635.55	6,635.47
		2015–16	2,029.19	2,481.41	-452.22	6,183.25
South Australia[b]	724.1	2012–13	816.15	522.09	294.06	1,400.86
		2013–14	823.70	442.85	380.84	1,535.24
		2014–15	860.31	500.87	359.44	1,540.85
		2015–16	893.66	597.47	296.19	1,499.50

[a] Annual balances do not sum to cumulative balances in Queensland due to the operation of cl 16 of Schedule E, where only two Cap valleys in Queensland run a cumulative balance.

[b] For this table to be consistent with data reported in the Cap Register, certain treatments have been used in relation to the Metropolitan Adelaide and associated country areas component of the SA state totals. The long-term Cap for Metropolitan Adelaide and associated country areas is 650 GL over any period of five years. To determine the long-term Cap for all of South Australia as set out in this table, an average volume of 130 GL for Metropolitan Adelaide and associated country areas has been used. The annual Cap target for Metropolitan Adelaide and associated country areas is 650 GL minus actual diversions for the previous four years.

The state scale cumulative balance volumes shown in Table 2 and the valley scale balances shown in the Cap Register (Table 8) represent the differences reported by states over time between modelled annual targets and actual water use behaviour under state water sharing arrangements. There is not a direct relationship between the cumulative balances and volumes of real water that remain in storage at the end of each water year.

In this context, it is important to note that both the annual Cap credits/debits and cumulative balance volumes are determined after the end of each water year once climate conditions and water availability for the year are known. In contrast, water allocation decisions are generally made by Basin states periodically from the commencement of each water year.

Basin states do not make allocation decisions based on the cumulative Cap credits that may be available. These decisions are made in response to actual water availability factors like: starting water storage conditions, water reserve commitments, carryover commitments, forecast inflows, forecast evaporation, forecast demand and allocation priority rules. Depending on these factors,

final allocation announcements against all classes of entitlements may not be made until well into the water year.

Figure 2 and Table 2 indicate that at a Basin scale over the period 2008–09 to 2014–15, actual diversions have been consistently and at times substantially less than the annual Cap targets. The growth in cumulative balances is likely to be a function of several factors that include:

1. In some states (e.g. some New South Wales valleys), water sharing arrangements set a maximum level of take that is below the long-term Cap limit. These circumstances make some annual credits in such areas the expected outcome.

2. Conservative water use decision making. A possible consequence of the millennium drought is that, in an overall sense, irrigators may have been more conservative in how much crop they plant in order to ensure they will have enough water to bring the crop through to harvest. This would result in less water use against allocations and the generation of annual Cap credits.

3. Irrigation enterprises may also have taken a while to get back to normal production levels after the millennium drought, and at first may not have been able to make full use of the water available.

4. Most of the Cap models currently used to determine annual Cap targets simulate 1993–94 arrangements and thus do not incorporate more recent carryover rules that have been established in the period since, including in response to the millennium drought. This means that modelled annual Cap targets could be expected to be higher than if these rules were incorporated, meaning annual credits are again more likely.

5. The methodology for accounting for environmental water recovery affects the annual Cap target, and this has an increased significance with large water recovery efforts beginning in 2009. The simple methodology available under Cap arrangements is based on ‘use methods’ (Appendix 4) that generally make annual credits more likely.

The trial of the SDL water accounting and compliance framework uses a methodology that more accurately represents the effect of the recovery of water for the environment in line with Basin Plan requirements (Water Resource Plans are required to use a methodology consistent with Basin Plan requirements). Refer to Section 7.2 and Appendix 5.

It should be noted that cumulative balances generated under the Cap will not transfer over to the relevant SDL resource unit under the SDL water accounting and compliance framework (though they will continue for Cap purposes, should such accounting continue to be mandated by the Murray–Darling Basin Ministerial Council). The Basin Plan requires that a new SDL Register of Take commences on 1 July 2019 with a cumulative balance of zero in all parts of the Basin.

2.3.1. Queensland

Diversions in all Queensland Cap valleys were within their annual Cap targets for 2012–13 and 2013–14. However, the data indicates that in the 2014–15 and 2015–16 water years, diversions in the Moonie valley exceeded annual Cap targets. Similarly, diversions in the Queensland Border Rivers exceeded the annual Cap target in 2015–16.

In the case of the Border Rivers Cap valley, the cumulative credits recorded in the Cap Register offset the annual exceedance and the valley remains compliant over the longer term.

In the case of the Moonie valley, the arrangements under Schedule E mean that while annual Cap credits/debits are recorded, they do not accumulate. In the absence of a cumulative balance, the arrangements for the Moonie — and the Warrego, Paroo and Nebine Cap valleys — are that if annual diversions exceed the annual Cap target the requirement for a special audit is triggered.

The MDBA established an Independent Audit Group (IAG) in consultation with Basin states in October 2017. The results of the special audit into Cap implementation in the Moonie must be made available within six months of commencement. If the IAG determines that the long-term Cap has been exceeded, the MDBA will declare the exceedance and report the matter to the Ministerial Council.

In response to the exceedance of the annual Cap target in the Moonie, Queensland has stated:

> *The exceedance of the annual Cap target in the Moonie valley in 2014–15 and 2015–16 was of a technical nature and relates to how the annual Cap target is calculated in the accredited hydrologic Cap model. This issue is being addressed in the review of the hydrologic model and water accounting methods for the water resource plan being prepared for accreditation under the Commonwealth Water Act 2007. A special audit conducted by the Independent Audit Group to review these matters is welcomed and Queensland awaits any advice from this process to improve water management in the Basin.*

2.3.2. New South Wales

All New South Wales valleys were Cap compliant over the reporting period and continue to accumulate credits. There were several Cap valleys where annual diversions were more than the annual Cap target in one or more years of the reporting period and annual debits were recorded. These were the:

- Gwydir valley in 2012–13 and 2014–15
- Macquarie/Castlereagh/Bogan in 2013–14 and 2015–16
- NSW Murray in 2014–15

In all instances, existing cumulative credits meant that each valley remained in overall cumulative credit and thus remained compliant with the Cap.

2.3.3. Victoria

All Victorian Cap valleys were compliant over the reporting period and continue to maintain cumulative credits. There were instances where annual diversions in various Cap valleys were more than the relevant annual Cap target and annual debits were recorded. These include the:

- Victorian Murray/Kiewa/Ovens Cap valley in 2012–13 and 2015–16
- Goulburn/Broken/Loddon Cap valley in 2015–16
- Wimmera–Mallee in 2015–16

In all instances, existing cumulative credits meant that each valley remained in overall cumulative credit and thus remained compliant with the Cap.

2.3.4. Australian Capital Territory

Diversions in the Australian Capital Territory Cap valley were within its annual Cap target over the four-year period, and Cap credits continued to accumulate.

2.3.5. South Australia

All South Australian Cap valleys were compliant over the reporting period and continue to accumulate credits. Diversions in all South Australian Cap valleys were also within their annual Cap targets over the reporting period.

Metropolitan Adelaide and associated country areas

Under the Cap arrangements, the Cap limit for the M*etropolitan Adelaide and associated country areas* Cap valley works differently to all other Cap valleys within the Basin. The Metropolitan Adelaide Cap covers diversions for water supply purposes delivered to Metropolitan Adelaide and associated country areas through the Swan Reach–Stockwell, Mannum–Adelaide and Murray Bridge–Onkaparinga pipeline systems.

This Cap valley operates under a five-year rolling Cap. The annual diversion target is calculated as 650 GL minus the sum of diversions of the preceding four years. Diversions for this Cap valley are not to exceed 650 GL within a five-year period. Further, the annual use and Cap target are adjusted for any water accessed through trade to support water use in this Cap area. This is known as the 'First Use licence' as it is considered to provide, for Cap purposes, the first water used in each water year. It is also used to account for additional water required for Metropolitan Adelaide on top of the water available under the Metropolitan Adelaide Cap.

In 2015–16 allocations of 8.34 GL were acquired from other designated Cap valleys and use was recorded against the First Use licence. This was the first time such a trade has occurred since 2005–06. Accordingly, the 2015–16 annual Cap target was adjusted by 8.34 GL to account for this temporary trade to the First Use licence.

2.4. The status of Cap models

Under Schedule E to the Murray–Darling Basin Agreement, full implementation of the Cap requires Basin states to develop Cap models that are accredited by the MDBA for use in determining annual Cap targets for all relevant Cap valleys. These models are the basis for assessing annual Cap compliance.

There are 24 Cap valleys designated under Schedule E. Schedule E requires that an accredited Cap model is developed for 22 valleys of these valleys. Two of these valleys in New South Wales (Namoi/Peel and Barwon–Darling/Lower Darling) have two models within them making a total of 24 models that are required to be accredited. The current status of these models is:

- 13 accredited Cap models are in place
- three have an accredited SDL model in place which is also used for Cap compliance purposes

- nine models have previously been accredited on a provisional basis and these accreditations have now lapsed
- one Cap valley does not have a Cap target and hence an accredited Cap model has not been developed
- one Cap valley does not have an accredited Cap model or lapsed provisionally accredited Cap model in place.

Appendix 3 gives further details on the status of Cap models.

The MDBA recognises that the Cap models or arrangements currently in place will likely remain the best available information to assess compliance under the Cap while the states manage the transition to SDL compliance. Ultimately, a decision to insist on full Cap implementation is a matter for the Murray–Darling Basin Ministerial Council.

Despite the current status of Cap models, States have continued to meet their obligations under the Cap and have provided their determination of the annual diversion targets for each Cap valley for each year since commencement of the Basin Plan.

The MDBA considers the modelling resources available during the remainder of the transition period are generally better spent preparing new models to meet the requirements under the SDL compliance framework. Basin states may however choose to submit new Cap models for (re-accreditation) or to amend existing accredited models. Where this is the case, the MDBA will provide assistance and support as necessary.

2.5. Annual Cap targets

The annual Cap target is the volume of water that is permitted to be taken from the designated Cap valleys for consumptive purposes. After the end of each water year, the MDBA assesses each Basin state's determination of the annual Cap target for each Cap valley for that water year. The annual Cap target has two components:

a) modelled component
b) un-modelled component

The portion of the annual Cap target determined by Cap models is called the modelled component. The Cap models use observed climatic and hydrologic data, as well as water use patterns to generate the annual Cap target. The diversions from unregulated sections of the river systems for which there are no models are called the un-modelled component. The un-modelled component of the annual Cap target is usually determined based on estimates. The total annual Cap targets are the sum of the modelled and un-modelled components.

With the exception of Queensland Cap models and the model for the Victorian Wimmera–Mallee Cap valley, the available Cap models determine the annual Cap targets that would have applied prior to water recovery efforts commencing. Since the Cap limits have to be calculated as they apply to consumptive use, the annual Cap targets calculated by the models have to be adjusted to remove held environmental water entitlements that were available for use in the relevant Cap valley in the relevant year.

The annual Cap targets are also adjusted to reflect trade that occurs between Cap valleys. The detail of the various adjustments to annual Cap targets for each water year are provided in the Cap Register (Table 3: Annual Cap adjustments for trade (GL), Table 4: Annual Cap adjustments for environment (GL) and Table 5: Annual Cap targets adjusted for trade and environment (GL)).

2.5.1. Environmental water adjustments

The need to adjust annual Cap targets to account for held environmental water that is available is a relatively recent development in the history of the Cap. As different programs aimed at recovering water entitlements for environmental use have emerged, the volume of held environmental entitlements in different valleys increased and the need to account for these in determining annual Cap targets for consumptive use became more pressing.

In May 2008, the Murray–Darling Basin Ministerial Council endorsed the 'Schedule E protocol' enabling long-term and annual Cap targets to be adjusted for environmental water entitlement recovery. This protocol means that diversions reported under the Cap should exclude held environmental water entitlements, thus enabling the assessment of Cap compliance against consumptive entitlement diversions only.

The protocol enables the annual Cap targets to be adjusted for environmental entitlement recovery through the following approaches:

a) hydrological models
b) estimates: fixed, allocations, usage
c) other methods: for example a 'scaling approach'.

Under both Cap and transitional SDL water accounting and compliance arrangements, the MDBA and Basin states have been working together to improve the methods being used to recognise environmental water recovery. Consistent with the Schedule E protocol, different states are working on different methods as appropriate to their existing water sharing arrangements. Final agreement between the MDBA and each Basin State to these methods was reached in November 2015.

This report uses the current methods agreed with Basin states for the adjustment of annual Cap targets in recognition of environmental water recovery. Appendix 4 sets out the nominated methods for annualising environmental water recovery under the Cap arrangements that have been agreed between the MDBA and each of the Basin states.

2.6. Operation of the Cap post 30 June 2019

Any decision to revoke or amend the Cap arrangements set out under Schedule E to the Murray–Darling Basin Agreement is a matter for the Murray–Darling Basin Ministerial Council. It is anticipated that the Ministerial Council may make decisions about the operation of the Cap following the commencement of the SDLs from 1 July 2019.

Any Cap credits or debits that have accrued as at 30 June 2019 will continue for Cap purposes. They will not however transfer over to the new SDL Register of Take which will commence with a balance of zero for all SDL resource units. Wherever there are accredited water resource plans in place from 1 July 2019, water take compliance will be reported and assessed under the SDL water accounting and compliance framework.

Any annual credits/debits at SDL resource unit scale and the resulting cumulative balance will be recorded in the Register of Take.

2.7. Cap Register 1 July 1997 to 30 June 2016

The Cap Register is set out in the following eight tables that show annual Cap adjustments, annual and cumulative Cap balances, and Cap compliance.

Note that Schedule E of the Murray-Darling Basin Agreement states that for all valleys except the Moonie, Nebine, Warrego and Paroo in Queensland and Metro Adelaide in South Australia, compliance with the Cap is assessed against the cumulative Cap balance (Table 8). For the four Queensland valleys, compliance with the Cap is assessed against an annual Cap target (

Table 7), and for the Metropolitan Adelaide and associate country areas Cap valley, compliance with the Cap is assessed against a five-year rolling balance (Table 9).

As Cap models are improved over time and new information on diversions becomes available there can be changes to the cumulative balance calculated in the previous year. Table 10 lists the instances where such changes have occurred for the 2015–16 water year and the reason for the change.

The format of the Cap Register is based on the approach adopted in Appendixes A to H of the former Water Audit Monitoring reports.

Table 3: Annual Cap adjustments for trade (GL)

System	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Intersecting Streams	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Border Rivers	0.00	-1.59	-3.51	-8.47	-8.70	-13.50	-3.40	-6.37	-11.63	-6.74	-14.75	-9.49	-8.58	-19.63	-26.11	-19.51	-27.44	-1.10	-8.83
Gwydir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Namoi/Peel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Macquarie/Castlereagh/Bogan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barwon-Darling/Lower Darling	5.39	13.02	8.99	21.93	7.82	0.00	0.00	-1.14	0.00	0.00	0.00	-27.15	-68.40	37.10	20.00	47.16	55.72	0.00	0.00
Lachlan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Murrumbidgee	-33.44	-38.02	-113.65	-21.42	31.49	-14.49	-34.71	8.03	-5.90	-96.79	-139.10	-389.97	-110.78	-57.20	5.97	7.07	-71.92	-33.00	-207.31
Murray	30.21	6.78	105.81	-12.90	-33.31	30.84	34.89	-0.75	0.08	44.20	-19.89	-138.07	-70.07	-49.72	55.52	102.03	-128.43	36.01	-30.98
Total New South Wales	***2.16***	***-19.82***	***-2.36***	***-20.85***	***-2.70***	***2.85***	***-3.22***	***-0.23***	***-17.44***	***-59.32***	***-173.74***	***-564.67***	***-257.83***	***-89.46***	***55.38***	***136.74***	***-172.08***	***1.91***	***-247.12***
Goulburn/Broken/Loddon	-3.13	3.33	-7.81	-0.77	0.76	-4.40	-59.69	-76.63	19.33	-62.30	-218.12	-106.91	-100.54	-135.21	-106.37	-188.56	-103.84	-218.14	-72.45
Campaspe	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.88	28.66	26.43	0.13	0.00	0.00	0.00	0.00	0.00
Wimmera-Mallee	0.00	0.00	0.00	0.00	0.00	0.75	0.70	-0.35	0.00	1.26	1.12	1.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Murray/Kiewa/Ovens	17.74	11.86	0.70	-1.63	-10.44	-17.42	34.23	53.79	-9.07	36.07	171.62	258.19	51.19	324.96	62.94	13.76	262.90	231.34	259.98
Total Victoria	***14.62***	***15.19***	***-7.10***	***-2.40***	***-9.68***	***-21.07***	***-24.76***	***-23.19***	***10.26***	***-24.97***	***-23.50***	***181.52***	***-22.92***	***189.88***	***-43.43***	***-174.80***	***159.06***	***13.21***	***187.54***
Metro-Adelaide & Associated Country Areas	0.00	0.00	0.00	0.00	12.00	11.00	9.41	8.80	16.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.34
Lower Murray Swamps	-2.30	-2.88	-4.01	-4.39	-3.81	-4.90	-21.77	-34.02	-32.98	-27.75	-20.22	-8.10	-23.61	-50.79	-47.43	-39.79	-51.90	-53.80	-53.32
Country Towns	0.00	0.00	0.00	0.00	-12.00	-11.00	-9.41	-5.00	-8.00	10.70	6.10	6.05	6.60	2.30	-14.00	-10.57	-13.50	-13.00	-12.00
All Other Purposes	-14.47	6.46	10.33	19.61	9.56	9.60	41.13	46.69	20.46	89.65	190.94	370.76	286.19	-76.54	18.59	64.84	47.63	45.93	104.27
Combined AOP + Swamps	-16.77	3.58	6.32	15.22	5.76	4.71	19.36	12.67	-12.52	61.90	170.72	362.65	262.58	-127.33	-28.85	25.05	-4.27	-7.87	50.95
Total South Australia	***-16.77***	***3.58***	***6.32***	***15.22***	***5.76***	***4.71***	***19.36***	***16.47***	***-4.52***	***72.60***	***176.82***	***368.70***	***269.18***	***-125.03***	***-42.85***	***14.48***	***-17.77***	***-20.87***	***47.29***
Condamine/Balonne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Border Rivers	0.00	1.59	3.51	8.47	8.70	13.50	3.50	6.37	11.63	6.74	14.75	9.49	8.58	19.63	26.11	19.51	27.44	1.10	8.83
Moonie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nebine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Warrego	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paroo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Queensland	***0.00***	***1.59***	***3.51***	***8.47***	***8.70***	***13.50***	***3.50***	***6.37***	***11.63***	***6.74***	***14.75***	***9.49***	***8.58***	***19.63***	***26.11***	***19.51***	***27.44***	***1.10***	***8.83***
Australian Capital Territory	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***
Total Basin	**0.00**	**0.55**	**0.37**	**0.44**	**2.07**	**-0.01**	**-5.13**	**-0.58**	**-0.08**	**-4.96**	**-5.67**	**-4.96**	**-2.99**	**-4.97**	**-4.79**	**-4.07**	**-3.34**	**-4.65**	**-3.46**

Table 3 details the volumes of allocations traded from one Cap valley to another Cap valley. It also includes an adjustment for entitlements permanently traded between three valleys, primarily from Victorian Murray and NSW Murray to SA Murray. This value adjusts the annual Cap target for each Cap valley. Sign convention follows positive (+) value as volume traded in and negative (-) value as volume traded out.

Table 4: Annual Cap adjustments for environment (GL)

System	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Intersecting Streams	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-16.24	0.00	0.00	0.00	0.00	0.00	0.00
Border Rivers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.27	-0.03	0.00	0.00
Gwydir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.18	-0.26	0.00	-16.77	-1.80	-48.07	-17.34	-56.64	-7.92
Namoi/Peel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-7.73	0.34	0.00	0.00
Macquarie/Castlereagh/Bogan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.69	0.00	-4.13	-60.21	-65.25	-137.72	-17.99	-16.04	-19.16
Barwon-Darling/Lower Darling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-11.40	-21.78	-208.71	-102.31	-48.79	-5.10	0.00	0.00
Lachlan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00	-11.98	-27.55	-66.28	-19.65	-5.82	-47.03
Murrumbidgee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-20.00	-20.00	-5.00	-12.96	-91.92	-334.09	-263.26	-326.62	-290.76	-350.55	-219.45
Murray	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.75	-0.23	-0.19	-3.11	-12.23	-358.82	-350.53	-416.08	-380.97	-283.98	-147.40
Total New South Wales	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***-21.75***	***-20.23***	***-6.07***	***-27.76***	***-146.31***	***-990.58***	***-810.69***	***-1,051.56***	***-731.49***	***-713.02***	***-440.96***
Goulburn/Broken/Loddon	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-17.96	-15.50	-4.26	-8.95	-7.11	-15.52	-26.69	-187.86	-216.34	-328.05	-311.99	-233.14
Campaspe	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-13.68	-24.91	-13.47	-39.47	-5.66
Wimmera-Mallee	-24.14	-31.89	-26.00	-15.08	-17.29	-9.88	-6.37	-7.28	-3.17	-6.68	-3.34	-3.25	-17.03	-44.38	0.00	0.00	0.00	0.00	0.00
Murray/Kiewa/Ovens	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-8.49	-6.99	-6.64	-12.42	-24.25	-42.57	-100.59	-104.32	-320.67	-315.49	-356.62	-536.04
Total Victoria	***-24.14***	***-31.89***	***-26.00***	***-15.08***	***-17.29***	***-9.88***	***-6.37***	***-33.73***	***-25.66***	***-17.58***	***-24.71***	***-34.61***	***-75.12***	***-171.66***	***-305.87***	***-561.92***	***-657.01***	***-708.08***	***-774.84***
Metro-Adelaide & Associated Country Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lower Murray Swamps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-8.08	-8.59	-8.73	-9.02	-9.22
Country Towns	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All Other Purposes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-9.24	-13.51	-0.95	-91.20	-143.90	-143.04	-155.43	-172.30
Combined AOP + Swamps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-9.24	-13.51	-0.95	-99.28	-152.49	-151.77	-164.45	-181.53
Total South Australia	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***-9.24***	***-13.51***	***-0.95***	***-99.28***	***-152.49***	***-151.77***	***-164.45***	***-181.53***
Condamine/Balonne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-11.51	-63.21	-22.21	-17.18	-10.17
Border Rivers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.39	-5.63	-9.05	-10.02	-4.02	-3.42	-3.28
Moonie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.30	-1.30	-1.30	-1.30	-0.20
Nebine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-3.81	-0.13	-0.17	-0.37	-1.14
Warrego	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-14.88	-1.26	-1.28	-6.64	-5.22
Paroo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Queensland	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***-0.39***	***-5.63***	***-40.55***	***-75.92***	***-28.98***	***-28.90***	***-20.00***
Australian Capital Territory	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***
Total Basin	**-24.14**	**-31.89**	**-26.00**	**-15.08**	**-17.29**	**-9.88**	**-6.37**	**-33.73**	**-47.41**	**-37.81**	**-30.78**	**-71.62**	**-235.32**	**-1,168.83**	**-1,256.38**	**-1,841.89**	**-1,569.24**	**-1,614.45**	**-1,417.33**

Table 4 details the values for adjustment of annual Cap targets for environmental water. An annual Cap target as determined by hydrological models includes both consumptive and environmental water. The models do not usually remove environmental water from the annual Cap target. Since compliance with Cap is confined to consumptive use, the adjustment is made to remove environmental use.

Table 5: Annual Cap targets adjusted for trade and environment (GL)

System	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Intersecting Streams	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Border Rivers	269.71	226.57	217.84	234.78	323.01	136.84	186.00	204.50	174.97	69.03	127.93	157.32	137.57	235.27	151.43	338.47	251.63	95.20	187.23
Gwydir	631.07	299.32	525.89	346.23	452.53	488.74	170.92	206.90	337.15	107.05	106.88	226.13	112.73	365.94	224.96	404.56	508.75	133.85	167.76
Namoi/Peel	367.07	352.13	380.15	374.83	370.19	311.66	249.02	290.65	329.86	160.86	200.06	260.50	260.52	414.15	312.95	421.78	387.20	220.05	204.37
Macquarie/Castlereagh/Bogan	385.71	591.12	410.09	574.66	576.77	256.41	270.43	184.03	393.48	120.42	218.62	143.77	113.53	590.41	407.42	535.38	268.12	203.59	123.05
Barwon-Darling/Lower Darling	249.19	537.74	327.48	490.98	242.96	183.28	256.88	164.96	258.68	18.63	178.79	151.79	117.71	248.48	226.47	333.23	268.96	154.49	111.45
Lachlan	402.10	318.01	282.92	370.93	439.55	233.39	92.65	60.30	157.12	72.49	92.14	63.86	55.93	118.35	227.53	401.03	358.39	214.57	195.94
Murrumbidgee	2,550.21	2,523.20	2,036.85	2,761.81	2,662.48	2,099.64	1,871.56	1,403.51	2,436.12	1,073.81	850.28	575.13	641.49	1,491.74	2,157.02	2,794.15	2,251.33	1,698.34	1,336.59
Murray	1,869.90	2,168.41	1,735.34	2,030.99	1,706.98	395.96	1,607.67	1,334.69	1,712.66	231.62	450.49	388.69	951.71	1,112.71	1,701.61	2,103.47	1,643.60	924.71	854.72
Total New South Wales	***6,724.97***	***7,016.51***	***5,916.57***	***7,185.21***	***6,774.49***	***4,105.91***	***4,705.13***	***3,849.55***	***5,800.04***	***1,853.90***	***2,225.19***	***1,967.18***	***2,391.18***	***4,577.04***	***5,409.39***	***7,332.07***	***5,937.97***	***3,644.80***	***3,181.11***
Goulburn/Broken/Loddon	1,984.79	1,652.40	1,589.53	1,679.22	1,587.12	1,004.65	1,622.03	1,642.57	1,590.54	630.58	772.87	588.47	1,114.96	1,266.41	1,717.11	1,793.09	1,641.34	1,292.84	732.19
Campaspe	127.45	84.55	80.14	107.97	111.93	87.49	83.07	81.27	47.01	19.49	44.59	47.61	47.26	59.63	93.92	127.53	114.44	52.08	59.31
Wimmera-Mallee	152.00	155.17	112.84	62.61	79.27	56.13	63.32	68.39	35.41	18.15	37.94	22.02	31.78	42.34	74.98	45.77	43.66	33.68	13.07
Murray/Kiewa/Ovens	1,869.73	1,745.45	1,610.11	1,758.16	1,871.83	1,915.91	1,555.09	1,597.95	1,714.39	1,443.12	1,091.52	875.60	1,314.65	1,226.54	1,621.97	1,573.51	1,645.25	1,836.04	1,224.62
Total Victoria	***4,133.97***	***3,637.56***	***3,392.62***	***3,607.96***	***3,650.16***	***3,064.17***	***3,323.50***	***3,390.18***	***3,387.35***	***2,111.34***	***1,946.91***	***1,533.71***	***2,508.65***	***2,594.92***	***3,507.98***	***3,539.90***	***3,444.69***	***3,214.64***	***2,029.19***
Metro-Adelaide & Associated Country Areas	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Lower Murray Swamps	91.90	91.32	90.19	89.81	90.39	89.30	67.72	55.47	61.22	28.77	9.92	8.85	34.80	43.41	38.68	45.82	33.57	31.38	31.66
Country Towns	50.00	50.00	50.00	50.00	38.00	39.00	40.60	42.50	42.00	40.70	37.10	37.05	37.60	35.60	36.00	39.43	36.50	37.00	38.00
All Other Purposes	411.84	444.61	449.82	472.98	456.40	487.99	494.56	453.27	445.34	390.26	353.83	464.30	581.57	326.56	353.51	402.76	357.66	381.21	421.69
Combined AOP + Swamps	503.74	535.94	540.01	562.80	546.79	577.30	562.28	508.74	506.56	419.03	363.75	473.15	616.37	369.97	392.20	448.58	391.23	412.59	453.35
Total South Australia	***553.74***	***585.94***	***590.01***	***612.80***	***584.79***	***616.30***	***602.88***	***551.24***	***548.56***	***459.73***	***400.85***	***510.20***	***653.97***	***405.57***	***428.20***	***488.01***	***427.73***	***449.59***	***491.35***
Condamine/Balonne	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,728.42	1,014.04	1,242.06	626.25	418.61	343.61
Border Rivers	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	184.06	175.24	601.05	255.90	520.30	148.41	114.74	76.80
Moonie	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	12.40	84.80	35.93	75.84	76.84	80.27	41.63	13.62	1.39	0.46
Nebine	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2.30	5.80	4.98	9.66	3.11	4.45	0.94	1.21	4.16	5.63
Warrego	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	45.90	77.00	18.93	94.48	93.56	78.38	5.79	3.47	28.26	17.75
Paroo	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2.13	4.09	1.18	1.58	0.08	0.08	0.05	0.07	0.08	0.08
Total Queensland	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***62.73***	***171.69***	***245.08***	***356.80***	***2,503.06***	***1,433.13***	***1,810.76***	***793.02***	***567.24***	***444.33***
Australian Capital Territory	***53.02***	***30.73***	***30.26***	***34.18***	***37.48***	***49.71***	***42.35***	***40.71***	***42.53***	***51.47***	***39.26***	***45.67***	***41.68***	***17.44***	***22.42***	***45.25***	***45.23***	***43.40***	***46.86***
Total Basin	**11,465.71**	**11,270.74**	**9,929.46**	**11,440.15**	**11,046.92**	**7,836.09**	**8,673.86**	**7,831.68**	**9,778.47**	**4,539.17**	**4,783.90**	**4,301.84**	**5,952.28**	**10,098.03**	**10,801.12**	**13,216.00**	**10,648.64**	**7,919.66**	**6,192.85**

Table 5 details the annual Cap target for consumptive water after adjusting for trade and environmental water in Table 3 and Table 4.

Table 6: Annual diversions (GL)

System	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Intersecting Streams	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31
Border Rivers	211.34	191.79	206.40	256.79	207.62	146.80	128.85	133.87	161.75	154.94	140.77	146.02	130.85	191.81	157.10	220.60	192.40	62.66	114.58
Gwydir	565.82	339.55	481.43	458.00	495.57	271.50	202.93	198.61	263.76	173.47	123.13	187.20	90.96	271.44	242.93	424.63	420.66	140.56	120.62
Namoi/Peel	340.02	357.22	384.96	389.67	398.40	328.78	208.07	225.08	269.03	200.92	176.68	223.05	204.77	269.90	245.49	399.81	405.49	188.34	164.31
Macquarie/Castlereagh/Bogan	442.28	395.76	437.44	521.53	596.73	411.20	218.66	102.47	224.15	252.16	74.54	105.61	112.06	182.52	266.65	456.43	292.12	114.49	131.47
Barwon-Darling/Lower Darling	269.53	431.75	263.64	492.87	204.32	126.90	292.40	186.07	199.41	17.17	221.20	159.26	150.28	124.06	166.37	283.94	180.01	73.58	84.16
Lachlan	428.97	293.22	300.59	423.16	457.15	252.99	58.89	36.45	127.66	66.01	46.30	40.23	25.74	90.14	204.51	343.23	240.73	187.79	166.53
Murrumbidgee	2,585.48	2,505.33	1,874.87	2,747.39	2,347.98	1,793.12	1,775.49	1,618.07	2,200.29	960.15	514.77	602.07	909.94	1,461.47	1,719.77	2,282.61	1,833.60	1,688.61	1,321.03
Murray	1,889.58	1,999.66	1,233.74	2,069.66	2,113.39	879.03	1,311.51	1,240.75	1,667.22	601.53	243.62	341.01	439.32	689.09	1,424.79	1,905.27	1,494.28	1,272.42	714.38
Total New South Wales	***6,736.34***	***6,517.60***	***5,186.38***	***7,362.38***	***6,824.47***	***4,213.64***	***4,200.10***	***3,744.68***	***5,116.57***	***2,429.64***	***1,544.31***	***1,807.74***	***2,067.23***	***3,283.72***	***4,430.93***	***6,319.81***	***5,062.60***	***3,731.75***	***2,820.38***
Goulburn/Broken/Loddon	1,909.00	1,698.51	1,553.46	1,568.79	1,700.32	1,075.63	1,595.59	1,552.81	1,592.39	651.32	684.46	628.26	803.65	544.46	1,009.77	1,235.48	1,165.29	1,124.88	1,080.56
Campaspe	104.76	83.37	79.84	112.43	128.78	84.81	79.66	41.10	21.34	13.46	23.62	26.64	26.43	18.36	28.48	42.55	25.87	35.06	39.29
Wimmera-Mallee	184.07	159.47	103.15	67.87	83.85	60.48	66.41	49.69	60.19	18.68	44.79	11.45	9.02	9.72	14.21	17.66	15.52	19.34	19.82
Murray/Kiewa/Ovens	1,742.98	1,803.74	1,555.38	1,712.00	1,916.38	1,754.69	1,477.67	1,492.91	1,577.87	1,406.28	800.53	837.39	970.57	563.00	1,292.36	1,674.26	1,310.70	1,399.81	1,341.75
Total Victoria	***3,940.81***	***3,745.09***	***3,291.82***	***3,461.09***	***3,829.33***	***2,975.61***	***3,219.34***	***3,136.51***	***3,251.80***	***2,089.74***	***1,553.40***	***1,503.74***	***1,809.66***	***1,135.55***	***2,344.83***	***2,969.95***	***2,517.38***	***2,579.09***	***2,481.41***
Metro-Adelaide & Associated Country Areas	153.09	152.88	138.71	103.63	82.45	164.70	82.07	71.61	73.90	203.08	89.45	149.50	56.90	56.44	59.03	81.67	42.14	73.19	153.34
Lower Murray Swamps	91.90	91.32	90.19	89.81	90.39	89.30	67.72	55.47	61.22	28.77	14.67	10.17	14.30	13.60	13.99	18.03	15.58	15.67	17.18
Country Towns	35.23	36.38	36.53	37.93	35.50	39.20	35.38	38.52	40.29	40.88	37.00	37.00	37.60	34.16	35.73	37.38	35.37	35.81	36.13
All Other Purposes	384.20	409.19	377.22	430.62	412.55	443.21	422.54	453.32	416.99	355.15	281.52	288.20	371.41	257.03	314.67	385.01	349.76	376.20	390.82
Combined AOP + Swamps	476.10	500.51	467.41	520.43	502.94	532.51	490.26	508.79	478.21	383.92	296.19	298.37	385.71	270.64	328.66	403.04	365.34	391.88	408.00
Total South Australia	***664.42***	***689.77***	***642.65***	***661.99***	***620.89***	***736.41***	***607.71***	***618.92***	***592.40***	***627.88***	***422.64***	***484.87***	***480.21***	***361.24***	***423.42***	***522.09***	***442.85***	***500.87***	***597.47***
Condamine/Balonne	544.92	467.13	366.38	360.40	161.63	123.06	575.04	166.96	186.16	57.42	775.75	189.86	1,049.32	1,063.50	765.16	1,004.77	611.07	354.08	265.17
Border Rivers	185.67	123.18	162.70	288.14	163.29	77.95	203.74	191.65	124.66	70.78	209.71	156.72	122.30	420.84	209.68	378.37	145.71	102.90	89.45
Moonie	8.33	8.09	8.16	30.64	5.65	6.06	25.83	23.20	2.28	9.36	41.46	29.00	42.60	29.21	18.60	33.62	12.86	3.72	0.78
Nebine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.17	0.11	0.09	1.00	0.15	1.00	0.00	0.00	0.08	1.40
Warrego	1.96	10.16	3.48	9.18	10.48	7.17	10.77	10.54	3.06	20.58	23.10	6.02	15.37	11.42	13.71	2.67	0.80	7.27	2.92
Paroo	0.04	0.04	0.03	0.03	0.00	0.00	0.10	0.06	0.04	1.99	4.01	1.02	1.57	0.06	0.03	0.03	0.04	0.01	0.00
Total Queensland	***740.92***	***608.60***	***540.76***	***688.38***	***341.04***	***214.25***	***815.47***	***392.40***	***316.28***	***160.29***	***1,054.14***	***382.70***	***1,232.16***	***1,525.17***	***1,008.19***	***1,419.46***	***770.48***	***468.06***	***359.72***
Australian Capital Territory	***44.21***	***29.40***	***26.47***	***33.74***	***36.52***	***40.11***	***27.82***	***27.12***	***27.80***	***25.06***	***15.59***	***18.66***	***17.61***	***6.55***	***8.49***	***18.66***	***18.76***	***16.99***	***20.10***
Total Basin	**12,126.71**	**11,590.45**	**9,688.08**	**12,207.59**	**11,652.26**	**8,180.02**	**8,870.45**	**7,919.63**	**9,304.86**	**5,332.60**	**4,590.08**	**4,197.71**	**5,606.86**	**6,312.22**	**8,215.85**	**11,249.97**	**8,812.07**	**7,296.76**	**6,279.08**

Table 6 details the actual diversions that occurred in each year for each Cap valley. Diversions are defined by the diversion formula register.

Table 7: Annual Cap credits (GL)

System	Long term Cap	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Intersecting Streams	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Border Rivers	234.00	58.37	34.78	11.44	-22.01	115.39	-9.96	57.15	70.63	13.22	-85.91	-12.84	11.31	6.72	43.47	-5.67	117.87	59.23	32.54	72.66
Gwydir	350.22	65.25	-40.23	44.46	-111.77	-43.04	217.24	-32.02	8.29	73.39	-66.41	-16.25	38.93	21.77	94.50	-17.97	-20.06	88.09	-6.72	47.14
Namoi/Peel	363.88	27.04	-5.09	-4.82	-14.84	-28.21	-17.12	40.95	65.57	60.83	-40.06	23.38	37.45	55.75	144.25	67.46	21.97	-18.30	31.71	40.07
Macquarie/Castlereagh/Bogan	491.67	-56.56	195.36	-27.34	53.14	-19.95	-154.79	51.77	81.56	169.34	-131.74	144.08	38.16	1.47	407.89	140.77	78.96	-24.00	89.11	-8.42
Barwon-Darling/Lower Darling	322.00	-20.34	105.99	63.84	-1.89	38.64	56.37	-35.52	-21.10	59.27	1.46	-42.41	-7.48	-32.57	124.42	60.10	49.29	88.94	80.91	27.29
Lachlan	335.37	-26.87	24.79	-17.67	-52.23	-17.59	-19.61	33.76	23.85	29.46	6.48	45.85	23.63	30.18	28.22	23.02	57.80	117.66	26.78	29.41
Murrumbidgee	2,358.37	-35.27	17.87	161.98	14.41	314.49	306.52	96.07	-214.56	235.82	113.67	335.51	-26.94	-268.45	30.27	437.25	511.55	417.73	9.73	15.57
Murray	1,907.66	-19.68	168.75	501.60	-38.67	-406.41	-483.07	296.16	93.94	45.45	-369.91	206.87	47.69	512.39	423.62	276.82	198.20	149.32	-347.71	140.34
Total New South Wales	***6,363.16***	***-8.06***	***502.22***	***733.49***	***-173.86***	***-46.67***	***-104.42***	***508.33***	***108.18***	***686.77***	***-572.42***	***684.19***	***162.75***	***327.26***	***1,296.63***	***981.78***	***1,015.57***	***878.68***	***-83.65***	***364.05***
Goulburn/Broken/Loddon	2,033.68	75.80	-46.11	36.08	110.43	-113.20	-70.97	26.44	89.76	-1.85	-20.74	88.41	-39.78	311.31	721.95	707.33	557.61	476.05	167.96	-348.36
Campaspe	121.82	22.69	1.18	0.31	-4.47	-16.85	2.67	3.41	40.17	25.66	6.04	20.97	20.97	20.83	41.27	65.44	84.98	88.56	17.02	20.03
Wimmera-Mallee	45.06	-32.07	-4.30	9.68	-5.26	-4.58	-4.35	-3.10	18.70	-24.78	-0.53	-6.85	10.57	22.76	32.62	60.77	28.11	28.14	14.34	-6.75
Murray/Kiewa/Ovens	1,702.03	126.75	-58.29	54.73	46.16	-44.55	161.22	77.41	105.05	136.51	36.83	290.98	38.22	344.09	663.54	329.61	-100.75	334.56	436.23	-117.14
Total Victoria	***3,902.59***	***193.16***	***-107.52***	***100.80***	***146.87***	***-179.17***	***88.57***	***104.16***	***253.67***	***135.55***	***21.60***	***393.51***	***29.97***	***698.99***	***1,459.37***	***1,163.15***	***569.95***	***927.31***	***635.55***	***-452.22***
Metro-Adelaide & Associated Country Areas	0.00	128.00	84.00	74.00	109.00	31.24	30.62	110.85	186.75	232.48	99.85	164.10	87.26	93.17	94.63	238.69	246.46	353.82	337.53	248.97
Lower Murray Swamps	94.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-4.75	-1.32	20.50	29.81	24.70	27.80	17.99	15.70	14.47
Country Towns	50.00	14.77	13.62	13.47	12.07	2.50	-0.20	5.21	3.98	1.71	-0.18	0.10	0.05	0.00	1.44	0.27	2.05	1.13	1.19	1.87
All Other Purposes	449.90	27.64	35.43	72.60	42.36	43.85	44.79	72.02	-0.05	28.35	35.11	72.31	176.10	210.17	69.53	38.84	17.75	7.89	5.01	30.87
Combined AOP + Swamps	544.10	27.64	35.43	72.60	42.36	43.85	44.79	72.02	-0.05	28.35	35.11	67.56	174.78	230.66	99.33	63.54	45.54	25.89	20.71	45.35
Total South Australia	***594.10***	***170.41***	***133.05***	***160.07***	***163.43***	***77.59***	***75.21***	***188.08***	***190.68***	***262.54***	***134.78***	***231.76***	***262.09***	***323.83***	***195.40***	***302.50***	***294.06***	***380.84***	***359.44***	***296.19***
Condamine/Balonne	729.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	664.92	248.88	237.29	15.18	64.53	78.43
Border Rivers	250.31	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	27.34	52.94	180.21	46.23	141.93	2.70	11.84	-12.64
Moonie	34.90	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3.04	43.34	6.93	33.24	47.63	61.67	8.01	0.75	-2.32*	-0.32*
Nebine	6.40	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2.13	5.69	4.89	8.66	2.96	3.45	0.94	1.21	4.09	4.23
Warrego	47.90	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	25.32	53.90	12.91	79.11	82.14	64.67	3.12	2.67	20.99	14.83
Paroo	0.18	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.15	0.08	0.16	0.01	0.03	0.05	0.02	0.03	0.07	0.08
Total Queensland	***1,068.69***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***30.64***	***103.01***	***52.24***	***173.95***	***977.89***	***424.94***	***391.30***	***22.54***	***99.18***	***84.61***
Australian Capital Territory	***40.50***	***8.81***	***1.33***	***3.80***	***0.44***	***0.96***	***9.60***	***14.53***	***13.59***	***14.73***	***26.41***	***23.67***	***0.00***	***0.00***	***10.89***	***13.93***	***26.60***	***26.47***	***26.41***	***26.76***
Total Basin	**11,969.04**	**364.32**	**529.08**	**998.16**	**136.88**	**-147.30**	**68.95**	**815.10**	**566.12**	**1,099.59**	**-358.99**	**1,436.13**	**507.05**	**1,524.03**	**3,940.19**	**2,886.30**	**2,297.47**	**2,235.84**	**1,036.93**	**319.39**
	*Cap exceedance is subject to a special audit by the Independent Audit Group as per Clause 16 of Schedule E of the Murray Darling Basin Agreement.																			

Table 7 details the annual balance in credit or debit after deducting actual diversions in Table 6 from annual Cap targets in Table 5 for each Cap valley.

Table 8: Cumulative Cap credits (GL)

System	Long term Cap	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Intersecting Streams	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Border Rivers	234.00	58.37	93.15	104.59	82.58	197.97	188.01	245.16	315.80	329.02	243.11	230.27	241.57	248.29	291.76	286.09	403.96	463.19	495.73	568.39
Gwydir	350.22	65.25	25.02	69.47	-42.29	-85.33	131.91	99.89	108.18	181.57	115.15	98.90	137.83	159.60	254.10	236.13	216.07	304.16	297.44	344.58
Namoi/Peel	363.88	27.04	21.96	17.14	2.30	-25.91	-43.03	-2.08	63.50	124.32	84.26	107.65	145.09	200.84	345.09	412.55	434.53	416.23	447.94	488.01
Macquarie/Castlereagh/Bogan	491.67	-56.56	138.79	111.45	164.59	144.63	-10.16	41.61	123.17	292.51	160.76	304.84	343.01	344.48	752.37	893.14	972.09	948.09	1,037.20	1,028.78
Barwon-Darling/Lower Darling	322.00	-20.34	85.65	149.49	147.60	186.24	242.61	207.10	185.99	245.26	246.72	204.31	196.84	164.27	288.68	348.79	398.08	487.02	567.93	595.22
Lachlan	335.37	-26.87	-2.08	-19.75	-71.98	-89.57	-109.18	-75.42	-51.57	-22.11	-15.63	30.22	53.85	84.03	112.25	135.27	193.06	310.73	337.50	366.91
Murrumbidgee	2,358.37	-35.27	-17.40	144.58	159.00	473.49	780.00	876.08	661.52	897.34	1,011.01	1,346.52	1,319.58	1,051.13	1,081.40	1,518.65	2,030.20	2,447.93	2,457.66	2,473.23
Murray	1,907.66	-19.68	149.08	650.68	612.01	205.60	-277.47	18.69	112.63	158.08	-211.83	-4.95	42.73	555.12	978.74	1,255.56	1,453.76	1,603.08	1,255.37	1,395.71
Total New South Wales	***6,363.16***	***-8.06***	***494.16***	***1,227.65***	***1,053.79***	***1,007.12***	***902.70***	***1,411.03***	***1,519.22***	***2,205.99***	***1,633.56***	***2,317.75***	***2,480.50***	***2,807.76***	***4,104.40***	***5,086.17***	***6,101.74***	***6,980.42***	***6,896.78***	***7,260.82***
Goulburn/Broken/Loddon	2,033.68	75.80	29.69	65.76	176.19	63.00	-7.98	18.46	108.22	106.37	85.63	174.04	134.25	445.57	1,167.52	1,874.85	2,432.46	2,908.51	3,076.47	2,728.11
Campaspe	121.82	22.69	23.87	24.17	19.71	2.86	5.53	8.94	49.11	74.77	80.81	101.77	122.74	143.57	184.84	250.27	335.25	423.81	440.84	460.86
Wimmera-Mallee	45.06	-32.07	-36.38	-26.69	-31.95	-36.52	-40.88	-43.98	-25.27	-50.06	-50.59	-57.44	-46.87	-24.11	8.51	69.28	97.39	125.53	139.87	133.12
Murray/Kiewa/Ovens	1,702.03	126.75	68.46	123.19	169.35	124.80	286.02	363.43	468.48	604.99	641.83	932.81	971.03	1,315.11	1,978.65	2,308.26	2,207.51	2,542.07	2,978.30	2,861.16
Total Victoria	***3,902.59***	***193.16***	***85.63***	***186.43***	***333.30***	***154.13***	***242.69***	***346.86***	***600.53***	***736.08***	***757.67***	***1,151.18***	***1,181.15***	***1,880.14***	***3,339.52***	***4,502.66***	***5,072.61***	***5,999.92***	***6,635.47***	***6,183.25***
Metro-Adelaide & Associated Country Areas	0.00	128.00	84.00	74.00	109.00	31.24	30.62	110.85	186.75	232.48	99.85	164.10	87.26	93.17	94.63	238.69	246.46	353.82	337.53	248.97
Lower Murray Swamps	94.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-4.75	-6.07	14.43	44.24	68.93	96.73	114.72	130.43	144.90
Country Towns	50.00	14.77	28.40	41.87	53.94	56.44	56.24	61.45	65.43	67.14	66.96	67.06	67.11	67.11	68.55	68.82	70.88	72.01	73.20	75.07
All Other Purposes	449.90	27.64	63.06	135.66	178.03	221.87	266.66	338.68	338.64	366.99	402.10	474.41	650.51	860.67	930.20	969.04	986.79	994.68	999.69	1,030.57
Combined AOP + Swamps	544.10	27.64	63.06	135.66	178.03	221.87	266.66	338.68	338.64	366.99	402.10	469.66	644.44	875.10	974.44	1,037.97	1,083.52	1,109.41	1,130.12	1,175.47
Total South Australia	***594.10***	***170.41***	***175.46***	***251.53***	***340.97***	***309.56***	***353.53***	***510.98***	***590.82***	***666.61***	***568.91***	***700.82***	***798.81***	***1,035.38***	***1,137.62***	***1,345.48***	***1,400.86***	***1,535.24***	***1,540.85***	***1,499.50***
Condamine/Balonne	729.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.00	664.92	913.80	1,151.08	1,166.26	1,230.79	1,309.22
Border Rivers	250.31	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.00	27.34	80.28	260.49	306.72	448.64	451.35	463.18	450.54
Moonie	34.90	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Nebine	6.40	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Warrego	47.90	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Paroo	0.18	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total Queensland	***1,068.69***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***27.34***	***80.28***	***925.41***	***1,220.51***	***1,599.72***	***1,617.61***	***1,693.97***	***1,759.77***
Australian Capital Territory	***40.50***	***8.81***	***10.14***	***13.94***	***14.38***	***15.34***	***24.94***	***39.47***	***53.05***	***67.78***	***94.19***	***117.85***	***117.85***	***117.85***	***128.74***	***142.68***	***169.28***	***195.75***	***222.16***	***248.92***
Total Basin	**11,969.04**	**364.32**	**765.40**	**1,679.56**	**1,742.44**	**1,486.15**	**1,523.86**	**2,308.34**	**2,763.62**	**3,676.45**	**3,054.33**	**4,287.61**	**4,605.66**	**5,921.42**	**9,635.68**	**12,297.51**	**14,344.21**	**16,328.93**	**16,989.23**	**16,952.26**

Table 8 details the values from Table 7 on a cumulative basis since Cap commenced.

Table 9: Cap Register — for Metropolitan Adelaide, South Australia (GL)

Year	SA - Metropolitan Adelaide Diversion	Gross Metro-Adelaide & Associated Country Areas (rolling 5-year Cap is 650 GL)	First use license	Net Metro-Adelaide & Associated Country Areas (rolling 5-year Cap is 650 GL)	Annual Cap Credit - Metro-Adelaide & Associated Country Areas
1997-98	Annual Diversion	153.09	0.00	153.09	
	Diversion - 5 Years to 1997/98	554.76	0.00	554.76	95.24
1998-99	Annual Diversion	152.88	0.00	152.88	
	Diversion - 5 Years to 1998/99	598.47	0.00	598.47	51.53
1999-00	Annual Diversion	138.71	0.00	138.71	
	Diversion - 5 Years to 1999/00	576.58	0.00	576.58	73.42
2000-01	Annual Diversion	103.63	0.00	103.63	
	Diversion - 5 Years to 2000/01	614.00	0.00	614.00	36.00
2001-02	Annual Diversion	82.45	12.00	70.45	
	Diversion - 5 Years to 2001/02	630.76	12.00	618.76	31.24
2002-03	Annual Diversion	164.70	11.00	153.70	
	Diversion - 5 Years to 2002/03	642.38	23.00	619.38	30.62
2003-04	Annual Diversion	82.07	9.41	72.66	
	Diversion - 5 Years to 2003/04	571.56	32.41	539.15	110.85
2004-05	Annual Diversion	71.61	8.80	62.81	
	Diversion - 5 Years to 2004/05	504.45	41.21	463.25	186.75
2005-06	Annual Diversion	73.90	16.00	57.90	
	Diversion - 5 Years to 2005/06	474.73	57.21	417.52	232.48
2006-07	Annual Diversion	203.08	0.00	203.08	
	Diversion - 5 Years to 2006/07	595.36	45.21	550.15	99.85
2007-08	Annual Diversion	89.45	0.00	89.45	
	Diversion - 5 Years to 2007/08	520.11	34.21	485.90	164.10
2008-09	Annual Diversion	149.50	0.00	149.50	
	Diversion - 5 Years to 2008/09	587.54	24.80	562.74	87.26
2009-10	Annual Diversion	56.90	0.00	56.90	
	Diversion - 5 Years to 2009/10	572.83	16.00	556.83	93.17
2010-11	Annual Diversion	56.44	0.00	56.44	
	Diversion - 5 Years to 2010/11	555.37	0.00	555.37	94.63
2011-12	Annual Diversion	59.03	0.00	59.03	
	Diversion - 5 Years to 2011/12	411.31	0.00	411.31	238.69
2012-13	Annual Diversion	81.67	0.00	81.67	
	Diversion - 5 Years to 2012/13	403.54	0.00	403.54	246.46
2013-14	Annual Diversion	42.14	0.00	42.14	
	Diversion - 5 Years to 2013/14	296.18	0.00	296.18	353.82
2014-15	Annual Diversion	73.19	0.00	73.19	
	Diversion - 5 Years to 2014/15	312.47	0.00	312.47	337.53
2015-16	Annual Diversion	153.34	8.34	145.00	
	Diversion - 5 Years to 2015/16	409.37	8.34	401.03	248.97

Table 9 details the Cap target for Metropolitan Adelaide. It is 650 GL each year minus the actual diversions for previous four years. A model is not used to determine the Cap target in the Metropolitan Adelaide.

Table 10: Difference in cumulative Cap credits between Cap Register, 2014–15 and Cap Register, 2015–16 (GL)

System	Cumulative Cap credit up to year 2014-15 in TPWT* Report 2014-15	Cumulative Cap credit up to year 2014-15 in TPWT* Report 2015-16	Difference in cumulative Cap credit	Cumulative Cap credit difference due to:			
				Model Cap targets	Cap adjustment for trade	Cap adjustment for environmental water	Diversions
Intersecting Streams	n/a	n/a	n/a	n/a	0.00	0.00	0.00
Border Rivers	482.53	495.73	13.20	13.20	0.00	0.00	0.00
Gwydir	336.99	297.44	-39.55	-39.55	0.00	0.00	0.00
Namoi/Peel	437.90	447.94	10.04	10.04	0.00	0.00	0.00
Macquarie/Castlereagh/Bogan	1,037.38	1,037.20	-0.18	-0.18	0.00	0.00	0.00
Barwon-Darling/Lower Darling	537.83	567.93	30.09	30.09	0.00	0.00	0.00
Lachlan	698.96	337.50	-361.46	-361.46	0.00	0.00	0.00
Murrumbidgee	2,298.73	2,457.66	158.93	158.93	0.00	0.00	0.00
Murray	1,281.46	1,255.37	-26.09	-26.09	0.00	0.00	0.00
Total NSW	***7,111.79***	***6,896.78***	***-215.01***	***-215.01***	***0.00***	***0.00***	***0.00***
Goulburn/Broken/Loddon	3,081.11	3,076.47	-4.64	-4.64	0.00	0.00	0.00
Campaspe	437.94	440.84	2.89	2.89	0.00	0.00	0.00
Wimmera-Mallee	141.74	139.87	-1.88	-1.88	0.00	0.00	0.00
Murray/Kiewa/Ovens	2,989.24	2,978.30	-10.94	-10.94	0.00	0.00	0.00
Total Victoria	***6,650.04***	***6,635.47***	***-14.57***	***-14.57***	***0.00***	***0.00***	***0.00***
Metro-Adelaide & Associated Country Areas	337.53	337.53	0.00	n/a	0.00	0.00	0.00
Lower Murray Swamps	130.43	130.43	0.00	0.00	0.00	0.00	0.00
Country Towns	73.20	73.20	0.00	0.00	0.00	0.00	0.00
All Other Purposes	999.69	999.69	0.00	0.00	0.00	0.00	0.00
Total South Australia	***1,540.85***	***1,540.85***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***
Condamine/Balonne	1,230.79	1,230.79	0.00	0.00	0.00	0.00	0.00
Border Rivers	463.18	463.18	0.00	0.00	0.00	0.00	0.00
Moonie	n/a	n/a	n/a	0.00	0.00	0.00	0.00
Nebine	n/a	n/a	n/a	0.00	0.00	0.00	0.00
Warrego	n/a	n/a	n/a	0.00	0.00	0.00	0.00
Paroo	n/a	n/a	n/a	0.00	0.00	0.00	0.00
Total Queensland	***1,693.97***	***1,693.97***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***
Australian Capital Territory	***222.16***	***222.16***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***
Total Basin	**17,218.81**	**16,989.23**	**-229.58**	**-229.58**	**0.00**	**0.00**	**0.00**

*TPWT Report = Transition Period Water Take Report

Table 10 is a comparison of the cumulative Cap credits with the previous year. Variations could be due to a more current model run, changes in trade and environmental adjustments and improvements in accuracy of actual diversions. Models are run each year to determine the annual Cap target. Where the model run produces a different target for the cumulative period than was obtained the previous year, a correction is made to the prior year's annual targets which results in variations in the cumulative balance.

Part 2:
Trial assessment of annual water availability and take under the sustainable diversion limit water accounting and compliance rules

3. Purpose of the trial

The making of the Basin Plan has set in train a seven-year process of transition (2012–13 to 2018–19) from Cap-based to SDL water accounting and compliance in the Basin. While some of the reporting components of the SDL water accounting and compliance framework commenced in 2012, the Cap remains the only Basin-wide water take compliance regime that is currently in place.

Given the additional forms of water take captured under the new SDL water accounting and compliance framework and the significant investment in water recovery to achieve the SDLs, it is prudent to ensure that all parties subject to the new framework are well prepared to comply with the new arrangements from 1 July 2019. On this basis, the MDBA and Basin states are collaborating to run a trial of the new framework during the transition period.

The trial is a 'proof of concept' to establish and test the types of arrangements that will need to be in place from 1 July 2019 to ensure compliance with the SDLs.

The objectives of the trial are to:

1. Develop and test the types of arrangements that Basin states and the Commonwealth Environmental Water Holder (CEWH) will use to prepare, self-assess and submit data to the MDBA as required under sections 71 and 32 of the *Water Act 2007* and Matter 9 of Schedule 12 of the 2012 Basin Plan.
2. Develop and test the arrangements that the MDBA will use to receive, assess and report on the data submitted by Basin states and the Commonwealth Environmental Water Holder.
3. Identify where current gaps or weaknesses in the trial arrangements are and the improvements that need to be made in order to enhance the overall integrity of the water accounting and compliance framework from 2019, noting that there are no compliance consequences during the trial.
4. Provide an indicative demonstration of what SDL compliance reporting may look like in terms of how data will assessed and presented when the rules are fully in force.

In relation to objectives 1 and 4, the trial assessment is being presented in a way that is consistent with the provisions of s.71(1) of the Water Act as set out below.

Part 2, Division 2, Subdivision F — Reporting obligations

71 Reporting obligations of Basin states

(1) A Basin State must, within 4 months after the end of a water accounting period for a water resource plan area in the Basin State give the Authority a written report that sets out the following:

a) the quantity of water available from the water resources of the water resource plan area during that water accounting period;

b) the quantity of water permitted to be taken from the water resources of the water resource plan area during the water accounting period;

c) the quantity of water actually taken from the water resources of the water resource plan area during the water accounting period;

d) details of the water allocations made in relation to the water resources of that area in relation to that water accounting period;

e) details of any other decisions made by, or under the law of, the Basin State, that permit the taking of water from the water resources of that area during that water accounting period;

f) details of the trading or transfer of tradeable water rights in relation to the water resources of that area during that water accounting period:

(i) within the area; and

(ii) into the area; and

(iii) from the area;

g) an assessment of compliance with any long-term annual diversion limit for the water resources of the area, or for a particular part of those water resources, in accordance with the method specified in the Basin Plan;

h) if there has been non-compliance with any long-term annual diversion limit for the water resources of the area, or for a particular part of those water resources—the actions that the Basin State proposes to take to ensure that the limit is complied with in the future.

With the commencement of the Basin Plan in November 2012, the reporting requirements under this clause commenced for the 2012–13 water year (i.e. the first such 'water accounting period' mentioned in s.71).

The structure of this part of the report is drawn from the reporting obligations under s.71. For each report section the connection to the relevant sub-clause(s) of s.71 is provided. In the same way, the requirements of s32 of the Water Act and Matter 9 of Schedule 12 to the Basin Plan 2012 are used as points of reference in Part 3 of this report.

Section 71 requires that data is reported at least at the level of water resource plan (WRP) areas. Each WRP area contains one or more SDL resource units as specified in the Basin Plan. For the purpose of the trial, SDL resource units have been used as the basis of reporting wherever possible.

This is considered to provide the most useful presentation for the purpose of informing the indicative compliance arrangements under the trial. It is also consistent with the forthcoming requirement under Basin Plan s6.08(2) for the Register of Take to provide, from 2019, a record of take and consequent annual and cumulative balances at the SDL resource unit scale.

Because the trial is a proof of concept, there may be instances where the data that is reported and the conclusions that are drawn from that data change between years as better information becomes available. It is the role of the trial to draw out instances where better information can be generated to inform improvements in reporting during the trial as well as the development of the accredited arrangements that will be applied from 1 July 2019. Consistent with this approach,

future transitional water take reports will, where practical to do so, update data from previous years where new/more accurate data becomes available.

The trial seeks to apply all the elements of the SDL water accounting and compliance framework that will operate from 1 July 2019. However, the extent to which this can be done is limited by the information and methods that are currently available.

3.1. How the SDL water accounting and compliance framework operates

3.1.1. The long-term average annual limit

As with the Cap, the annual SDL water accounting and compliance framework is made in reference to long-term average annual limits on the volume of water that can be taken for consumptive use in each SDL resource unit. These limits are the SDLs specified in Schedule 2 of the Basin Plan.

At the completion of each water year, the method set out in the accredited WRPs will be used to ascertain the 'permitted take' that applied for that year based on the climatic conditions experienced. This method often employs long-term hydrological models. This work translates the long-term average SDL into an annual limit for comparison against actual take. This is analogous to the arrangements for the long-term Cap and annual Cap target.

Under the Basin Plan the concept of water 'take' means the removal of water, or the reduction in flow, from a water resource.

The Basin Plan defines forms of take as:

- take from a watercourse
- take from a regulated river
- take by floodplain harvesting
- take by runoff dams
- net take by commercial plantations
- take from groundwater
- take under basic rights.

For the purposes of the trial, a concept of transitional diversion limits (TDLs) has been established. These operate in essentially the same way as Cap limits or SDLs, however they also will reflect the amount of water that has been recovered to bridge the gap at the outset of the each water year. The concept of the TDL is that given the SDLs have not yet been achieved across all SDL resource units it is not appropriate to determine annual permitted take in reference to the SDL. To do so would see actual diversions in the transition period compared to a diversion limit that had not yet necessarily been achieved through water recovery efforts.

Were an SDL resource unit to be fully recovered, the transitional diversion limit would equal the SDL; were recovery yet to commence, the transitional diversion limit would equal the baseline diversion limit (BDL) which generally represents 2009 levels of use and was adopted as the baseline for the Basin Plan (specified in Schedule 3 of the Basin Plan).

Across the Basin scale, each TDL is expected to decrease each year as water recovery to achieve the SDL continues and is achieved.

3.1.2. Determination of annual permitted take

Section 10.10 of the Basin Plan requires Basin states to prepare water resource plans that include methods for determining annual permitted take for each form of take in each SDL resource unit within the water resource plan area. These methods are equivalent to the Cap models under the Cap framework. The methods set out in the water resource plans must demonstrate that over a repeat of the Basin Plan historical climate conditions (1895 to 2009), permitted take will achieve the SDL for each SDL resource unit.

It is important to understand that as with the long-term Cap limits, the SDLs are not an annual limit on permitted take for a SDL resource unit. The SDLs are long-term average annual volumes and by definition, it will be routine for the volume of permitted take in individual years to be above or below the SDL. While permitted take methodologies attempt to explain as much of the inter-annual variation as possible (e.g. through relating use to climatic conditions and water availability), it is not always possible to fully explain such variations and thus 'unders' and 'overs' are expected and a cumulative balance is used.

Basin Plan compliant methods for determining annual permitted take for each form of take are currently under development by Basin states. For the trial, Cap models adjusted as necessary to the BDL and for environmental water recovery are being used to determine surface water permitted take from watercourses and regulated rivers.

Permitted take for the other forms of surface water take is being determined based on the estimates in Schedule 3 of the Basin Plan or *Water resource assessments for without-development and baseline conditions, Murray–Darling Basin Authority technical report 2010/20 Version 2 (MDBA 2011)* or alternative estimates provided by Basin states. Issues associated with the use of these long-term average estimates are discussed at section 5.

At this point in the transition period, the use of these long-term estimates of take for certain forms of surface water take is necessary as methods are not yet available to provide improved estimates on an annual basis. However, the MDBA is working with the Basin states to develop more appropriate methods to estimate, model or measure annual actual take by interceptions. The MDBA considers any improvements in this area will enhance the overall integrity of the SDL water accounting and compliance framework that is put in place from 1 July 2019.

The determination of permitted take for groundwater is a concept that has not previously existed. For the purposes of the trial, permitted take is being set at the TDL for each SDL resource unit. Further discussion about the determination of permitted take for groundwater is provided at section 7.4.

3.1.3. Determination of annual actual take

Section 10.15 of the Basin Plan requires that water resource plans must set out how the volume of water actually taken each year for consumptive use by each form of take in each SDL resource unit will be determined. This is likely to be a combination of volumes measured by water meters, modelled by hydrological models and/or estimated based on agreed parameters.

For the trial, annual actual take from watercourses and regulated rivers is being determined using the same methods as for Cap diversions. For the other forms of surface water take, annual actual take is being set as the long-term average annual estimates listed in Schedule 3 of the Basin Plan or *Water resource assessments for without-development and baseline conditions, Murray–Darling Basin Authority technical report 2010/20 Version 2 (MDBA 2011)* or an alternative

estimate determined by the relevant Basin State. For groundwater, annual actual take is being determined through a combination of metered and estimated take.

As with permitted take, annual actual take will vary between years. This variability will be the result of a combination of water availability and the water use decisions made by individual water entitlement holders. These decisions will be influenced by many factors including the extent of current and planned plantings, announced allocations, access to carryover, in-crop rainfall and commodity prices. The effect of these decisions will be that annual actual take will rarely be the same as annual permitted take. Annual actual take will routinely be at volumes above and below annual permitted take.

3.1.4. Reporting of annual permitted take, annual actual take and related information

Section 71 of the Water Act, requires Basin states to provide a written report to the MDBA by 31 October each year (or other date agreed by the MDBA) that sets out a range of information about: water availability, annual permitted take, annual actual take, allocations, trade and so on. Section 71 has been reproduced in full at the start of this section.

3.1.5. Assessment of compliance with the SDLs

To assist in determining compliance, section 6.08 of the Basin Plan requires the MDBA to establish a Register of Take. As a minimum, the Register of Take must record for each SDL resource unit:

- annual credits where annual actual take is less than annual permitted take
- annual debits where annual actual take is more than annual permitted take
- a cumulative balance of the annual credits and debits.

When the SDLs are in force, compliance will be assessed against the cumulative balance of annual credits and debits relative to the annual permitted take. If the cumulative balance — adjusted for any acquisition or disposal of held environmental water — for an SDL resource unit is a debit of 20% or more of the SDL and the relevant Basin state does not have a ‘reasonable excuse’ as provided for under section 6.12 of the Basin Plan, then an instance of non-compliance will be confirmed.

For the purposes of the trial of the SDL water accounting and compliance framework, the MDBA is maintaining a trial Register of Take. The trial Register of Take is being operated as would be the case if actual compliance was being assessed. It is being used to give an indicative demonstration of the cumulative balance of take for each SDL resource unit as assessed against the relevant TDL for that resource unit.

Given that SDL models are not yet in place and the volume of held environmental water varies over the water years, a method to estimate the annual transitional permitted take that adjusts for the amount of held environmental water available is required. For the purpose of the trial, MDBA and each Basin state have agreed on a nominated method for making this annual adjustment. These methods are a further improvement on those used for Cap purposes and are set out at Appendix 5. Noting that compliance will ultimately apply at SDL resource unit scale, Figure 3 and Figure 4 provide the Basin scale findings for the above processes for surface water and groundwater.

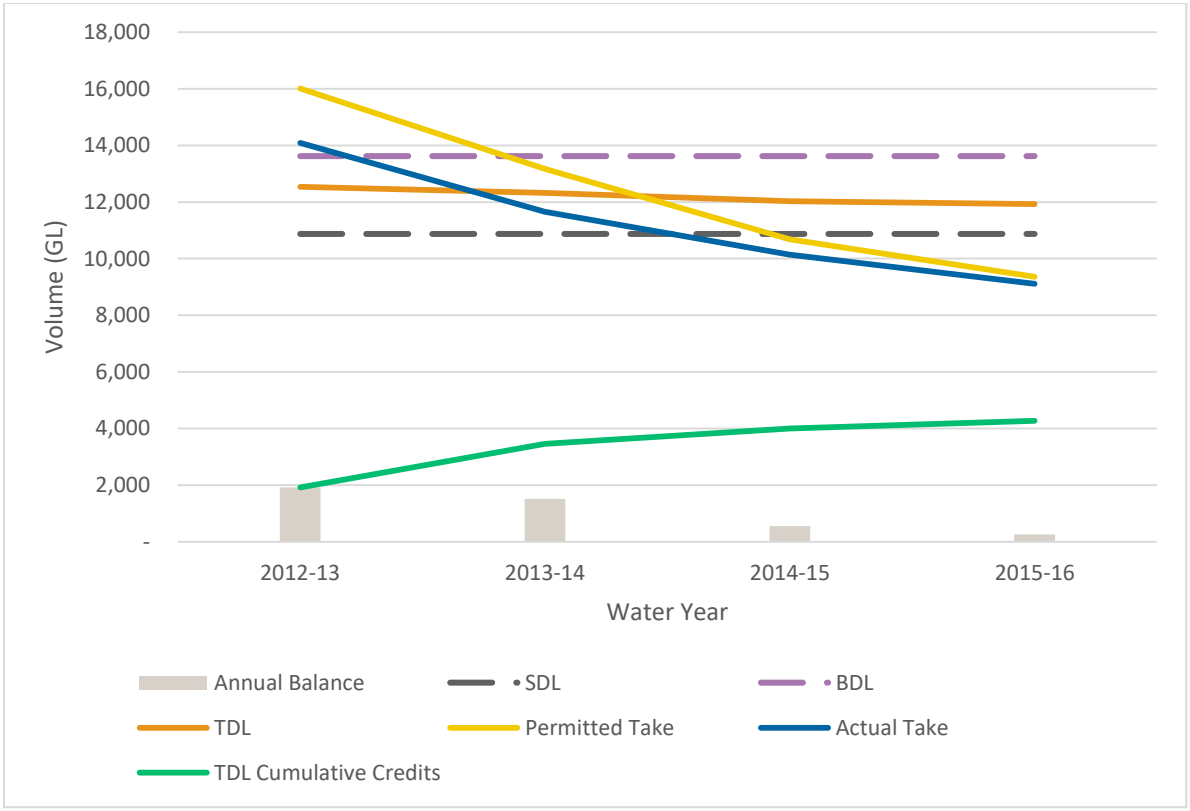


Figure 3 Basin scale surface water transitional diversion limit, annual permitted take, annual actual take, annual credits and adjusted cumulative balance 2012–13 to 2015–16

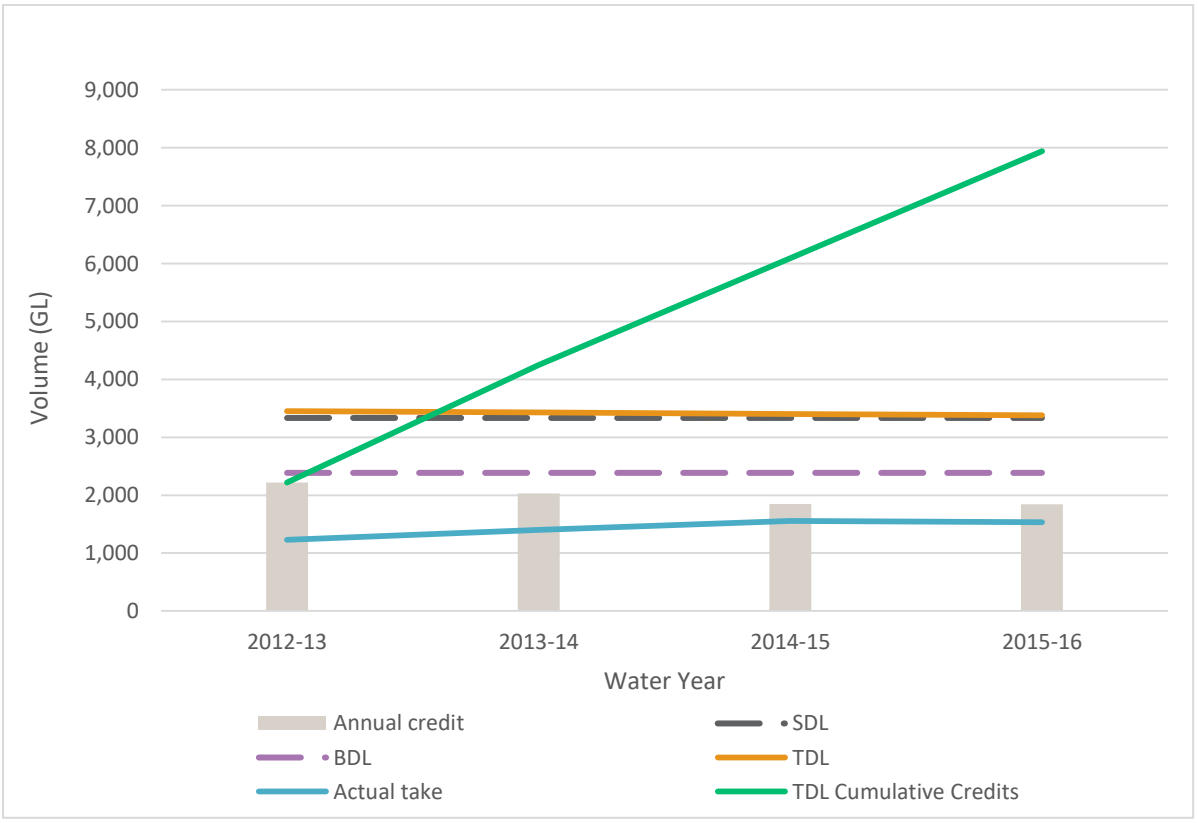


Figure 4 Groundwater Basin scale transitional diversion limit, annual actual take, and annual credits and cumulative balance 2012–13 to 2015–16

4. Water availability

s.71(1)(a) the quantity of water available from the water resources of the water resource plan area during that water accounting period

This section provides information on the overall quantity of water available in the Basin. The purpose of reporting this volume is to provide an overall picture of the water available throughout the Basin for surface water and groundwater SDL resource units.

While this is intended to provide useful context for the water allocated, water used and the water permitted to be taken under the SDL framework, it does not represent a controlling element of water planning in its own right (though more localised assessments of water availability inform each of the qualities established for other data reported under s.71).

Over recent years there have been ongoing discussions with Basin states as to how to meaningfully calculate this volume on an annual basis. These discussions have noted the lower priority for settling a method for doing so in light of other work to implement the Basin Plan. The limited utility of an overall assessment of 'water availability' to these other elements of Basin planning has also been a consideration.

Accordingly, for the purpose of this transitional period water take report, long-term annual average volumes are presented at the Basin scale. In future reports, this data is expected to be improved in terms of inter-annual variability and estimates at the SDL resource unit scale.

4.1. Surface water

For surface water, the long-term average Basin-wide availability was assessed in the 2012 Basin Plan as 32,553 GL per year comprising inflows to the Basin and transfers into the Basin (e.g. from the Snowy Hydro-electric Scheme).[16] As noted in the Basin Plan, this was the MDBA's best estimate of surface water runoff generated across the Basin, based on modelled inflows adjusted where necessary to incorporate the effects of interception activities.

4.2. Groundwater

For groundwater, the volume of recharge to groundwater systems is considered the most suitable measure of 'water available'. This volume is difficult to calculate on a long-term basis and more so on an annual basis.

The long-term average estimate of this volume does however provide an overall context for the scale of development of the groundwater resources of the Basin. It was also used extensively at the SDL resource unit scale in setting the groundwater SDLs as part of the recharge risk assessment methodology adopted by the MDBA.

Accordingly, based on the long-term average volume of recharge to groundwater, the long-term average Basin-wide groundwater availability was assessed by the MDBA as 23,450 GL per year.[17]

[16] Basin Plan 2012, Schedule 1, paragraph 34.
[17] Basin Plan 2012, Schedule 1, paragraph 8.

4.3. Climate and storages

Annual rainfall, temperature conditions and water available in storage are the high-level drivers of annual water availability. Summaries of these conditions for each year of the reporting period are set out below.

The climate over the four-year reporting period was variable, commencing with near average conditions in 2012–13, steadily becoming drier and hot from 2013–14 to mid–2015–16 and then the period closed with above average rainfall and inflows across much of the Basin. Areas of Queensland, New South Wales and Victoria entered drought at various points through the reporting period and maximum and minimum temperatures exceeded the highest on record in some areas.

In a general sense, the reporting period saw surface water availability decrease as each year was generally drier than the preceding year.

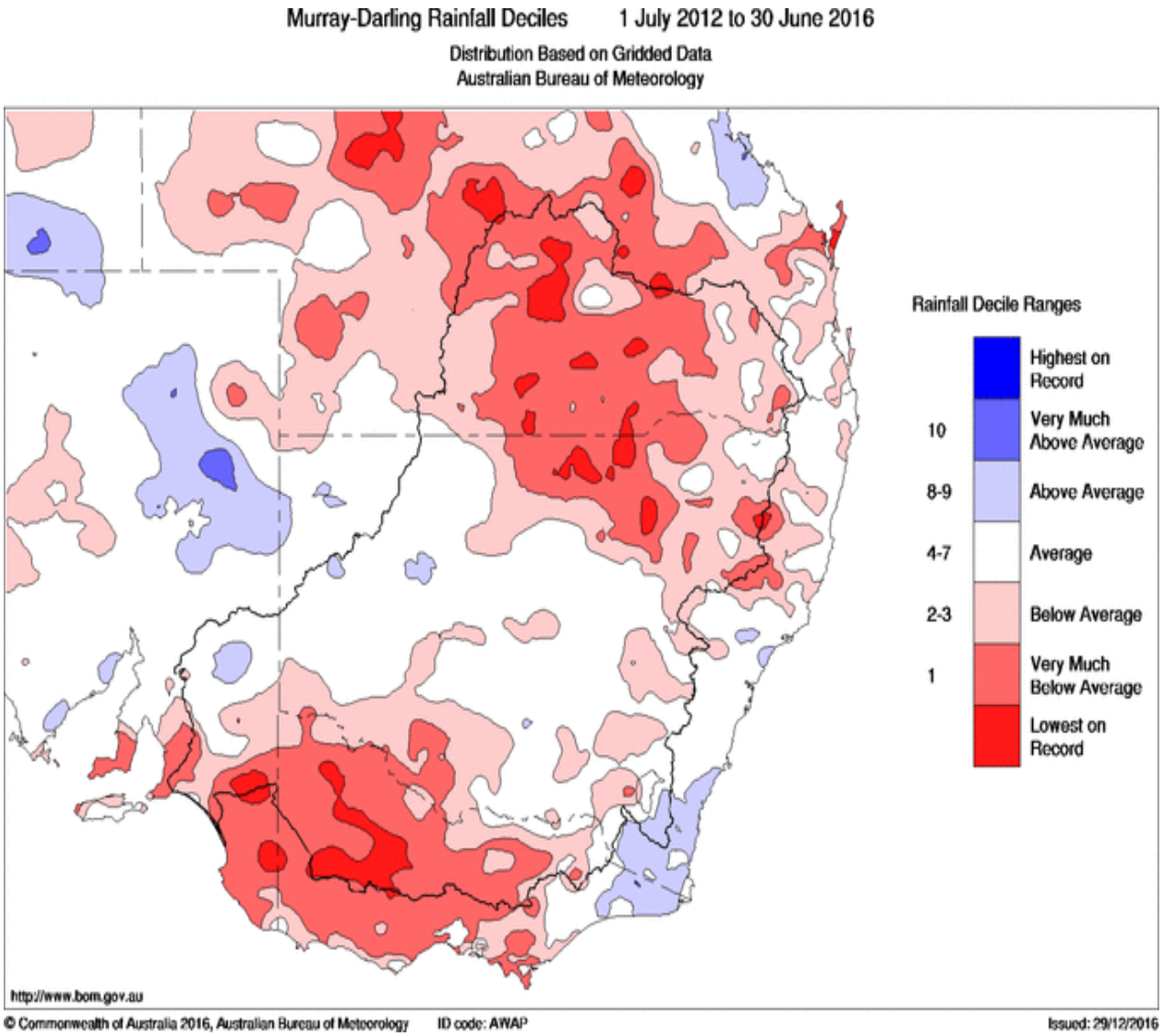


Figure 5 Murray–Darling Basin rainfall deciles highest to lowest on record 2012–13 to 2015–16

4.3.1. 2012–13: Below average rainfall and warmer than average temperatures

Rainfall across most of the Basin was below average during 2012–13, contrasting strongly with the previous two years during which above-average rainfall was recorded across most regions. The annual pattern of rainfall was also more typical of the long-term average for the region with a return to hot and dry weather during the summer months for most of the Basin.

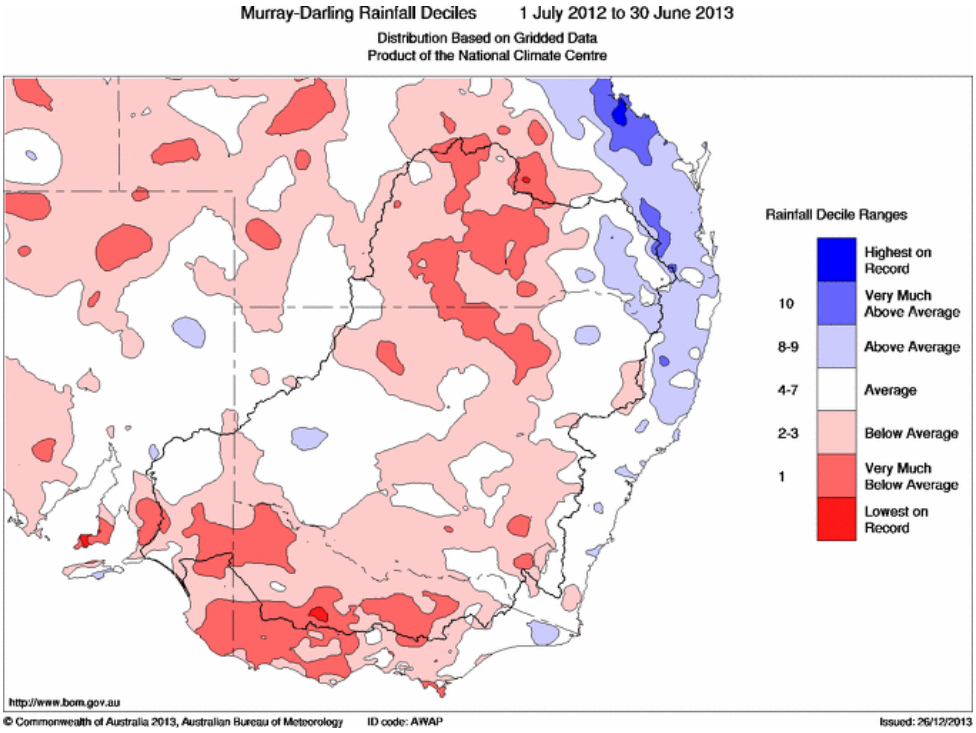


Figure 6 Basin rainfall decile ranges 1 July 2012 to 30 June 2013

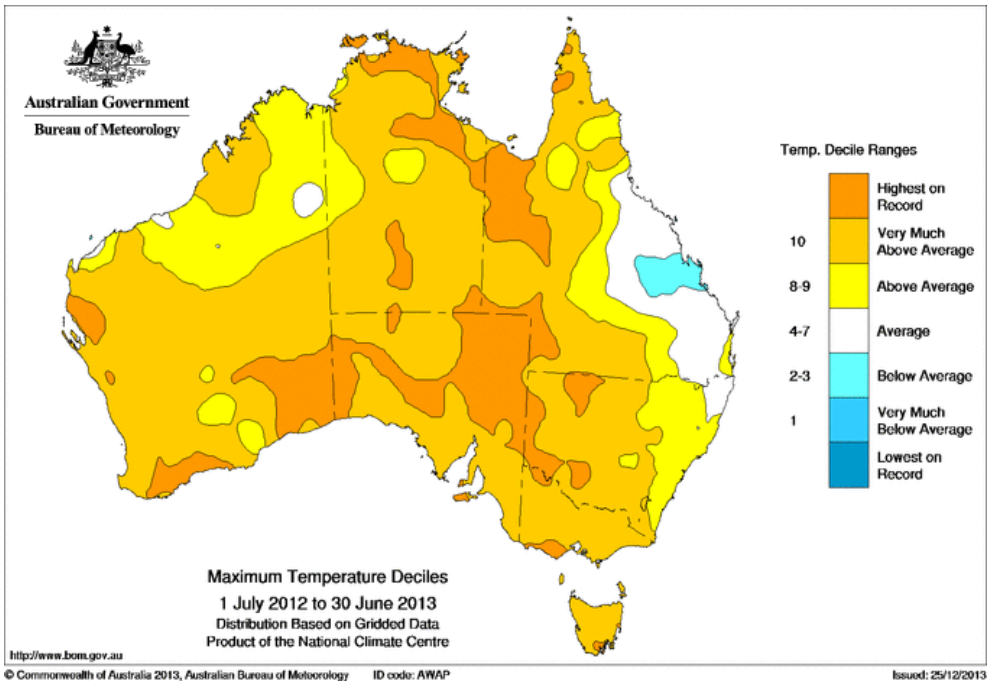


Figure 7 Basin temperature deciles 1 July 2012 to 30 June 2013

There were, however, contrasting extremes during January 2013 when the majority of the Basin experienced a record heat wave accompanied by very low rainfall during what was Australia's hottest month on record at that time. Later in January, torrential rainfall generated by ex-Tropical Cyclone Oswald broke monthly records across parts of the upper Condamine and Border Rivers catchments in the north-eastern Basin.

This event generated major flooding along several Barwon–Darling tributaries during the second half of the 2013 summer. There was remarkably heavy rain at some locations near the New South Wales–Queensland border; although a relatively steep gradient to lighter rain inland of the Great Divide meant that downstream flood peaks and volumes were mostly a lot smaller than those experienced during the Darling system flood events between 2010 and 2012.

Inflows to the River Murray System in 2012–13 broadly followed the long-term seasonal pattern.[18] However, July 2012 inflows were the highest since 1995, and August 2012 inflows were also above the long-term average. Wet catchments in the upper Murray system tributaries prior to the 2012 winter resulted in good responses to rain events during winter. Subsequent drying due to hot weather and low rainfall meant that inflows receded steadily during the spring and summer period and remained largely below long-term averages. During autumn, inflows were generally below average, despite around average total rainfall in the south of the Basin.

Total inflows to the River Murray System for 2012–13 (including inflows to the Menindee Lakes but excluding releases from the Snowy Mountains Scheme) were around 9,600 GL — annual exceedance probability (AEP) of 52%. That is, 52 years in 100 would see higher volumes and therefore close to the long-term median. This figure also includes almost 500 GL of inflows resulting from environmental water releases along tributaries such as the Goulburn and Murrumbidgee Rivers. This water — used mainly for in-channel benefits and to boost flows to South Australia — formed part of the largest ever volume of environmental water released into the River Murray System during a single year.

Total River Murray System active storage levels remained above the long-term average during 2012–13.[19] Active storage was particularly high during October 2012 when the volume reached a peak of 8,750 GL or 102% (note that storage can exceed 100% when Menindee Lakes are surcharged above nominal full supply level). By the end of May 2013, lower than average rainfall and inflows and much higher demands than in previous years, reduced active storage in the River Murray System to around 6,000 GL.

4.3.2. 2013–14: A year of contrast

There was a notable difference in rainfall across the Basin during the 2013–14 water year between the north and north-east — where rainfall was below or very much below average — and central and southern areas, where rainfall was generally average to above average.

The first half of the year was characterised by dry conditions throughout large parts of the Basin, with markedly reduced rainfall in late winter and spring compared to the long-term average. In the

[18] The River Murray System runs from Lake Hume to the barrages in South Australia and includes the lower Darling up to and including Menindee Lakes. It includes Dartmouth Reservoir and Lake Victoria.
[19] Most storages have a total capacity that is the sum of 'dead' storage and 'active' storage. Active storage is the volume that can be release via the Dam outlets. Dead storage is usually the volume that is below the release outlets and is effectively inaccessible.

northern Basin, below-average rainfall continued on throughout January, with particularly low inflows in the headwater catchments of the Darling River. By this time, much of Queensland had had below average rainfall for over two years, and with the driest December in Queensland since 1932, large portions of the state were declared to be in drought conditions.

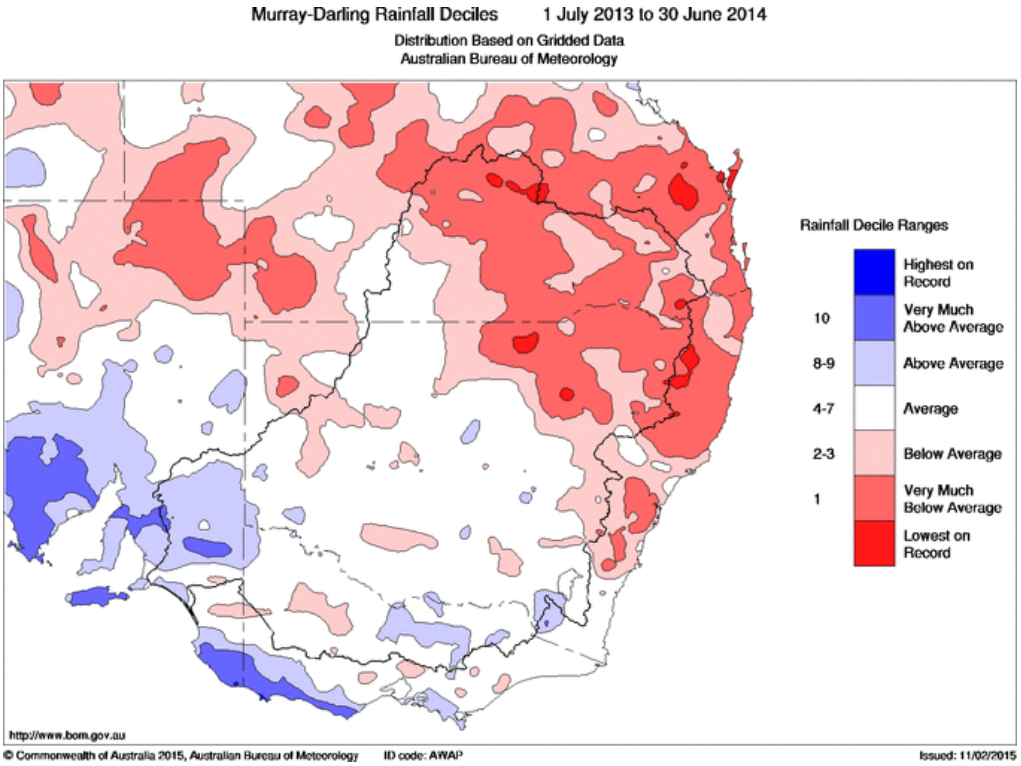


Figure 8 Basin rainfall deciles 1 July 2013 to 30 June 2014

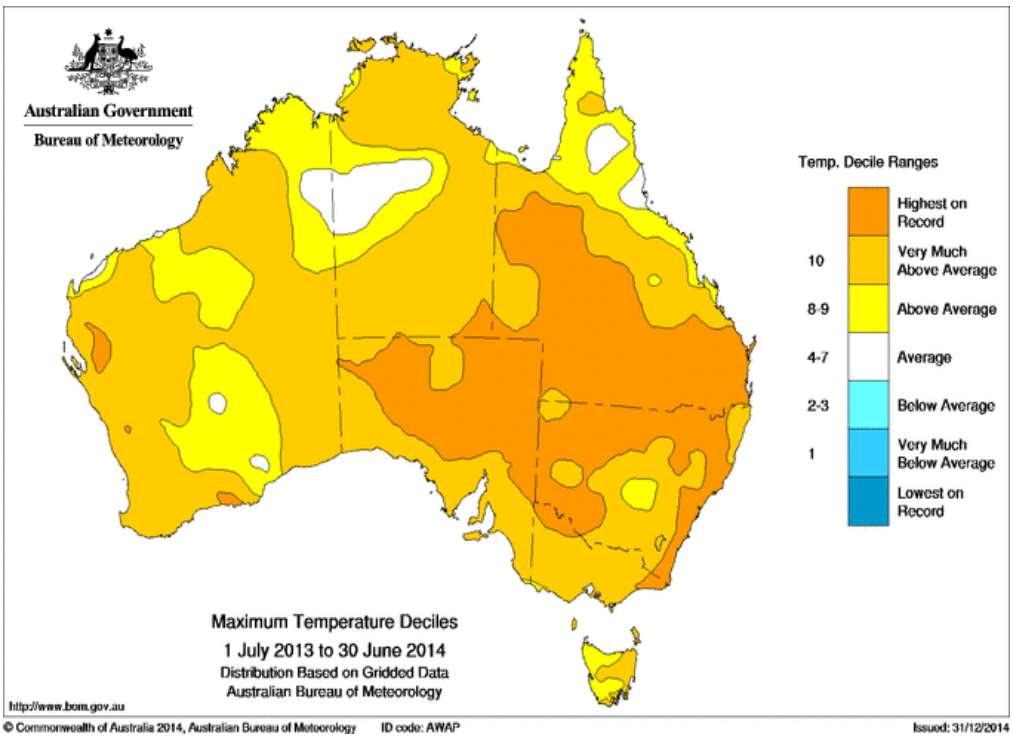


Figure 9 Basin temperature deciles 1 July 2013 to 30 June 2014

In the southern Basin, wetter conditions returned in the second half of the year with many areas experiencing above average rainfall for the period January–June 2014. South Australia and the lower Murray received particularly high rainfall over this period, with a number of significant rainfall events associated with trough systems, many of tropical origin, feeding moisture from the Indian Ocean across south-eastern Australia. One such event in mid-April delivered falls of up to 100 mm of rain right along the length of the River Murray channel. These rain events were the catalyst for a significant drop in irrigation demand that then remained low until the conclusion of the irrigation season in mid-May.

The pattern of inflows into the River Murray System in 2013–14 was broadly similar to that of 2012–13. Wet catchments in the upper Murray system tributaries leading into 2013–14 resulted in high inflows during parts of July and August when good rains fell. A significant portion of these inflows were captured in headwater storages although releases for airspace management were also required as Dartmouth and Hume Reservoirs approached full supply. Downstream flows did not reach minor flood level.

Thereafter, inflows mostly fell away quickly during spring and into summer while the Basin experienced low rainfall and above-average temperatures. There was very hot weather — similar to the previous year — during late spring and early summer, with several weeks of extreme temperatures contributing to high demands and a period that featured some of the highest system losses ever observed. Despite wetter conditions returning to the southern Basin from February onwards, there was only a limited flow response and monthly inflow volumes remained below the long-term average through to the end of May 2014.

Total inflows to the River Murray System for 2013–14 (including inflows to the Menindee Lakes but *excluding* releases from the Snowy Mountains Scheme, Inter-Valley Transfers and environmental water inflows) were low, around 5,800 GL (AEP of 76%).

Total River Murray System active storage levels remained above the long-term average during the first half of 2013–14 but then declined and tracked close to average over the last few months. River Murray System active storage peaked in September 2013 at just below 8,000 GL. Lower than average rainfall and inflows combined with high demands during spring and most of summer combined to reduce active storage in the River Murray System to around 5,000 GL by the end of May 2014. This was around 1,000 GL less than at the same time in 2013, although the volume in storage was beginning to increase again leading into the 2014 winter as catchments were wetting up.

4.3.3. 2014–15: Persisting Dry Conditions

Total inflow to the River Murray System for 2014–15 (including inflows to the Menindee Lakes but excluding releases from the Snowy Mountains Scheme, Inter-Valley Transfers and environmental water inflows) was very low, around 4,350 GL (AEP of 90%).

In July, the headwater catchments received average rainfall whilst the rest of the River Murray System received below average rainfall and inflows. In August, a period of warmer than average temperatures and below-average rainfall began and as a result, inflows receded. August inflows, around 700 GL (AEP of 74%), were very much below the long-term average of 1,580 GL.

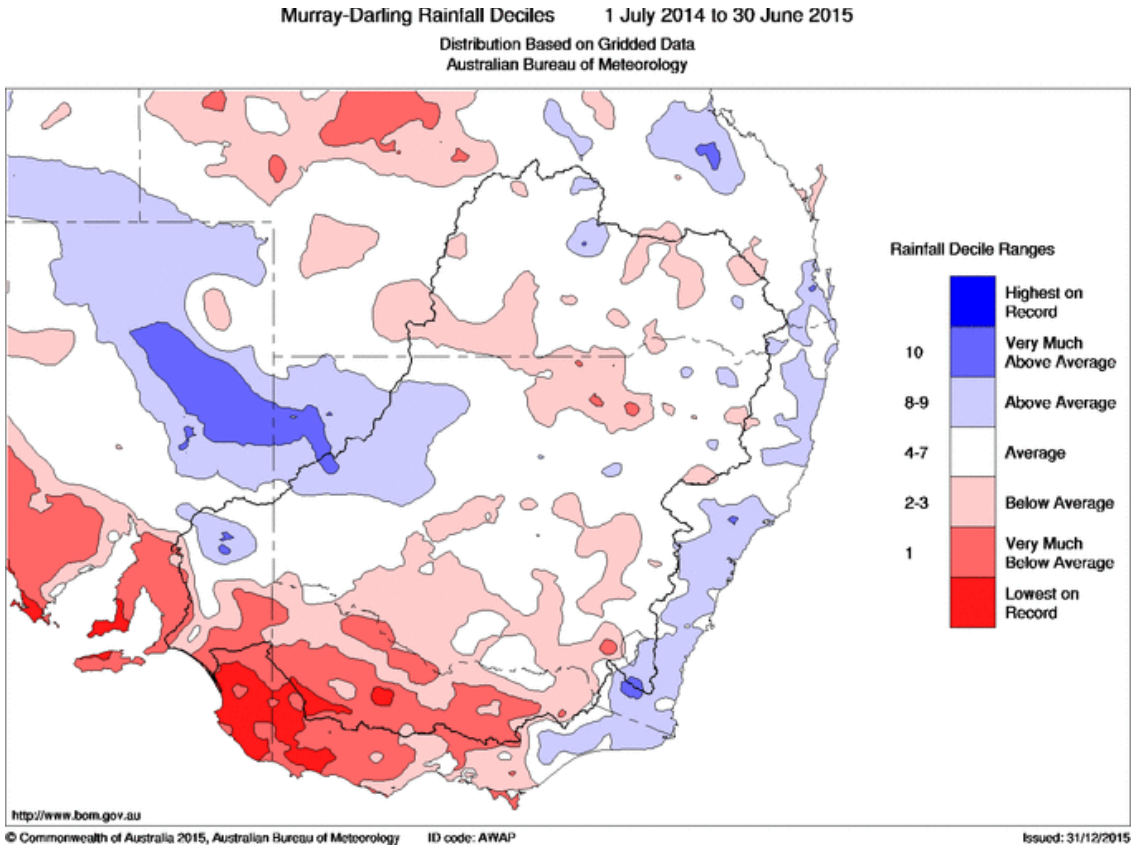


Figure 10 Basin rainfall deciles 1 July 2014 to 30 June 2015

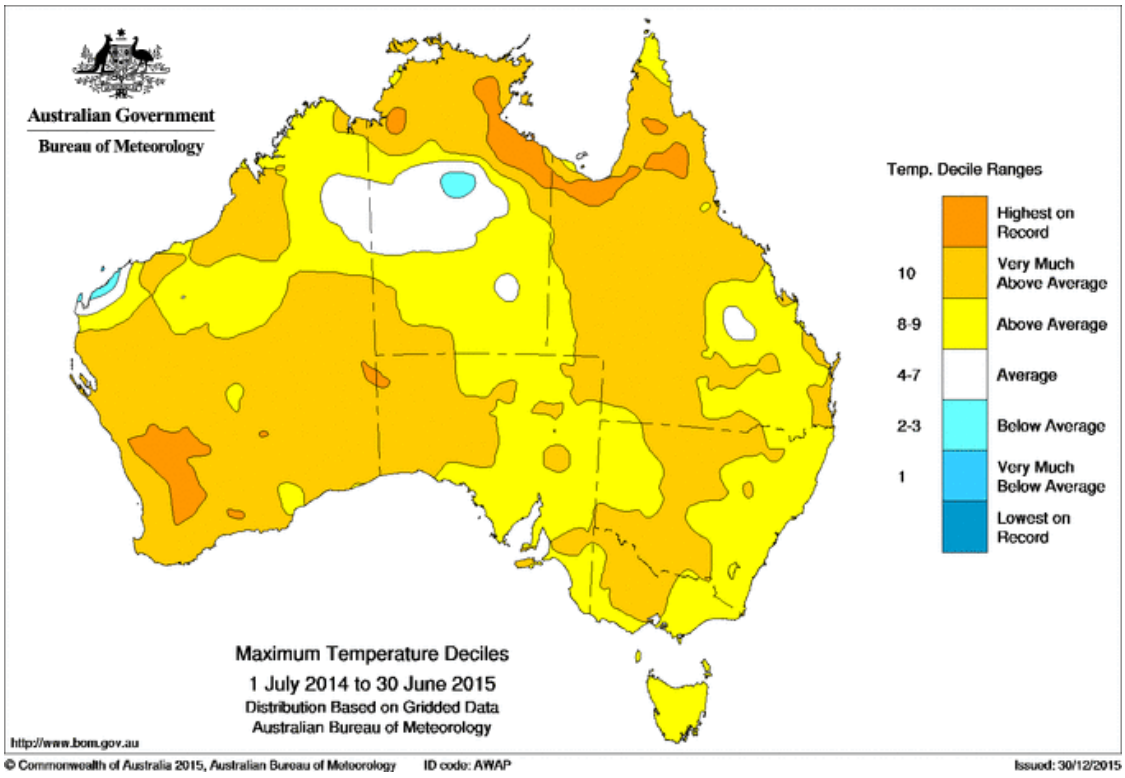


Figure 11 Basin temperature deciles 1 July 2014 to 30 June 2015

In contrast to the south, the northern Basin, in particular the north west of the Basin, received good rainfall in the middle of August with above average, and in some places very much above average, rainfall for the month.

Dry conditions continued through spring and were coupled with record warm temperatures. Inflows continued to recede over spring in contrast to the normal pattern of high inflows for this time of year. Rainfall was below average or very much below average in the northern Basin for October and November 2014.

Overall, the drought continued across affected areas with rainfall across the Basin lower than average, reflected by particularly dry conditions in Victoria (lowest rainfall on record) and a decline of water in storages. Across the northern Basin average to below average rainfall was recorded, except in the lower Darling, where rainfall was above average.

Drought conditions eased slightly in Queensland alongside recorded rainfall very much below the average in the Barwon–Culgoa area.

4.3.4. 2015–16: Positive end-of-year outlook

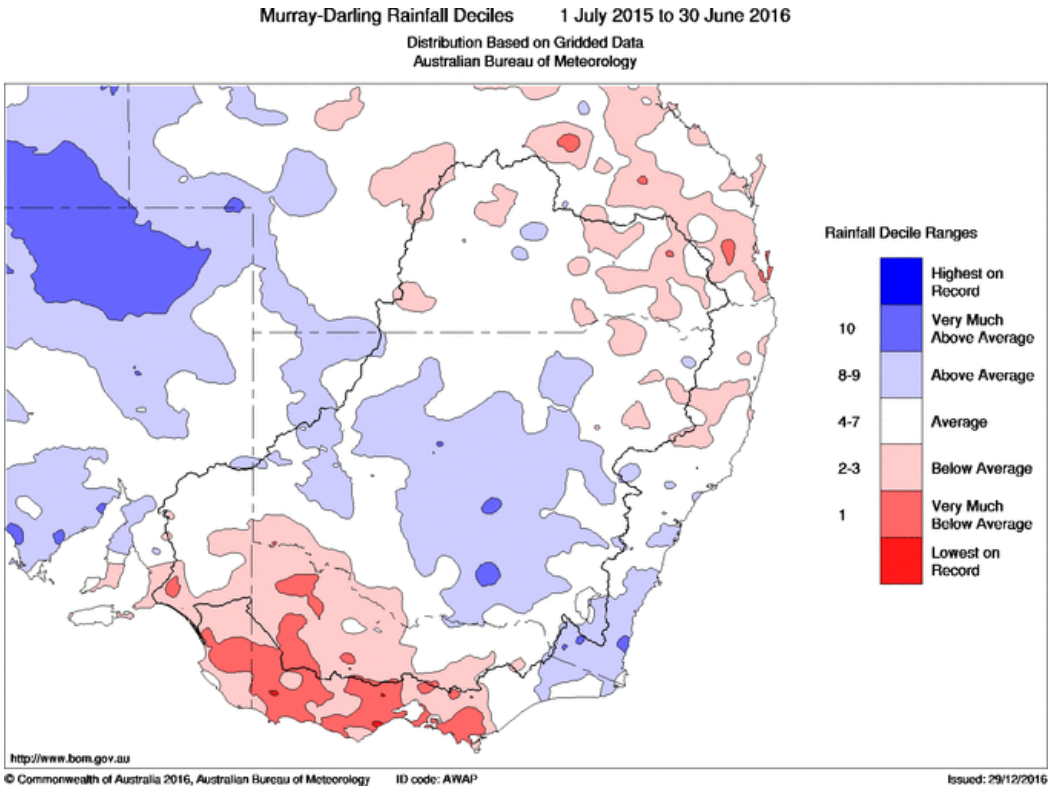


Figure 12 Basin rainfall deciles 1 July 2015 to 30 June 2016

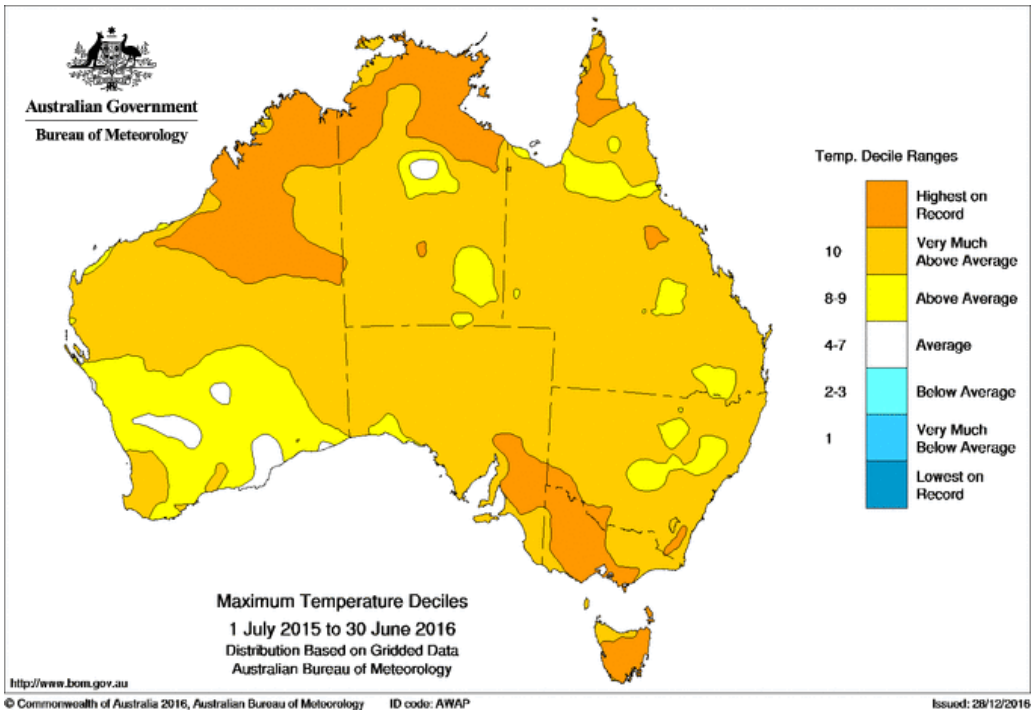


Figure 13 Basin temperature deciles 1 July 2015 to 30 June 2016

By the end of 2015-16, the Murray–Darling Basin had received rainfall that was generally close to or just below average. Initially, the distribution of rainfall was similar to 2014–15, including well below average rainfall across the northern Victorian catchments which flow into the River Murray. The upper Murray region, which provides runoff into the major headwater storages of Dartmouth and Hume, experienced generally below average rainfall. In the northern Basin, the upper Darling catchments received generally average to below average rainfall for the year, with many locations in south-east Queensland still in drought conditions following three consecutive failed summer wet seasons.

Temperatures were well above average throughout the Basin in 2015–16. Of particular note were those areas that recorded the highest mean temperatures on record including much of the upper Murray region, the northern Victoria catchments, along the River Murray, northwest New South Wales, and southwest Queensland.

The relatively dry and warm conditions observed in south-east Australia during 2015–16 were in part due to one of the strongest El Niño events on record, comparable with those of 1982–83 and 1997–98. El Niño conditions persisted well into 2016, with sea surface temperatures in the tropical Pacific only cooling to neutral levels in May. As is often observed in El Niño years, there were significantly fewer tropical cyclones in 2015–16, with only three named tropical cyclones developing in the region and only one crossing the coast in Western Australia. This was the least active tropical cyclone season since reliable records began in the 1950s. This had a significant impact on rainfall in the northern Basin during the monsoon season (usually November to April).

Consecutive years of below average rainfall and above average temperatures contributed to a decline in lower level soil moisture throughout large parts of the Murray–Darling Basin, in particular in northern Victoria and south-east Queensland. This catchment condition meant that even though parts of the River Murray system received average rainfall in 2015–16, the runoff was often relatively low as much of the rainfall soaked into the soil or evaporated in a dry landscape instead of flowing into storages.

There was a distinct change to wetter conditions from May 2016 across the entire Basin. Large parts of all states experienced above average rainfall, and parts of central New South Wales experienced the highest-ever recorded winter rainfall.

Total inflow to the River Murray System for 2015–16 (including inflows to the Menindee Lakes but excluding releases from the Snowy Mountains Scheme, Inter-Valley Transfers and environmental water inflows) was very low, around 3,120 GL (AEP of 92%). With minimal inflows to Menindee Lakes, River Murray System inflows (excluding Snowy Scheme, Darling River, Inter-Valley Trades and managed environmental inflows) contributed almost all of the inflows to the Murray during 2015–16 totalling around 3,040 GL (91% AEP).

4.3.5. Water in storages

Storages within the Basin followed the broad climate trends, with higher levels seen in 2012–13 before dry conditions lead to higher demand and low inflows later in the reporting period. Water storage levels in the Basin finished June 2016 at 8,754 GL, or 39% of total capacity. This is 611 GL less than at 30 June 2015.

Table 11 Percentage volumes in storage as at 30 June in the northern and southern Basin over the period 2012–13 to 2015–16

	Northern Basin	Southern Basin
June 2012	83%	57%
June 2013	65%	73%
June 2014	30%	65%
June 2015	23%	47%
June 2016	24%	41%

In the southern Basin, River Murray System active storage started 2015–16 with 3,780 GL spread across Dartmouth Reservoir, Hume Reservoir and Lake Victoria. As at 31 May 2016, the active storage volume was 2,540 GL (30% capacity), which was about 2,500 GL less than the long-term average for the end of the water year.

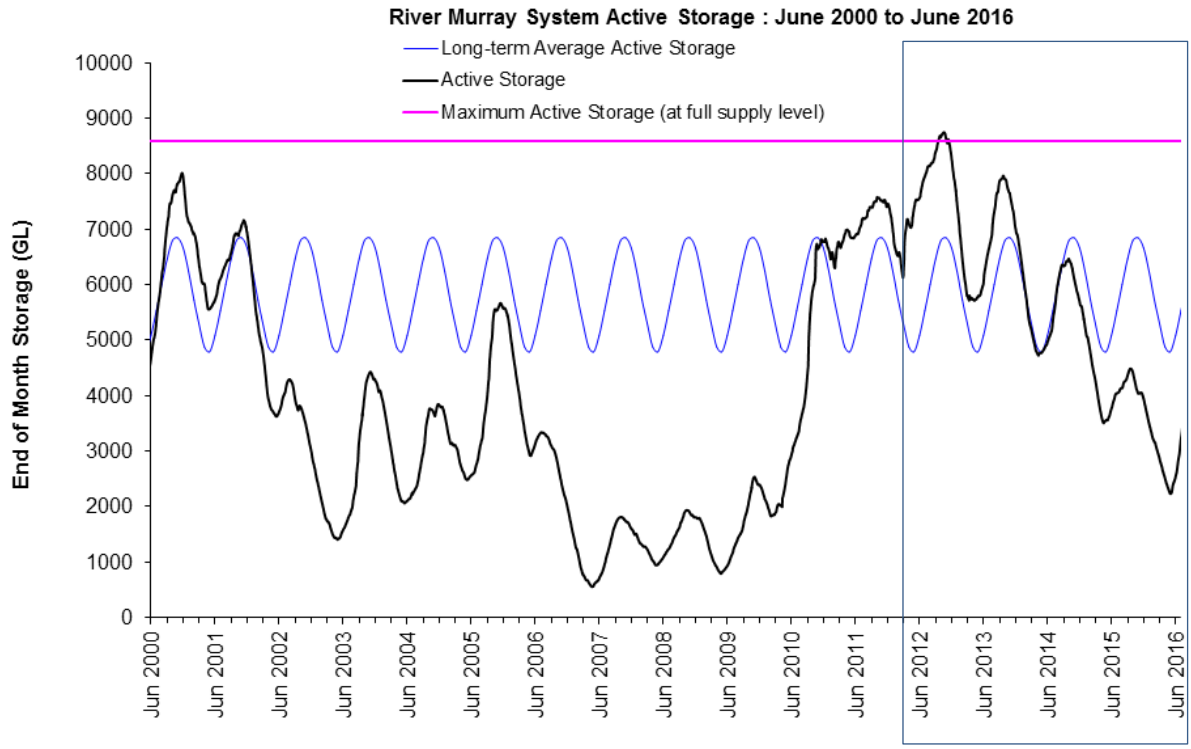


Figure 14 River Murray System active storage volumes for the period June 2000 to June 2016. Graph shows the sum of active storage in Dartmouth and Hume Reservoirs, Lake Victoria and the Menindee Lakes Storage

5. Annual actual take 2012–13 to 2015–16

5.1. Actual take

s.71(1)(c) the quantity of water actually taken from the water resources of the water resource plan area during the water accounting period

This section provides information on the reported quantity of water actually taken throughout the Basin at the SDL resource unit level. Appendix 1 and Appendix 2 set out the combined total reported volumes of transitional actual take by all forms of take at SDL resource unit level for surface water and groundwater respectively. Table 13 to Table 16 list reported actual take by each form of surface water take at the SDL resource unit scale.

'Actual take' refers to water *recorded* as being removed from rivers, dams, storages, floodplains, groundwater systems and net take by commercial plantations. Actual take relates only to consumptive use and does not include water used for environmental purposes. Part 3 of this report provides information on the use of held environmental water.

The inclusion of forms of take in the SDL framework that have not to date been part of the Cap arrangements is one of the key water management and accounting challenges facing Basin states and the MDBA during the transition period. This is because historically, these forms of take have not been routinely or consistently estimated, modelled or measured.

This report documents progress to date in developing methods for reporting on annual actual take for all forms of take set out in the Basin Plan. For both surface water and groundwater, progressively more detailed data on actual take has been reported each year.

Depending on the year in question, up to 30% of the reported annual actual take is based on the long-term average estimates used in the Basin Plan or alternative estimates provided by Basin states. The MDBA and Basin states are using the transition period and beyond to improve the arrangements for monitoring and reporting on these forms of take (i.e. take by interceptions).

For example, commencing in 2013–14, the Australian Capital Territory introduced improvements in annual reporting by including diversions from Lake Burley Griffin (LBG) and water use from surviving allocations. This is an important achievement that aligns with the Basin Plan which requires any water taken from Basin water resources to be accounted for.

Also, commencing from 2014–15, Queensland has been reporting annual actual take volumes for floodplain harvesting as discrete volumes rather than a volume combined with take by runoff dams.

New South Wales has reported discrete long-term estimates of actual take under basic rights as determined under the relevant water sharing plan.

During the transition period, no compliance consequences apply if there is an instance where the cumulative balance of differences between actual and permitted take is a debit of 20% or more of the relevant surface water or groundwater TDL. However, these instances may inform the development of water resource plans including accredited methods for determining permitted take. They may also form contextual information that the MDBA considers when assessing those methods.

5.1.1. Variability of actual take between years

As discussed in section 3.1.3 it is anticipated that annual actual take will fluctuate from year to year based around water availability and water use decisions taken by water entitlement holders. Those water use decisions are generally influenced by:

- the water needs of current crops and/or planned plantings
- commodity and water prices and opportunities to trade
- overall water availability — water in storage, tributary inflows, in-crop rainfall
- annual allocations to entitlements and the timing of such allocations
- the conditions on entitlements — such as annual use limits or commence-to-pump triggers
- access to carryover
- the ability to purchase additional allocation.

The same area of a particular crop (annual or permanent) can have different water needs over a season or between seasons depending on climate conditions. This will influence water take decisions over the course of a water year. For example hot, dry and windy conditions will mean higher volumes of actual water take to meet crop needs, while good in-crop rainfall at the right times can significantly reduce actual water take.

While permitted take methodologies attempt to explain as much of the inter-annual variation as possible (e.g. through relating use to climatic conditions and water availability), it is not always possible to fully explain such variations and thus ‘unders’ and ‘overs’ are expected and a cumulative balance is used.

Further information about the differences between volumes of water authorised for use and annual permitted take is provided at section 7.1.

5.1.2. Annual actual take and the National Water Accounts (Bureau of Meteorology)

Water take in the Murray–Darling Basin is also reported by the Bureau of Meteorology as part of their work in preparing National Water Accounts (refer http://www.bom.gov.au/water/nwa/2016/).

The reported water take in the Basin differs between this report and that published by the Bureau due to different approaches being adopted in terms of how the data is collated. The data presented in this report is consistent with the definitions and reporting units established by the Basin Plan; in particular the way the SDLs have been specified and the way water recovery amounts have been quantified. These accounts provide the basis for the Register of Take required under the Basin Plan and the compliance arrangements that will apply from 2019.

The volumes reported in the National Water Accounts (NWA) differ from the volumes reported here for several reasons including:

- NWA does not include take by interceptions;
- NWA presents data at a gross level for each component of reported take, where the MDBA presents this as a net take. For some SDL resource units, such as the ACT, actual take is net of any diversions returned to the river;
- NWA includes some minor adjustments where other data is reported from another agency for the purposes of the NWA. For example different volumes for basic rights are used;

- NWA determines the take in Victoria for the Goulburn at the farm gate, rather than from the river. MDBA accounts for Goulburn diversions to the Waranga Western Chanel at the river, before water is provided to irrigation districts in the Campaspe and Loddon. The movement of water from the Goulburn to these irrigation areas is for Goulburn entitlements.

5.2. Surface water annual actual take

Appendix 1 (column headed ‘s6.10, s10.10, s10.15: Annual data: Actual take GL/y’) sets out total reported combined annual actual take by all forms of take for each SDL resource unit and Table 13 to Table 16 list reported annual actual take for each form of surface water take for each SDL resource unit.

The actual take reported under SDL accounting is higher than that published in the Cap Register (Table 6) as the SDL accounting includes water course diversions for areas previously not included, interception activities, basic rights and floodplain harvesting in NSW. On average over the four years of this reporting period, actual take is 2,840 GL higher as a result of this inclusion.

The reporting period saw surface water availability decrease as each year was generally drier than the preceding year. As a consequence, available water in storage declined as did inflows. The use of trade increased over the reporting period as entitlement holders sought to maximise the volume of water they had available for use.

Section 6 provides further detail on general water availability, allocations and trade over the reporting period. At a Basin scale, surface water annual actual take during the trial was less than annual permitted take in each year of the reporting period.

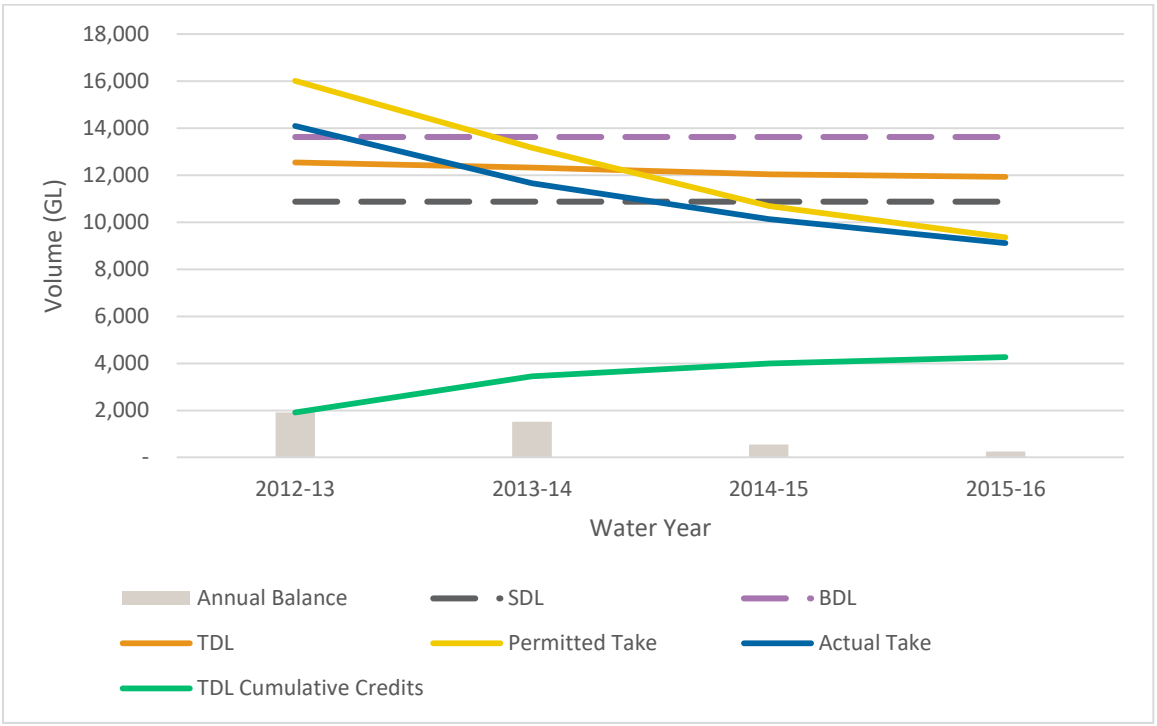


Figure 15 Basin scale surface water transitional diversion limit, annual permitted take, annual actual take, annual credits and adjusted cumulative balance 2012–13 to 2015–16

Table 12 sets out the annual volumes for permitted take, actual take, annual credits/debits and the transitional cumulative balances for each Basin State over the reporting period (noting that the credits/debits and transitional cumulative balance are for the purposes of the trial only and that the formal balance commences at 0 GL once the SDLs come into effect in 2019).

Table 13 to Table 16 set out the reported volumes of actual take (measured and estimated) for each form of surface water take at the SDL resource unit scale. Where actual take reported in these tables has been determined through the use of a long-term average estimate used in the Basin Plan, this is indicated through the use of shading. The relative proportions of actual take reported by Basin states using measured volumes (i.e. metered) or alternative estimates to those used in the Basin Plan is also shown in these tables.

Table 12 Basin and state scale surface water permitted take, actual take, annual credits and transitional adjusted cumulative balance (all in GL) 2012–13 to 2015–16

	2012–13				2013–14				2014–15				2015–16			
	Permitted take	Actual take	Annual credit	Cumul. balance	Permitted take	Actual take	Annual credit	Cumul. balance	Permitted take	Actual take	Annual credit	Cumul. balance	Permitted take	Actual take	Annual credit	Cumul. balance
Qld	2,322.5	1,931.2	391.3	391.3	1,304.7	1,282.2	22.5	413.8	1,078.9	979.8	99.2	513.0	956.0	871.4	84.6	597.6
NSW	9,318.6	8,148.8	1,169.8	1,175.8	7,566.1	6,891.6	674.5	1,882.6	5,497.2	5,560.7	-63.5	1,814.0	4,990.2	4,649.4	340.8	2,156.9
ACT	57.3	30.7	26.6	26.6	57.2	30.8	26.5	53.1	55.4	29.0	26.4	79.5	56.7	32.1	24.6	104.1
Vic	3,700.5	3,430.6	269.9	275.8	3,727.0	2,978.0	749.0	1,028.9	3,503.3	3,039.7	463.6	1,494.4	2,676.7	2,942.0	-265.4	1,251.4
SA	612.3	551.6	60.7	48.6	512.6	473.6	39.0	76.5	550.5	526.7	23.8	99.2	680.2	615.0	65.2	160.5
Basin	**16,011.1**	**14,092.8**	**1,918.4**	**1,918.1**	**13,167.7**	**11,656.1**	**1,511.6**	**3,455.0**	**10,685.3**	**10,135.8**	**549.5**	**4,000.1**	**9,359.8**	**9,109.9**	**249.9**	**4,270.5**

Table 13 Surface water annual actual take (GL) by different forms of take and the level of certainty for each SDL resource unit, water year 2012–13*

	Take from watercourses and regulated rivers	Take by floodplain harvesting	Take under basic rights	Net take by commercial plantation	Take by runoff dams	Total	% take annually reported**
Queensland							
Paroo	0.03	0.00	-	0.00	9.70	9.73	0%
Warrego	2.67	0.00	-	0.00	83.00	85.67	3%
Nebine	0.00	0.00	-	0.00	25.00	25.00	0%
Condamine–Balonne	729.36	275.42	-	1.00	264.00	1,269.78	79%
Moonie	30.62	3.00	-	0.00	51.00	84.62	40%
Queensland Border Rivers	218.88	159.49	-	1.00	77.00	456.37	83%
Queensland total	**981.56**	**437.91**	**0.00**	**2.00**	**509.70**	**1,931.17**	**74%**
New South Wales							
NSW Border Rivers	220.60	2.95	9.89	0.00	95.00	328.44	67%
Intersecting Streams	3.31	-	2.46	-	111.00	116.77	3%
Gwydir	424.63	17.80	8.01	1.00	124.00	575.44	74%
Namoi	399.81	13.99	4.72	5.00	160.00	583.52	69%
Macquarie–Castlereagh	456.43	0.00	7.11	44.00	266.00	773.54	59%
Lachlan	343.23	0.00	5.61	29.00	287.00	664.84	52%
Murrumbidgee	2,282.60	-	6.08	116.00	385.00	2,789.68	82%
Barwon–Darling Watercourse	189.31	11.49	0.82	-	-	201.62	94%
Lower Darling	94.63	-	2.49	0.00	5.50	102.62	92%
NSW Murray	1,905.27	-	3.07	24.00	80.00	2,012.34	95%
New South Wales total	**6,319.82**	**46.23**	**50.26**	**219.00**	**1,513.50**	8,148.81	78%
Australian Capital Territory							
Australian Capital Territory (Surface water)	**18.66**	**-**	**-**	**11.00**	**1.00**	**30.66**	**61%**
Victoria							
Victorian Murray	1,647.42	-	-	22.00	23.00	1,692.42	97%
Kiewa	6.72	-	-	7.00	6.60	20.32	33%
Ovens	20.12	-	-	32.00	26.00	78.12	26%
Broken	12.21	-	-	13.00	30.00	55.21	22%
Goulburn	1,153.52	-	-	23.00	86.00	1,262.52	91%
Campaspe	42.56	-	-	1.00	39.00	82.56	52%
Loddon	69.74	-	-	5.00	85.00	159.74	44%
Wimmera–Mallee (surface water)	17.66	-	-	1.00	61.00	79.66	22%
Victoria total	**2,969.95**	**0.00**	**0.00**	**104.00**	**356.60**	**3,430.55**	**87%**
South Australia							
South Australian Murray	522.09	-	-	-	-	522.09	100%
South Australian Non-Prescribed Areas	0.00	-	-	-	3.50	3.50	0%
Marne Saunders	0.04	-	-	0.00	2.12	2.16	100%
Eastern Mount Lofty Ranges	10.49	-	-	3.20	10.18	23.87	87%
South Australia total	**532.62**	**0.00**	**0.00**	**3.20**	**15.80**	**551.62**	**97%**
Basin total	**10,822.61**	**484.14**	50.26	**339.20**	**2,396.60**	14,092.81	81%
Proportion of combined total take	**76.78%**	**3.43%**	0.36%	**2.41%**	**17.00%**	**100%**	
% Take annually reported	**100.00%**	**90.45%**	**0.00%**	**0.00%**	**0.51%**		
% Based on long-term average	**0.00%**	**9.55%**	**100.00%**	**100.00%**	**99.45%**		

*Note: Shaded cells represent long-term average estimates

** Proportion of data that is reported using annual volumes and not long term average estimates

Table 14 Surface water annual actual take (GL) by different forms of take and the level of certainty for each SDL resource unit, water year 2013-14*

	Take from watercourses and regulated rivers	Take by floodplain harvesting	Take under basic rights	Net take by commercial plantation	Take by runoff dams	Total	% Take annually reported**
Queensland							
Paroo	0.04	0.00	-	0.00	9.70	9.74	0%
Warrego	0.80	0.00	-	0.00	83.00	83.80	1%
Nebine	0.00	0.00	-	0.00	25.00	25.00	0%
Condamine–Balonne	413.37	197.69	-	1.00	264.00	876.06	70%
Moonie	12.86	0.00	-	0.00	51.00	63.86	20%
Queensland Border Rivers	135.87	9.84	-	1.00	77.00	223.71	65%
Queensland total	**562.94**	**207.53**	**0.00**	**2.00**	**509.70**	**1,282.17**	**60%**
New South Wales							
NSW Border Rivers	192.40	2.95	9.89	0.00	95.00	300.24	64%
Intersecting Streams	3.31	-	2.46	-	111.00	116.77	3%
Gwydir	420.66	17.80	8.01	1.00	124.00	571.47	74%
Namoi	405.49	13.99	4.72	5.00	160.00	589.20	69%
Macquarie–Castlereagh	292.13	0.00	7.11	44.00	266.00	609.24	48%
Lachlan	240.73	0.00	5.61	29.00	287.00	562.34	43%
Murrumbidgee	1,833.59	-	6.08	116.00	385.00	2,340.67	78%
Barwon–Darling Watercourse	78.45	11.49	0.82	-	-	90.76	86%
Lower Darling	101.56	-	2.49	0.00	5.50	109.55	93%
NSW Murray	1,494.29	-	3.07	24.00	80.00	1,601.36	93%
New South Wales total	**5,062.61**	**46.23**	**50.26**	**219.00**	**1,513.50**	6,891.60	73%
Australian Capital Territory							
Australian Capital Territory (Surface water)	**18.76**	**-**	**-**	**11.00**	**1.00**	**30.76**	**61%**
Victoria							
Victorian Murray	1,290.48	-	-	22.00	23.00	1,335.48	97%
Kiewa	2.62	-	-	7.00	6.60	16.22	16%
Ovens	17.60	-	-	32.00	26.00	75.60	23%
Broken	11.87	-	-	13.00	30.00	54.87	22%
Goulburn	1,118.28	-	-	23.00	86.00	1,227.28	91%
Campaspe	25.87	-	-	1.00	39.00	65.87	39%
Loddon	35.13	-	-	5.00	85.00	125.13	28%
Wimmera–Mallee (surface water)	15.52	-	-	1.00	61.00	77.52	20%
Victoria total	**2,517.37**	**0.00**	**0.00**	**104.00**	**356.60**	**2,977.97**	**85%**
South Australia							
South Australian Murray	442.85	-	-	-	-	442.85	100%
South Australian Non-Prescribed Areas	0.00	-	-	-	3.50	3.50	0%
Marne Saunders	0.06	-	-	0.00	2.13	2.19	100%
Eastern Mount Lofty Ranges	11.67	-	-	3.20	10.20	25.07	87%
South Australia total	**454.58**	**0.00**	**0.00**	**3.20**	**15.83**	**473.61**	**96%**
Basin total	**8,616.26**	**253.76**	50.26	**339.20**	**2,396.63**	11,656.11	77%
Proportion of combined total take	**73.90%**	**2.18%**	0.43%	**2.91%**	**20.56%**	**100%**	
% Take annually reported	**100.00%**	**81.78%**	**0.00%**	**0.00%**	**0.51%**		
% Based on long-term average	**0.00%**	**18.22%**	**100.00%**	**100.00%**	**99.44%**		

*Note: Shaded cells represent long-term average estimates

** Proportion of data that is reported using annual volumes and not long term average estimates

Table 15 Surface water annual actual take (GL) by different forms of take and the level of certainty for each SDL resource unit, water year 2014-15*

	Take from watercourses and regulated rivers	Take by floodplain harvesting	Take under basic rights	Net take by commercial plantation	Take by runoff dams	Total	% Take annually reported**
Queensland							
Paroo	0.01	0.00	-	0.00	9.70	9.71	0%
Warrego	7.27	0.00	-	0.00	83.00	90.27	8%
Nebine	0.08	0.00	-	0.00	25.00	25.08	0%
Condamine–Balonne	343.94	10.15	-	1.00	264.00	619.09	57%
Moonie	3.72	0.00	-	0.00	51.00	54.72	7%
Queensland Border Rivers	102.90	0.00	-	1.00	77.00	180.90	57%
Queensland total	**457.92**	**10.15**	**0.00**	**2.00**	**509.70**	**979.77**	**48%**
New South Wales							
NSW Border Rivers	62.66	2.95	9.89	0.00	95.00	170.50	37%
Intersecting Streams	3.31	-	2.46	-	111.00	116.77	3%
Gwydir	140.56	17.80	8.01	1.00	124.00	291.37	48%
Namoi	188.34	13.99	4.72	5.00	160.00	372.05	51%
Macquarie–Castlereagh	114.49	0.00	7.11	44.00	266.00	431.60	27%
Lachlan	187.79	0.00	5.61	29.00	287.00	509.40	37%
Murrumbidgee	1,688.61	-	6.08	116.00	385.00	2,195.69	77%
Barwon–Darling Watercourse	31.68	11.49	0.82	-	-	43.99	72%
Lower Darling	41.90	-	2.49	0.00	5.50	49.89	84%
NSW Murray	1,272.42	-	3.07	24.00	80.00	1,379.49	92%
New South Wales total	**3,731.76**	**46.23**	**50.26**	**219.00**	**1,513.50**	5,560.75	67%
Australian Capital Territory							
Australian Capital Territory (Surface water)	**16.99**	**-**	**-**	**11.00**	**1.00**	**28.99**	**59%**
Victoria							
Victorian Murray	1,375.66	-	-	22.00	23.00	1,420.66	97%
Kiewa	5.81	-	-	7.00	6.60	19.41	30%
Ovens	18.34	-	-	32.00	26.00	76.34	24%
Broken	14.98	-	-	13.00	30.00	57.98	26%
Goulburn	1,080.81	-	-	23.00	86.00	1,189.81	91%
Campaspe	35.05	-	-	1.00	39.00	75.05	47%
Loddon	29.09	-	-	5.00	85.00	119.09	24%
Wimmera–Mallee (surface water)	19.34	-	-	1.00	61.00	81.34	24%
Victoria total	**2,579.08**	**0.00**	**0.00**	**104.00**	**356.60**	**3,039.68**	**85%**
South Australia							
South Australian Murray	500.87	-	-	-	-	500.87	100%
South Australian Non-Prescribed Areas	0.00	-	-	-	3.50	3.50	0%
Marne Saunders	0.10	-	-	0.00	2.25	2.35	100%
Eastern Mount Lofty Ranges	7.84	-	-	3.20	8.89	19.93	84%
South Australia total	**508.81**	**0.00**	**0.00**	**3.20**	**14.64**	**526.65**	**97%**
Basin total	**7,294.56**	**56.38**	50.26	**339.20**	**2,395.44**	10,135.84	73%
Proportion of total combined take	**71.95%**	**0.56%**	0.50%	**3.35%**	**23.63%**	**100%**	
% Take annually reported	**100.00%**	**18.00%**	**0.00%**	**0.00%**	**0.47%**		
% Based on long-term average	**0.00%**	**82.00%**	**100.00%**	**100.00%**	**99.49%**		

*Note: Shaded cells represent long-term average estimates

** Proportion of data that is reported using annual volumes and not long term average estimates

Table 16 Surface water annual actual take (GL) by different forms of take and the level of certainty for each SDL resource unit, water year 2015-16*

	Take from watercourses and regulated rivers	Take by floodplain harvesting	Take under basic rights	Net take by commercial plantation	Take by runoff dams	Total	% Take annually reported**
Queensland							
Paroo	0.00	0.00	-	0.00	9.70	9.70	0%
Warrego	2.92	0.00	-	0.00	83.00	85.92	3%
Nebine	1.40	0.00	-	0.00	25.00	26.40	5%
Condamine–Balonne	207.63	57.55	-	1.00	264.00	530.18	50%
Moonie	0.78	0.00	-	0.00	51.00	51.78	2%
Queensland Border Rivers	87.45	2.00	-	1.00	77.00	167.45	53%
Queensland total	**300.18**	**59.55**	**0.00**	**2.00**	**509.70**	**871.43**	**41%**
New South Wales							
NSW Border Rivers	114.58	2.95	9.89	0.00	95.00	222.42	52%
Intersecting Streams	3.31	-	2.46	-	111.00	116.77	3%
Gwydir	120.62	17.80	8.01	1.00	124.00	271.43	44%
Namoi	164.31	13.99	4.72	5.00	160.00	348.02	47%
Macquarie–Castlereagh	131.46	0.00	7.11	44.00	266.00	448.57	29%
Lachlan	166.53	0.00	5.61	29.00	287.00	488.14	34%
Murrumbidgee	1,321.02	-	6.08	116.00	385.00	1,828.10	72%
Barwon–Darling Watercourse	75.66	11.49	0.82	-	-	87.97	86%
Lower Darling	8.49	-	2.49	0.00	5.50	16.48	52%
NSW Murray	714.39	-	3.07	24.00	80.00	821.46	87%
New South Wales total	**2,820.37**	**46.23**	**50.26**	**219.00**	**1,513.50**	4,649.36	61%
Australian Capital Territory							
Australian Capital Territory (Surface water)	**20.10**	**-**	**-**	**11.00**	**1.00**	**32.10**	**63%**
Victoria							
Victorian Murray	1,318.94	-	-	22.00	23.00	1,363.94	97%
Kiewa	6.15	-	-	7.00	6.60	19.75	31%
Ovens	16.66	-	-	32.00	26.00	74.66	22%
Broken	10.76	-	-	13.00	30.00	53.76	20%
Goulburn	1,045.46	-	-	23.00	86.00	1,154.46	91%
Campaspe	39.28	-	-	1.00	39.00	79.28	50%
Loddon	24.34	-	-	5.00	85.00	114.34	21%
Wimmera–Mallee (surface water)	19.82	-	-	1.00	61.00	81.82	24%
Victoria total	**2,481.41**	**0.00**	**0.00**	**104.00**	**356.60**	**2,942.01**	**84%**
South Australia							
South Australian Murray	597.47	-	-	-	-	597.47	100%
South Australian Non-Prescribed Areas	0.00	-	-	-	3.50	3.50	0%
Marne Saunders	0.00	-	-	0.00	2.02	2.02	100%
Eastern Mount Lofty Ranges	1.60	-	-	3.20	7.21	12.01	73%
South Australia total	**599.07**	**0.00**	**0.00**	**3.20**	**12.73**	**615.00**	**97%**
Basin total	**6,221.13**	**105.78**	50.26	**339.20**	**2,393.53**	9,109.90	70%
Proportion of combined total take	**68.27%**	**1.16%**	0.55%	**3.72%**	**26.27%**	**100%**	
% Take annually reported	**100.00%**	**56.30%**	**0.00%**	**0.00%**	**0.39%**		
% Based on long-term average	**0.00%**	**43.70%**	**100.00%**	**100.00%**	**99.57%**		

*Note: Shaded cells represent long-term average estimates

** Proportion of data that is reported using annual volumes and not long term average estimates

5.2.1. Proportions of surface water annual actual take that are metered

For the volumes of annual actual take that do not use long-term estimates not all volumes reported in an SDL resource unit are measured (i.e. metered). In the absence of metering other forms of estimation are used including use of long term average estimates and hydrological models. At the Basin scale over the four year reporting period, between 64% and 73% of annual actual consumptive take from all forms of surface water take was metered. For watercourses and regulated rivers, between 89% and 92% of Basin scale annual actual take was metered.

Reducing the proportion of unmetered take is an area where further improvements in these accounts can be made, recognising the need for cost effectiveness considerations in relation to certain forms of take (e.g. runoff dams). This report makes a number of recommendations in relation to this issue (refer section 5.4). The reported data does not indicate the type or standard of metering. Examples of different types of metering may include measuring depth through a regulator, use of a magnetic flow meter, measurement through a flume gauge, measurement through a Dethridge wheel, or measurement based on pump hours.

The levels of metering varies between the northern and southern Basin. For all forms surface water take between 25% and 51% is metered in the northern Basin and between 77% and 84% in the southern Basin. Despite this difference in proportion of metered take, the volume of unmetered water take is similar in the northern and southern Basin due to the larger volumes used in the southern Basin. That is, the average unmetered take over the four years in the northern Basin was 1,963 GL/y while in the southern Basin the average was 1,569 GL/y.

In generating these statistics, the MDBA has assumed that:

- In Victoria, unmetered take from watercourses in 2014–15 and 2015–16 used the same categories of reliability as reported by Victoria in the previous two years where data was provided.
- In the Australian Capital Territory and the South Australian Eastern Mount Lofty Ranges and Marne–Saunders SDL resource units all watercourse diversions are metered.

Water taken for environmental benefits is not included in these estimates.

Table 17 Basin and state scale percentage of surface water annual actual take that is metered

State / Basin	Metered actual take from watercourses (%)				Metered actual take for all forms of take (%)			
	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16
Queensland	58%	31%	61%	81%	43%	18%	29%	33%
New South Wales	94%	92%	89%	86%	74%	69%	62%	54%
Australian Capital Territory	100%	100%	100%	100%	61%	61%	59%	63%
Victoria	99%	98%	98%	98%	86%	83%	83%	83%
South Australia	98%	98%	98%	98%	95%	94%	95%	96%
Northern Basin	72%	63%	56%	65%	51%	40%	25%	29%
Southern Basin	98%	98%	98%	97%	84%	81%	80%	77%
Basin total	91%	89%	91%	92%	73%	68%	67%	64%

5.2.2. Actual take from watercourses

Basin scale data on actual take from watercourses has been reported since the 1983–84 water year. Cap reporting on watercourse diversions from the designated Cap valleys commenced on an interim basis in 1994–95 and under the ongoing Cap arrangements from 1997–98. Reporting on annual actual take from watercourses and regulated rivers under the 29 surface water SDL resource units covered by the SDL water accounting and compliance framework commenced with the 2012–13 water year.

The watercourse and regulated rivers volumes cited in Table 13 to Table 16 effectively represent Cap watercourse diversion plus annual actual take from the surface water SDL resource units not covered by Cap in the Eastern Mount Lofty Ranges water resource plan area of South Australia. As a result of this area now being included, the difference between Cap and SDL watercourse diversions over the period is an increase of an average of 8 GL per year.

Basin scale actual take in the form of watercourse diversions was 10,823 GL in 2012–13, which places it in about the top third of the annual volumes of take since 1983–84. Even when accounting for the difference between Cap and SDL watercourse diversions, the 2012–13 level of take was the highest since 2001–02 (before the millennium drought). This level of annual actual take followed two consecutive years of above average inflows in 2010–11 and 2011–12.

Of the total 2012–13 watercourses actual take volume in Table 13, New South Wales accounted for 58% at 6,320 GL, Victoria accounted for 27% at 2,970 GL, Queensland accounted for 9% at 982 GL, South Australia accounted for 5% at 523 GL, and the Australian Capital territory accounted for 0.2% at 19 GL. As surface water availability fell over the four-year reporting period in response to reduced inflows, there was a significant corresponding reduction in annual actual take from watercourses.

Figure 16 shows annual actual take in the form of watercourse diversions over the period of record (1983–84 to 2015–16). Figure 17 shows the same data for Queensland, South Australia and the Australian Capital Territory to more clearly illustrate the variation in annual actual take in those states over the reporting period.

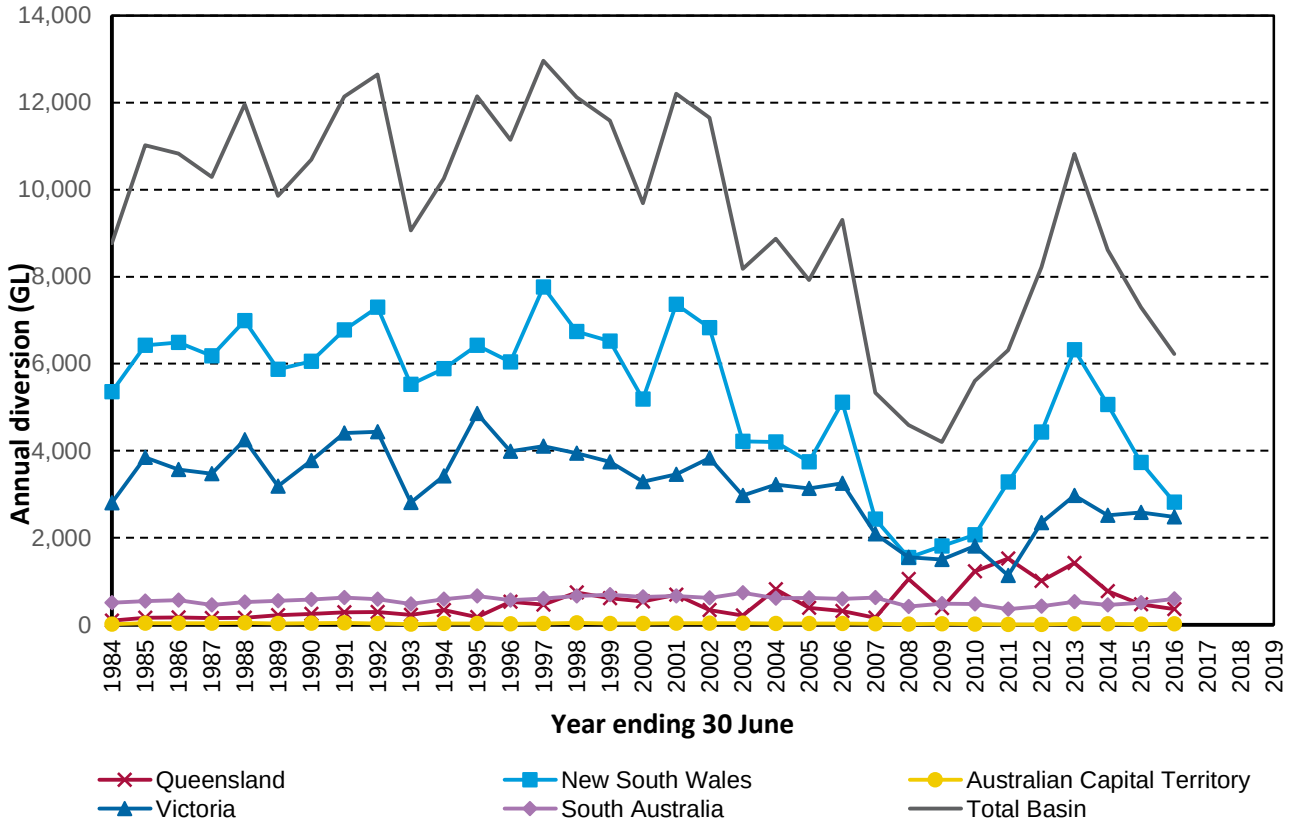


Figure 16 Basin and state scale annual actual take (GL) from watercourses 1983–84 to 2015–16

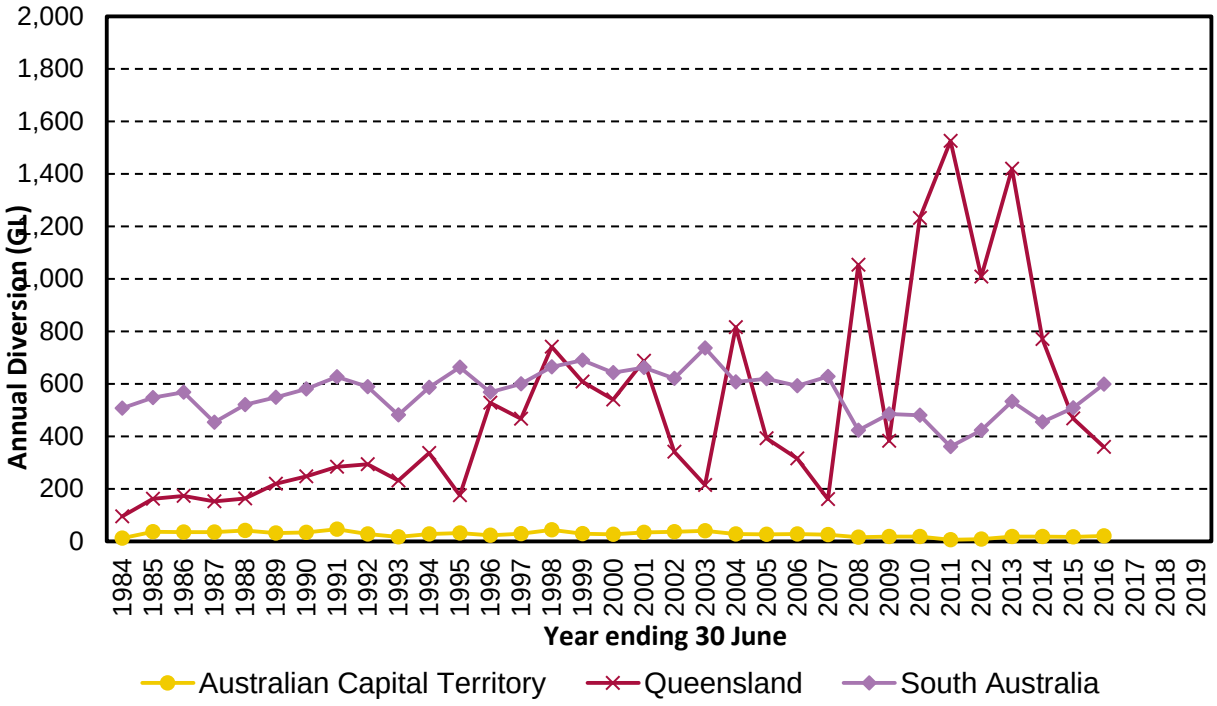


Figure 17 Annual actual take (GL) from watercourses for Queensland, Australian Capital Territory and South Australia only 1983–84 to 2015–16

5.2.3. Take by floodplain harvesting and runoff dams, net take by commercial plantations and take under basic rights

As discussed in earlier sections, the Basin Plan aims to manage forms of water take not fully accounted for to date under Cap water accounting and compliance arrangements. For surface water these include take by floodplain harvesting, take by runoff dams, net take by commercial plantations and take under basic rights.

For the purpose of the trial of the SDL water accounting and compliance framework, with limited exceptions, both annual actual take (Table 13 to Table 16) and annual permitted take for these forms of take at SDL resource unit level are being determined as the long-term estimates as listed in Schedule 3 of the Basin Plan or *Water resource assessments for without-development and baseline conditions, Murray–Darling Basin Authority technical report 2010/20 Version 2 (MDBA 2011)* or alternative volumes as reported by the relevant Basin states.

Approaches adopted for the purpose of this report are:

- Queensland:
    - floodplain harvesting (known as 'take by overland flow') was measured and reported annually and these have been used in the accounts in preference to the estimates in Schedule 2 of the Basin Plan.
- New South Wales:
    - floodplain harvesting estimates used were those incorporated in the estimates in Schedule 2 of the Basin Plan. There is work underway to better quantify these estimates. Once this work has been completed and reviewed by the MDBA, it will be incorporated in future reports.
    - take under basic rights is reported using the estimated volumes as determined under the relevant water sharing plan as at 2016.
- South Australia:
    - runoff dam actual take was reported as a combination of metered and estimated data for the Marne Saunders and Eastern Mount Lofty SDL resource units. These have been used in the accounts in preference to the estimates in Schedule 2 of the Basin Plan.
- Australian Capital Territory
    - Commercial plantation estimate used was that incorporated in the estimates in Schedule 2 of the Basin Plan. There is work underway to better quantify this estimate as part of the WRP being prepared by the ACT.

The use of the same long-term average (or where available annual) estimates to determine annual permitted take and annual actual take for these forms of take means that these forms of take do not impact on the annual calculation of credits and/or debits, or on the consequent cumulative balance and compliance assessment. For example, if the floodplain harvesting component of annual permitted take and annual actual take in an SDL resource unit is always 5 GL the annual balance arising from this component will always be 0 GL.

The current use of long-term average estimates for up to 30% of actual take provides a benchmark from which improvements can be made. Improvements in this area will enhance integrity of the water accounting and compliance framework.

New methods that either give some expression to annual weather conditions and water availability in the relevant SDL resource unit and/or apply other lines of evidence to provide some ability to identify any growth in these forms of take should be investigated over the remainder of the transition period so that they can be applied from 1 July 2019 wherever possible.

5.3. Groundwater annual actual take

Groundwater take occurs across the entire Murray–Darling Basin with annual average extraction estimated to be 1,415 GL over the 13 years to 2016. Groundwater represents 10 to 20 per cent of the total water take in the Basin over the reporting period with the remainder attributed to surface water take.

However, the relative use of groundwater use varies greatly across the Basin. During drier periods, the relative importance of groundwater becomes greater and is especially important for regional economies during these times. In particular, communities in north-western New South Wales and south-western Queensland have a high reliance on groundwater.

Furthermore, most groundwater annual actual take is centred on a small number of large alluvial groundwater systems in New South Wales, Queensland and Victoria and most of this groundwater use is for irrigation. Ten out of the 81 groundwater SDL resource units represent two thirds or 64% of all groundwater take across the Basin over the four years of the reporting period. There are also several cities and towns across the Basin that rely on groundwater for most of their water supply.

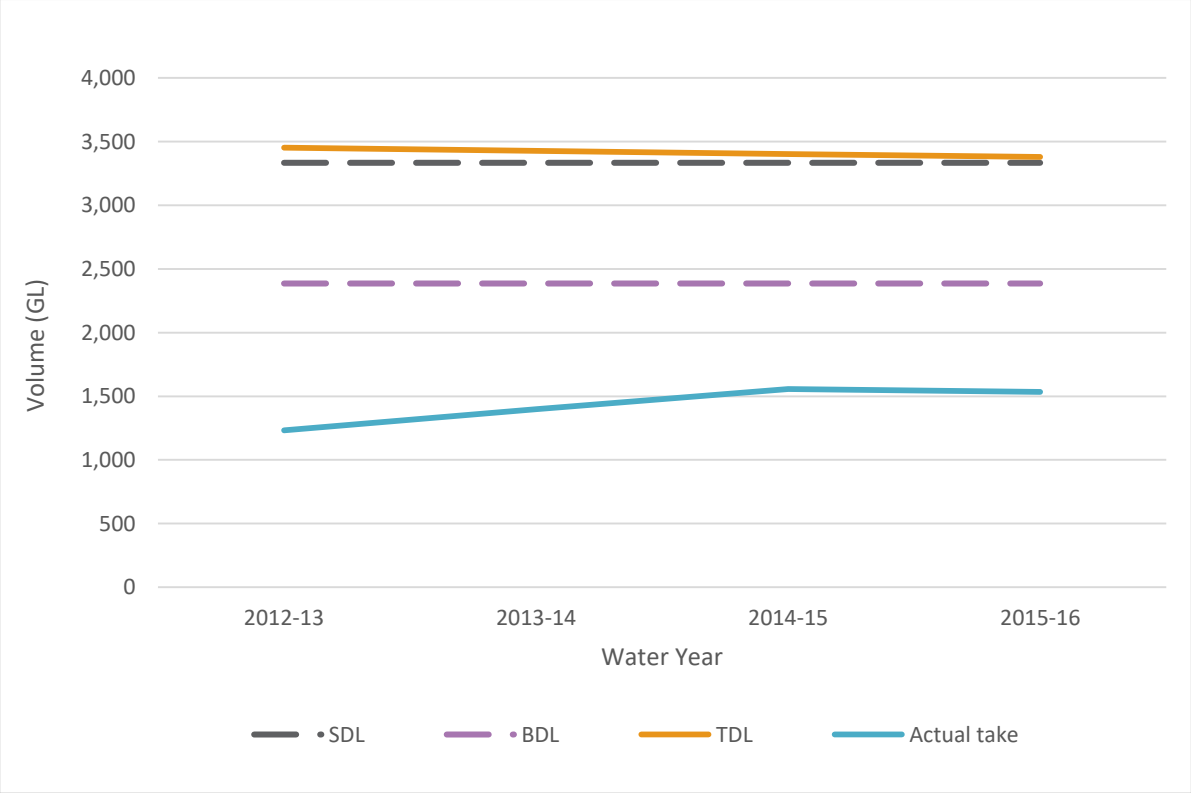


Figure 18 shows that at a Basin scale, there was a gradual increase in groundwater annual actual take over the first three years of the reporting period from 1,231 GL in 2012–13 to 1,556 GL in 2014–15. This trend steadied with annual actual take reducing slightly from 1,556 GL to 1,535 GL between 2014–15 and 2015–16.

The bulk of the increase over the reporting period was driven by increased take in New South Wales. In each year across the four-year period, New South Wales was the major groundwater

user accounting for 70% of the total actual take of groundwater. This was followed by Queensland and Victoria, each using 13% of groundwater annual actual take.

South Australia accounts for about 4% of Basin scale groundwater annual actual take. Annual actual take in South Australia and the Australian Capital Territory was stable throughout the reporting period.

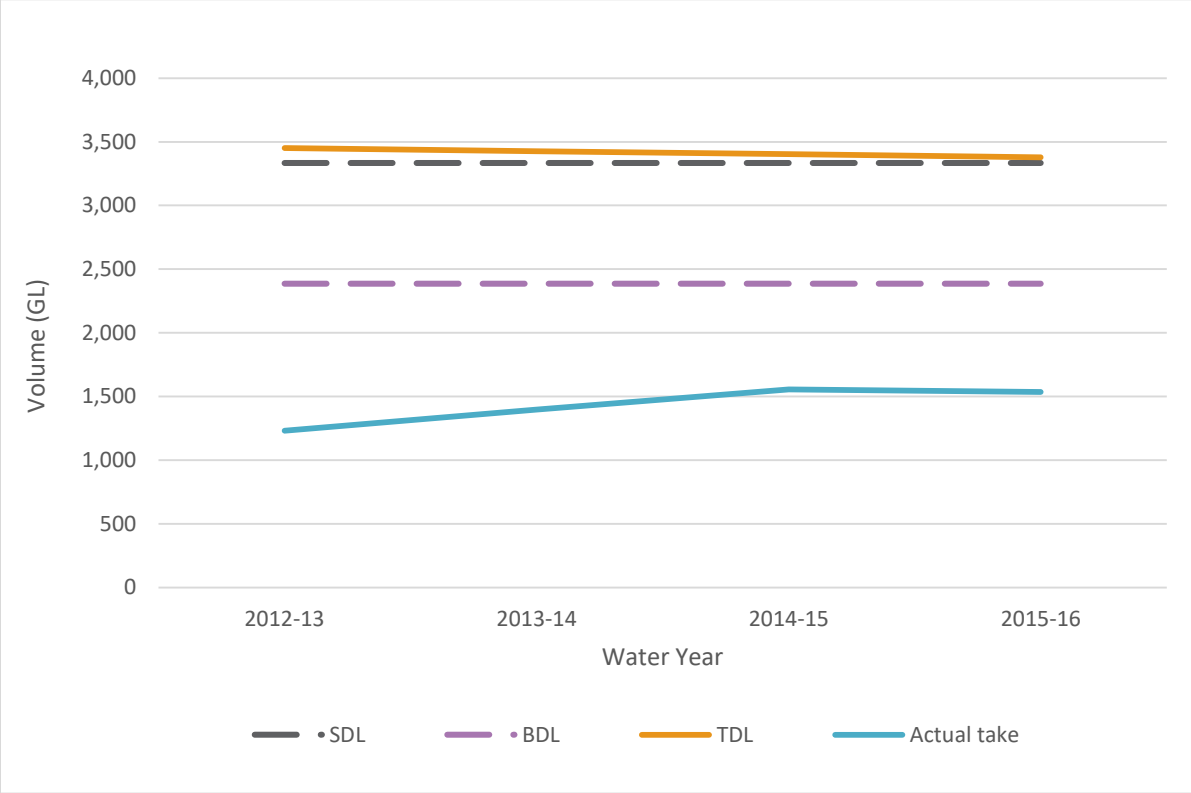


Figure 18 Basin scale groundwater BDL, SDL, TDL and actual take 2012–13 to 2015–16

5.3.1. Groundwater take under basic rights

Groundwater take under basic rights covers water used for stock and domestic purposes in all Basin states as well as groundwater used for native title rights in some Basin states. While the licencing requirements vary across Basin states, a licence or approval is generally required to construct a bore for stock and domestic purposes, but not always to extract water from it.

Basin states use estimation methods to determine reportable groundwater take under basic rights as volumes extracted are not limited or reportable. In 2015–16, Basin states estimated the total take of groundwater extracted under basic rights to be 238 GL.

In some parts of the Basin, groundwater is the only reliable source of water for stock and domestic purposes. In 32% of groundwater systems (26 out of 81 SDL resource units) over the reporting period, take under basic rights was the only or main form of take. These SDL resource units accounted for approximately 11% (60 GL/y) of all groundwater take under basic rights across the Basin. In contrast, in 60% of groundwater systems or 49 SDL resource units, take under basic rights represents less than 10% of total actual take in that SDL resource unit.

Data reporting on groundwater take under basic rights has improved over the four-year reporting period as states have improved their estimation methods. Due to this improvement, only the estimated figures for 2015–16 have been reported in the detailed groundwater data set at Appendix 2. It is unlikely that groundwater taken under basic rights will fluctuate significantly in quantity between water years as there is unlikely to be significant growth in this form of groundwater use.

5.3.2. Proportions of groundwater annual actual take that are metered

The proportion of groundwater take that is metered varies between the different states across the Basin. In 2015–16, Basin states reported that 78% of the total groundwater take was metered. However, 100% of the take under basic rights was unmetered.

In 2015–16, in Victoria 91% of the total groundwater take was metered. This was followed by New South Wales and South Australia, with total groundwater take of 83% and 88% metered in each state respectively. While in Queensland, only 28% of the total groundwater take was metered. The highest percentage of metered groundwater take was in the Australian Capital Territory where 100% of groundwater take was metered.

5.3.3. Managed aquifer recharge

Managed aquifer recharge (MAR) is the intentional recharge of an aquifer, either by injection or infiltration of treated or untreated surface water into a groundwater system for subsequent recovery by planned extraction or for environmental benefit. One of the inherent benefits of MAR is the ability to use the groundwater system as a storage system to 'bank' injected waters for use at another time (e.g. recharge water during wet years for extraction during drier years).

A number of MAR schemes are proposed within the Basin. However, MAR is currently practiced in only two groundwater SDL resource units, one in South Australia and the other in the Australian Capital Territory.

In South Australia, water from the River Murray SDL resource unit and from the tributaries of the River Murray in the Eastern Mount Lofty Ranges surface water SDL resource unit is recharged into the Angas Bremer (Murray Group Limestone) SDL resource unit. Over the reporting period 4.65 GL was added to this aquifer via MAR as storage with 1.16 GL extracted over the same period.

MAR was first used in the Australian Capital Territory in 2014–15 to test and evaluate the suitability of an aquifer within the Australian Capital Territory (groundwater) SDL resource unit. This forms part of a pilot program by the Australian Capital Territory Government to use MAR to store stormwater harvested and filtered at a neighbourhood-scale for future irrigation of urban green spaces. Over the reporting period, 0.41 GL was added to this groundwater system as storage and 0.35 GL was extracted for use over the same period.

The Basin Plan requires that MAR is accounted for in determining annual permitted take.[20] MAR volumes are being accounted for in a way that avoids double-counting the extraction of water against an SDL in both the source and receiving SDL resource units. The use of water extracted from surface water (source) for the purpose of MAR water storage is accounted as actual take for

[20] Basin Plan 2012, s10.12(1)(i)

the relevant surface water SDL resource unit. The later extraction of the MAR from the groundwater system (receiver) is then separately accounted for in a way that it does not impact on annual allocations or the determination of annual permitted take or annual actual take from the relevant groundwater SDL resource unit. MAR extraction is not included in the permitted take, actual take and allocation while reporting these components of take from groundwater.

Over the reporting period 5.06 GL were added to aquifers across the basin via MAR with 1.51 GL extracted over the same period.

Table 18 Managed aquifer re-charge volumes 2012–13 to 2015–16

	2012–13		2013–14		2014–15		2015–16	
SDL Resource unit	**Stored**	**Extracted**	**Stored**	**Extracted**	**Stored**	**Extracted**	**Stored**	**Extracted**
Australian Capital Territory								
Australian Capital Territory (groundwater) (GS52)	n/a	n/a	n/a	n/a	0.28	0.31	0.13	0.05
South Australia								
Angas Bremer (Murray Group Limestone) (GS1)	1.51	n/d[a]	1.21	n/d[a]	0.90	0.64	1.02	0.52
Basin total	**1.51**	**0.00**	**1.21**	**0.00**	**1.19**	**0.94**	**1.15**	**0.57**

[a] No data was available regarding extraction volumes in South Australia for 2012–13 or 2013–14

5.4. Recommendations

Recommendation 1:

Improving the methods for estimating volumes of annual actual and annual permitted take.

The current use of long-term average estimates for up to 30% of take (i.e. take by floodplain harvesting, runoff dams, commercial plantations (net take) and under basic rights) provides a benchmark from which improvements can be made. Improvements in this area will enhance integrity of the water accounting and compliance framework.

New methods that give some expression to annual weather conditions and water availability in the relevant SDL resource unit should be investigated over the remainder of the transition period so that they can be applied from 1 July 2019 wherever possible. Similarly, other lines of evidence that provide the ability to identify any growth in these forms of take should also be developed.

Recommendation 2:

Increasing the proportion of actual take that is measured across the Basin to an agreed standard.

The integrity of the SDL water accounting and compliance framework is enhanced wherever actual take is measured rather than modelled or estimated. Identifying and taking advantage of cost effective ways of increasing the proportion of measured take, particularly where that measurement is consistent with an agreed national standard, will increase the overall integrity of the framework as well the levels of public confidence in the accounting and compliance arrangements.

6. Allocations and trade

s.71(1)(d) details of the water allocations made in relation to the water resources of that area in relation to that water accounting period

s.71(1)(e) details of any other decisions made by, or under the law of, the Basin state, that permit the taking of water from the water resources of that area during that water accounting period

This section provides information on the quantity of water allocated throughout the Basin at the SDL resource unit level. 'Other decisions' under s.71(1)(e) refers to forms of access such as carryover, basic rights and water used by farm dams and commercial plantations.

6.1. Allocations

The annual volume of allocation — subject to any use limits and/or periods of access — is one of the key factors influencing the volume of water that is actually taken during a water year. However, it is important to note that in most water years, entitlement holders do not take their full allocation (generally about 75% of the water allocated at the Basin scale is taken). Allocation not taken is often traded or carried over for use in future years. Allocation that is carried over is at risk of forfeiture and/or spill depending on the rules in the relevant SDL resource unit.

Annual allocation — including relevant use limits — combined with carryover available from the previous year and any additional water secured through trade, provides the total volume of water authorised for use in any one year. Appendices 1 (surface water) and 2 (groundwater) provide the total combined volumes of water authorised for use for each SDL resource unit over the reporting period.

Annual allocations are the volumes of water actually authorised by Basin states for take by entitlement holders. This may be expressed as a percentage or share component of the total share value of the entitlements held. For example, a 50% allocation against an entitlement with a 100 megalitre (ML) share value authorises the holder of the entitlement to take 50 ML of water. Annual allocations are referred to differently across the Basin. For example, in New South Wales they are known as 'available water determinations', in the Victorian Murray they are 'seasonal determinations' and in South Australia they are 'allocations'.

Allocations are authorised by Basin states against the different entitlements in a particular valley or water source under the terms of the relevant water sharing arrangements. Allocations are made in response to things like available water in storage, minimum expected stream flows, forecast rainfall and other seasonal conditions.

The volume of water allocated does not match the permitted take (or Cap target) for the purpose of SDL accounting (refer Section 7.1).

6.1.1. Surface water allocation

Table 19 shows the total volume authorised in surface water SDL resource units over the reporting period. This data also forms part of Appendix 1, column headed 'Annual authorised (allocated) water including interceptions (GL/y)(s.71(1)(d)).

Table 19 Surface water authorised (GL) from 2012–13 to 2015–16

SDL resource unit	2012–13	2013–14	2014–15	2015–16
Paroo	9.7	9.7	9.7	9.7
Warrego	85.8	85.6	91.2	86.7
Nebine	25.0	25.0	25.1	26.4
Condamine–Balonne	1,305.3	903.4	629.1	539.6
Moonie	84.6	63.9	54.7	51.8
Queensland Border Rivers	482.0	234.2	196.6	192.7
Queensland total	**1,992.4**	**1,321.8**	**1,006.3**	**906.9**
NSW Border Rivers	421.7	338.0	199.0	276.5
Intersecting Streams	131.8	137.6	131.3	131.3
Gwydir	845.2	729.2	392.6	308.2
Namoi	723.0	642.1	416.5	388.5
Macquarie–Castlereagh	1,107.9	948.4	741.4	737.9
Lachlan	930.8	926.8	745.3	741.6
Murrumbidgee	3,631.6	2,887.5	2,644.6	2,163.0
Barwon–Darling Watercourse	475.1	471.0	517.2	511.1
Lower Darling	180.7	128.3	96.8	60.7
NSW Murray	2,798.5	2,045.7	1,872.4	1,291.6
New South Wales total	**11,246.4**	**9,254.5**	**7,757.3**	**6,610.5**
Australian Capital Territory (Surface Water)	**85.1**	**86.7**	**88.7**	**87.7**
Victorian Murray–Kiewa–Ovens	2,671.8	1,654.2	1,869.1	2,036.0
Goulburn–Broken–Campaspe–Loddon	1,927.1	1,902.7	1,621.6	1,646.5
Wimmera–Mallee (Surface Water)	212.4	283.5	207.0	191.3
Victoria total	**4,811.3**	**3,840.4**	**3,697.7**	**3,873.8**
SA Murray	659.3	609.5	604.7	672.2
SA Non-Prescribed Areas[a]	3.5	3.5	3.5	3.5
Marne Saunders	3.3	3.3	3.2	3.3
Eastern Mount Lofty Ranges	23.9	25.1	28.1	27.8
South Australia total	**689.9**	**641.4**	**639.5**	**706.8**
Basin total	**18,825.2**	**15,144.8**	**13,189.4**	**12,185.7**

[a] Volumetric allocations or authorisations are not made in the SDL resource unit. In the absence of authorisations / allocations, the permitted take values have been used.

The volumes reported in Table 19 include water allocated in the year in question along with any carryover available in the relevant systems. As some water can be carried over across multiple years it is not possible to sum volumes allocated across years as this would involve some double counting. In the case of two areas in Victoria a combined total has been provided (Murray—Kiewa–Ovens; Goulburn–Broken–Campaspe–Loddon). Future reports will endeavour to separate this information out to the SDL resource unit level.

In some unregulated surface water systems (e.g. the Barwon–Darling) water allocated is only available to be taken when conditions such as flow heights or other conditions are met. The data in Table 19 is the overall volume available but access to this water is subject to the relevant licence conditions being met.

Table 20 shows the proportion of the volume allocated that was actually taken in each year of the reporting period. As can be seen from the data in the table, at the Basin scale around 75% of the water legally authorised for use in a given year is taken (75%–77% in the four years of the reporting period). This data also forms part of Appendix 1.

Table 20 Proportion of actually taken as surface water authorised from 2012–13 to 2015–16

SDL resource unit	2012–13	2013–14	2014–15	2015–16
Paroo	100%	100%	100%	100%
Warrego	100%	98%	99%	99%
Nebine	100%	100%	100%	100%
Condamine–Balonne	97%	97%	98%	98%
Moonie	100%	100%	100%	100%
Queensland Border Rivers	95%	96%	92%	87%
Queensland total	**97%**	**97%**	**97%**	**96%**
NSW Border Rivers	78%	89%	86%	80%
Intersecting Streams	89%	85%	89%	89%
Gwydir	68%	78%	74%	88%
Namoi	81%	92%	89%	90%
Macquarie–Castlereagh	70%	64%	58%	61%
Lachlan	71%	61%	68%	66%
Murrumbidgee	77%	81%	83%	85%
Barwon–Darling Watercourse	42%	19%	9%	17%
Lower Darling	57%	85%	52%	27%
NSW Murray	72%	78%	74%	64%
New South Wales total	72%	74%	72%	70%
Australian Capital Territory (Surface Water)	**36%**	**35%**	**33%**	**37%**
Victorian Murray–Kiewa–Ovens	67%	86%	81%	72%
Goulburn–Broken–Campaspe–Loddon	81%	77%	89%	85%
Wimmera–Mallee (Surface Water)	38%	27%	39%	43%
Victoria total	**71%**	**78%**	**82%**	**76%**
SA Murray	79%	73%	83%	89%
SA Non-Prescribed Areas[a]	100%	100%	100%	100%
Marne Saunders	66%	67%	73%	62%
Eastern Mount Lofty Ranges	100%	100%	71%	43%
South Australia total	**80%**	**74%**	**82%**	**87%**
Basin total	75%	77%	77%	75%

[a] Volumetric allocations or authorisations are not made in the SDL resource unit. In the absence of authorisations / allocations, the permitted take values have been used.

6.1.2. Surface water carried over from the previous year

Methods of determining surface water annual permitted take have to account for the volume of water that is available as carryover from the previous year. Over recent years Basin state governments have further developed rules that allow entitlement holders to carryover unused annual allocation volumes. This has been in part a response to the millennium drought. The arrangements seek to increase the capacity of individual entitlement holders to manage their water portfolio including risks with respect to securing access to water from one year to the next.

The rules affecting access to carryover volumes vary from state to state. Subject to these rules — and usually depending on the water available during a water year — access to carryover may be cancelled or forfeited. The available carryover is volume carried over from the last water year less carryover cancelled during the water year in question.

During the reporting period, carryover of surface water allocations was available in all Basin states except the Australian Capital Territory. Carryover has been a prominent factor in water use and hence on the determination of annual permitted take. A number of factors may be contributing to the use of carryover by entitlement holders. These include allocation price volatility and the experience of water shortages during the millennium drought.

It is also likely that there is a relationship between how well carryover behaviour is being reflected in the determination of annual permitted take and the subsequent annual credits that have accrued each year during the trial as cumulative TDL balances. The Cap models being used to determine annual permitted take for watercourses and regulated rivers are not well tuned to the carryover rules that have developed in the period since most Cap models were developed and so determinations of permitted take may not be as accurate as they could be.

6.1.3. Groundwater allocation

All Basin states have the ability to make groundwater allocation announcements based on rules within state water management plans. States take into account many factors when making allocations which may include current or expected levels of recharge to a groundwater system, risk of water level changes influencing water quality, water mixing between groundwater systems or changes in groundwater pressure levels causing irreversible impact to the system or risk to existing infrastructure such as bores or wells.

Over the four reporting years, all states except the Australian Capital Territory have made allocation announcements affecting a specific SDL resource unit or sub-areas within SDL resource units.

Table 21 shows the total volume of groundwater allocated by states each reporting year. Take under basic rights is not generally subject to allocation announcements. Broadly, allocation over the four reporting periods has remained at similar levels.

6.1.4. Groundwater carried over from the previous water years

Carryover enables groundwater users to carryover unused available groundwater at the end of a water year. This carryover water becomes available in the next water year within the limits and subject to the conditions and rules that the relevant Basin state has in place for each SDL

resource unit. The rules affecting access to carryover volumes vary from state to state due to different licence categories and varied hydrogeology across the SDL resources units. In most of the groundwater systems, towns, domestic and stock and supplementary licence categories cannot carryover.

During the reporting period, carryover of groundwater allocations were available in all Basin states except the Australian Capital Territory. Carryover volumes are provided by all relevant Basin states for all four reporting years, where applicable. Generally, carryover volumes are calculated as the unused volumes from the previous water year that are further adjusted to reflect the carryover conditions and rules under the relevant state water management framework.

Table 21 shows Basin scale authorised groundwater (allocation and carryover) over the reporting period.

In Appendix 2, the data for allocation and carryover at the SDL resource unit scale is provided (column headed ‘Allocation + Carryover (GL/y) s.71(1)(d) – water allocations’). At the Basin scale about one third to one half of water authorised for use was used in the years of this reporting period (38% to 47%). This does however vary within years with some systems using a high proportion of the water authorised for use reflecting the level of development in such systems and/or the method for authorising take in these systems.

Table 21 Basin State authorised groundwater (allocation and carryover) for the period 2012–13 to 2015–16

	2012-13			2013-14			2014-15			2015-16		
Basin State	**Total authorised (carryover + allocation) (GL)**	**Actual take (GL)**	**Allocation used (%)**	**Total authorised (carryover + allocation) (GL)**	**Actual take (GL)**	**Allocation used (%)**	**Total authorised (carryover + allocation) (GL)**	**Actual take (GL)**	**Allocation used (%)**	**Total authorised (carryover + allocation) (GL)**	**Actual take (GL)**	**Allocation used (%)**
Queensland	282.82	162.36	57%	270.31	193.86	72%	279.86	177.64	63%	276.92	187.24	68%
New South Wales	2,414.22	844.50	35%	2,445.23	999.54	41%	2,405.88	1,109.65	46%	2,317.14	1,043.02	45%
Australian Capital Territory[a]	1.03	0.58	56%	1.03	0.46	45%	1.61	0.76	47%	1.48	0.96	65%
Victoria[b]	428.41	162.99	38%	509.86	149.24	29%	502.20	213.11	42%	499.40	241.86	48%
South Australia	110.69	61.01	55%	110.80	54.55	49%	140.62	55.28	39%	141.81	62.22	44%
Basin total	**3,237.17**	**1,231.44**	**38%**	**3,337.23**	**1,397.65**	**42%**	**3,330.17**	**1,556.44**	**47%**	**3,236.75**	**1,535.30**	**47%**

[a] Carryover is not enabled for groundwater in the Australian Capital Territory

[b] Carryover was not enabled for groundwater in Victoria in 2012–13

6.2. Water Trade within the Basin

s.71(1) (f) details of the trading or transfer of tradeable water rights in relation to the water resources of that area during that water accounting period.

This section provides information on the quantity of water trading throughout the Basin at the SDL resource unit level. Trade between SDL resource units affects the annual permitted take in such units where water is traded between consumptive users. Water trade between consumptive users and between environmental uses (disposal or acquisition of held environmental water) is however treated differently for the purposes of SDL compliance (refer Basin Plan s10.12(3)).

The Basin Plan water trading rules came into effect on 1 July 2014. Trade of water allocations continues as a major feature of annual water use. This underlines the importance of minimising restrictions on trade and building security and certainty into water sharing frameworks.

Under the SDL accounting framework, the volume of allocation trades across the year are totaled, inclusive of trade within and across SDL resource units, and these volumes are provided at Table 22. The trade across SDL resource units is used to adjust annual permitted take. Volumes of entitlement trade across the Basin are published separately by the Bureau of Meteorology.

6.2.1. Surface water trade

Surface water is traded within and between Basin states, and also within and between the pool of consumptive water entitlements (for irrigation of crops and town water supplies etc.) and environmental water entitlements. Water trade has enabled water entitlement holders to maximize the value of their entitlement by being able to buy and sell water when required.

The volumes of water traded throughout the Basin on an annual basis is described in Table 22. The total volume represents all allocation trades (due to short term and long term water trades)) within and from an SDL resource unit in each state. This data is provided for both consumptive and environmental holdings.

The overall volumes of allocation trade are also partitioned in to source (i.e. origin) of the water traded (consumptive, environmental) and its destination (consumptive, environmental) in Table 23 (see also Figure 19 and Figure 20). The bulk of environmental water allocation trade occurs as the mechanism to deliver and account for the movement of environmental water from one SDL resource unit to another as part of environmental watering actions.

Table 22 Total surface water allocation trade (GL) across the Basin: consumptive and environmental uses

Year	Total volume (GL / %)	Consumptive to consumptive	Environmental to environmental	Consumptive to environmental	Environmental to consumptive
2012–13	5,811.8	2,840.1	2,937.2	17.4	17.1
	100%	49%	51%	<1%	<1%
2013–14	4,860.2	2,625.5	2,170.2	19.6	44.9
	100%	54%	45%	<1%	1%
2014–15	5,321.1	2,500.1	2,786.3	19.5	15.2
	100%	47%	52%	<1%	<1%
2015–16	5,611.1	2,535.9	3,040.8	6.9	27.5
	100%	45%	54%	<1%	<1%

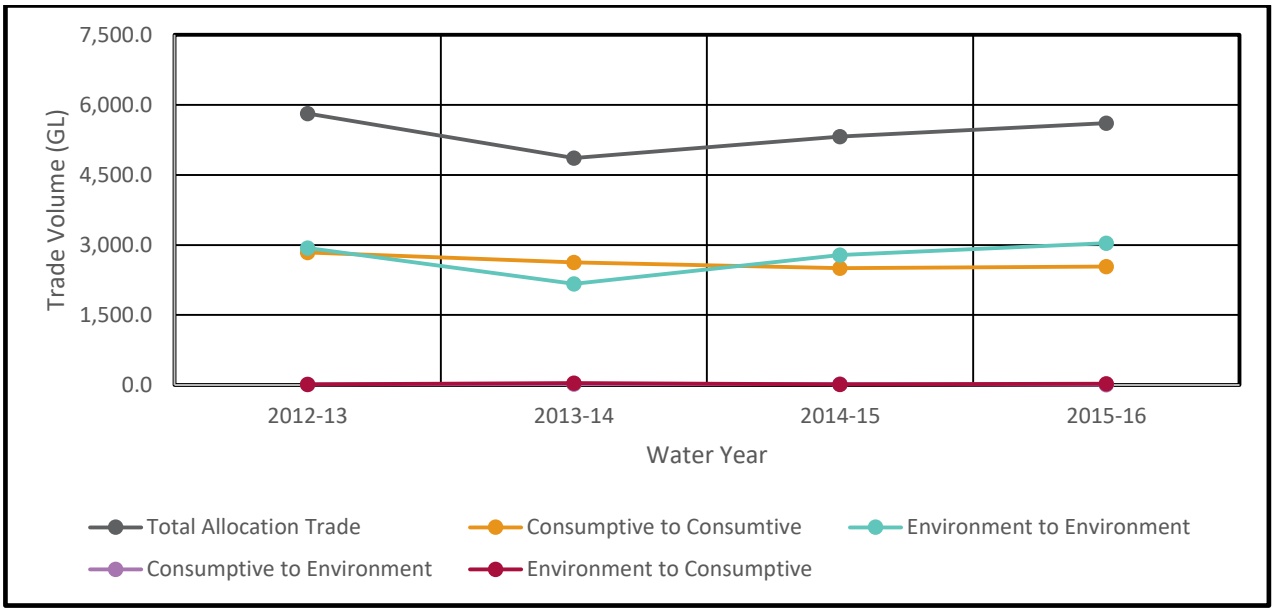


Figure 19 Surface water allocation trade volumes 2012–13 to 2015–16, including total trade, consumptive to consumptive, environment to environment, consumptive to environment and environment to consumptive

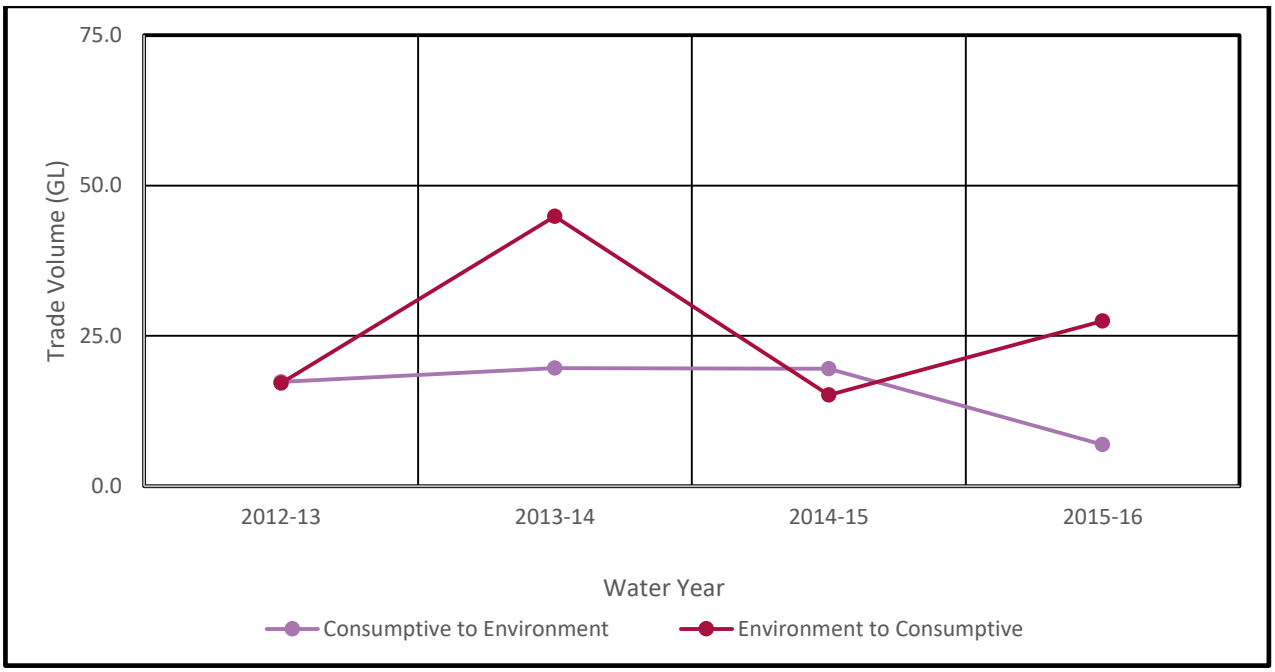


Figure 20 Surface water allocation trade volumes 2012–13 to 2015–16, consumptive to environment and environment to consumptive only

Table 23 Surface water allocation total trade (GL): between consumptive and environmental uses

Year	Basin state	Allocation trade: total[a]	Consumptive to consumptive	Environmental to environmental	Consumptive to environmental	Environmental to consumptive	Net environmental to consumptive
2012–13	Queensland	104.7	104.7	0.0	0.0	0.0	0.0
	New South Wales	2,384.7	1,338.7	1,017.7	11.2	17.1	5.9
	Australian Capital Territory	0.0	0.0	0.0	0.0	0.0	0.0
	Victoria	2,297.4	1,327.9	975.4	–5.8	0.0	5.8
	South Australia	1,024.9	68.8	944.1	12.0	0.0	–12.0
	TOTAL	**5,811.8**	**2,840.1**	**2,937.2**	**17.4**	**17.1**	**–0.2**
2013–14	Queensland	105.1	105.1	0.0	0.0	0.0	0.0
	New South Wales	2,058.6	1,270.9	730.9	12.3	44.6	32.3
	Australian Capital Territory	0.0	0.0	0.0	0.0	0.0	0.0
	Victoria	1,901.7	1,059.8	845.3	–3.7	0.3	4.1
	South Australia	794.8	189.7	593.9	11.1	0.0	–11.1
	TOTAL	**4,860.2**	**2,625.5**	**2,170.2**	**19.6**	**44.9**	**25.2**
2014–15	Queensland	123.6	123.6	0.0	0.0	0.0	0.0
	New South Wales	1,929.3	910.8	1,008.0	7.8	2.7	–5.1
	Australian Capital Territory	0.0	0.0	0.0	0.0	0.0	0.0
	Victoria	2,457.4	1,256.6	1,177.8	10.5	12.5	2.0
	South Australia	810.8	209.1	600.5	1.2	0.0	–1.2
	TOTAL	**5,321.1**	**2,500.1**	**2,786.3**	**19.5**	**15.2**	**–4.3**
2015–16	Queensland	106.2	106.2	0.0	0.0	0.0	0.0
	New South Wales	2,201.9	1,197.8	1,002.0	0.0	2.1	2.1
	Australian Capital Territory	0.0	0.0	0.0	0.0	0.0	0.0
	Victoria	2,405.9	1,033.3	1,350.2	0.0	22.4	22.3
	South Australia	897.1	198.6	688.6	6.9	3.0	–3.9
	TOTAL	**5,611.1**	**2,535.9**	**3,040.8**	**6.9**	**27.5**	**20.6**

*Total represents tagged and temporary trade that includes within and across each SDL resource unit in each state. This analysis shows total trade activity and is not the trade adjustment to permitted take.

6.2.2. Groundwater trade

Groundwater allocations and entitlements across the Basin can be traded in the following three broad categories, noting that trade between states is not currently enabled:

- Within the same SDL resource unit
- Between different SDL resource units
- Between surface water and groundwater

Rules governing groundwater trade vary across the Basin by state and SDL resource unit based on individual aquifer properties and demand for the water source. There are a number of SDL resource units where trade is not enabled, commonly where the water quality is not suitable for use or the water in the groundwater system is too difficult to access. States may choose to enable trade in these SDL resource units in the future. Across the Basin, 99% of all trade occurred as trade within the same SDL resource unit and the remaining 1% was trade between SDL resource units in Victoria. There was no trade reported between surface water and groundwater in any state.

Across the 2012–13 to 2015–16 period, Victoria was the only state to report trade between SDL resource units. This trade in Victoria occurred between SDL resource units in the Goulburn-Murray water resource plan area in two years, 2013–14 and 2015–16. The volumes of water traded totalled less than 1 GL in each of those years. Under the SDL accounting framework, volumes of trade between SDL resource units should be taken into account and annual permitted take adjusted accordingly; however due to the small volumes involved, permitted take volumes in these SDL resource units were not adjusted over this reporting period. Improved accounting for the effects of trade on permitted take will be included in future reports.

The majority of groundwater trade, over 90% by volume in each year, occurred in New South Wales with over 40% of total trade accounted for in the Lower Murrumbidgee Alluvium (deep) SDL resource unit (GS28) and Lower Lachlan Alluvium SDL resource unit (GS25) combined. State rules in South Australia and New South Wales currently do not allow for trade between SDL resource units.

As groundwater availability is not dependent on weather conditions in the short term, users commonly turn to groundwater to supplement needs when surface water availability is low. At a Basin scale, reporting data shows that increases in both groundwater trade and groundwater take correspond with decreased surface water allocations.

Total groundwater allocation volume traded across the basin was 138 GL in 2013–14 which increased to 214 GL in 2014–15 and 244 GL in 2015–16. This correlates with hotter and drier climatic conditions and reduced surface water availability.

Across the Basin, groundwater allocation trade reported has steadily increased in volume each year with 74 GL reported in 2012–13, 137 GL in 2013–14, 214 GL in 2014–15 and 245 GL in 2015–16. This increase may be partially attributed to changing climatic conditions and surface water availability, and partially to improved reporting data from the states, noting that there was no data received from Victoria or the Australian Capital Territory for the 2012–13 reporting period. The improvement in data reporting is reflected in the more complete data sets in both 2014–15 and 2015–16.

Table 24 Total groundwater allocation trade volumes (GL) at Basin and state scales 2012–2013 to 2015–2016. Total includes trade within, into and out of SDL resource units

	Allocation trade (GL)			
State	**2012–2013**	**2013–2014**	**2014–2015**	**2015–2016**
Queensland	1.17	4.04	5.06	5.53
New South Wales	71.71	124.59	199.36	221.47
Australian Capital Territory[a]	n/d	0.08	0.00	0.02
Victoria[a]	n/d	5.95	7.62	17.46
South Australia	0.66	1.85	3.36	3.11
Basin Total	**73.54**	**136.90**	**214.12**	**245.98**

[a] No data was available from the Australian Capital Territory or Victoria in 2012–13

Detailed trade volumes at SDL resource unit scale are available from MDBA upon request. This includes a list of SDL resource units where trade was not enabled.

7. Permitted take and indicative compliance

s.71(1)(b) the quantity of water permitted to be taken from the water resources of the water resource plan area during the water accounting period

This section provides information on the quantity of water permitted to be taken throughout the Basin at the SDL resource unit level.

Appendix 1 (surface water) and 2 (groundwater) detail the combined total reported volumes of transitional annual permitted take — as determined against the TDL — from each SDL resource unit over the reporting period.

Importantly, permitted take is different to the water allocated which is also known as 'water authorised for use'. The 'permitted take' is broadly analogous to the annual Cap target under the Cap on diversions.

Annual permitted take is defined in the Basin Plan s6.10(1) as:

> 'For a water accounting period, sum the maximum quantity of water permitted to be taken by each form of take for consumptive use from the SDL resource unit, determined in accordance with the method for section 10.10 (annual permitted take).'

WRPs are required under section 10.10(1) to set out the method for determining the annual permitted take. To this end, section 10.10(4) states WRPs must demonstrate '…that the method relates to the SDL of each resource unit in such a way that, if applied over a repeat of the historical climate conditions, it would result in meeting the SDL for the resource unit …'

In addition to demonstrating that they can achieve the SDLs over the Basin Plan historical climate conditions, the methods for determining annual permitted take that Basin states incorporate into accredited water resource plans must consider a range of matters (refer Basin Plan s10.12). These include:

- the climate conditions experienced during the year in question
- all forms of take (from watercourses, regulated rivers, groundwater, by runoff dams, by floodplain harvesting, by commercial plantations (net take) and under basic rights) and all classes of water entitlement in the SDL resource unit
- carryover of allocation from the previous year
- return flows (for surface water)
- trade in and out of the SDL resource unit
- water resources used for managed aquifer recharge (for groundwater)
- accounting separately for the movement of water between the consumptive and environmental pools.

Accordingly, the annual permitted take is the annual expression of the limit on actual take that would, over a repeat of the historic climatic conditions (1895–2009), meet the SDL. Thus upon the completion of each water year, the method that would deliver the SDL over the long-term is applied to the year just ended, for example incorporating the climatic conditions experienced, to determine the annual permitted take.

The key component of each accredited surface water WRP will be the 'SDL model' that will generate annual permitted take for each form of take for the purposes of SDL compliance.

During the transition period, most surface water SDL models are not yet available so existing modelling platforms are used and then adjusted as necessary to produce an estimate of the permitted take for the purpose of the transitional account. These are generally the Cap models, adjusted as necessary to the BDL, then further reduced to allow for water recovery that bridges the gap to the SDLs as at the outset of each water year (termed the TDL).

While permitted take methodologies attempt to explain as much of the inter-annual variation as possible (e.g. through relating use to climatic conditions and water availability), it is not always possible to fully explain such variations and thus 'unders' and 'overs' are expected and a cumulative balance is used. This is further accentuated in the transition period as the models in use were generally not specifically developed to assist in this task. This situation will be addressed through the preparation of WRPs.

7.1. Water authorised for use versus annual permitted take

Appendix 1 and 2 also provide data about the reported volumes of water authorised for use in each SDL resource unit over each year during the reporting period. These volumes are generally higher than the reported total volumes of permitted take for the same SDL resource unit in the same year.

The question 'how can the volume of water authorised for use be more than permitted take' requires some explanation. At its simplest, the Cap and SDL frameworks are a limit on actual take not, directly, on the amount of water allocated.

Basin states allocate water based on the sharing arrangements set out in the water resource management instruments developed in each state. Some underuse of allocated water is expected for a range of reasons (e.g. mid-summer rainfall suppressing demand). Since the introduction of the Cap, Basin states have moderated the amount of water allocated as necessary to ensure Cap compliance. Over the period 2012–13 to 2015–16, the amount of water actually taken is around 75% of that authorised for extraction across the Basin.

Appendixes 1 and 2 detail the amount of water authorised for use (including carryover) each year for each surface water and groundwater SDL resource unit. Also shown is the proportion of water authorised that was actually taken.

7.2. Surface water annual permitted take

Annual surface water permitted take is calculated after the end of each water year. It is the volume of take for the relevant SDL resource unit that reflects for that year: the weather conditions, announced allocations, available carryover, and trade. Appendix 1 sets out the annual permitted take for each SDL resource unit as it relates to the long-term average TDL for that year. See column headed 'Transitional permitted take (GL/y) (s.71(1)(b))'.

For the purposes of the trial, the adjustment to annual permitted take to account for held environmental water is being undertaken using a scaling approach as nominated and agreed with each Basin state. These methods improve on those currently being used under the Cap but are a temporary measure to accommodate TDL reporting in advance of fully developed methods that will be defined in Basin state water resource plans (WRPs).

The use of models for this purpose is a critical function in SDL compliance and perhaps the key component to the overall integrity of the accounts. It should be emphasised that attention to this aspect of water resource plan accreditation will be thorough and the MDBA looks forward to improvements in model performance for this purpose.

Further, a number of specific approaches were adopted for determining the annual permitted take for some surface water SDL resource units that are described here for completeness:

- New South Wales Barwon Darling:
    - A number of improvements have been investigated to address long-term issues associated with the hydrological modelling, in particular the 'trunk' streams of the Barwon–Darling and River Murray systems. An important issue for modelling such streams is the selection of inflows to be used to generate annual permitted take targets. For the purpose of this report, the annual permitted take targets in the trunk streams have been calculated based on the methodology used for the annual Cap target (i.e. under Cap reporting arrangements) for the transition years.
    - The independent audit reports of Cap models provide a number of recommendations for improving these models including in relation to the choice of inflows and improved estimation for the end of system flows (i.e. Menindee inflows).
    - As there was insufficient opportunity to thoroughly address these recommendations for this report, these issues are identified as areas of future improvement and are expected to be addressed through WRPs due by 2019.

- Australian Capital Territory
    - The water recovery to meet the ACT reduction target (4.9 GL) has been achieved through the purchase of entitlements in the NSW Murrumbidgee. In order for this recovery to be reflected in the annual permitted take in the ACT, an interstate trade account between NSW and the ACT is required. This is not yet in place though both NSW and the ACT have committed to establishing the necessary arrangements. For the purpose of this report, it has been assumed that this arrangement is already in place. This was considered the best way to report water use and permitted take for the transition period.

- South Australian Murray
    - For the Metropolitan Adelaide water use component of the SA Murray SDL resource unit annual permitted take, actual use for each of the four years has been used. In the absence of a climate adjusted model for this component of water use, this was seen to provide the most useful surrogate, noting that the actual take for Metropolitan Adelaide has been lower due to the operation of the Adelaide Desalination Plant. A climate adjusted approach for this component is expected to form part of the WRP under preparation for this area.

Appendix 5 sets out the nominated methods for environmental water adjustment that have been agreed between the MDBA and each of the Basin states for use during the transition period.

The methods adopted for the purpose of transition period water accounting better align with Basin Plan arrangements. In NSW and Victorian SDL resource units, this results in a larger adjustment to the raw estimates of annual permitted take. Accordingly, the annual and cumulative credits over the four years of this accounting period differ under the TDL and Cap reporting processes. There is no difference in the methodologies in Queensland and South Australia. In the ACT a difference only applies in 2015–16 reflecting progress in water recovery at that time.

In overall terms, over the four years of the reporting period, the TDL permitted take volumes are less than the comparable annual Cap targets by an average of around 120 GL per year.

Figure 21 presents transitional annual permitted take for surface water over the four years at the Basin scale and by Basin State. The reduction in the volume of annual permitted take at the Basin scale is also a consequence of reduced water availability due to climate conditions.

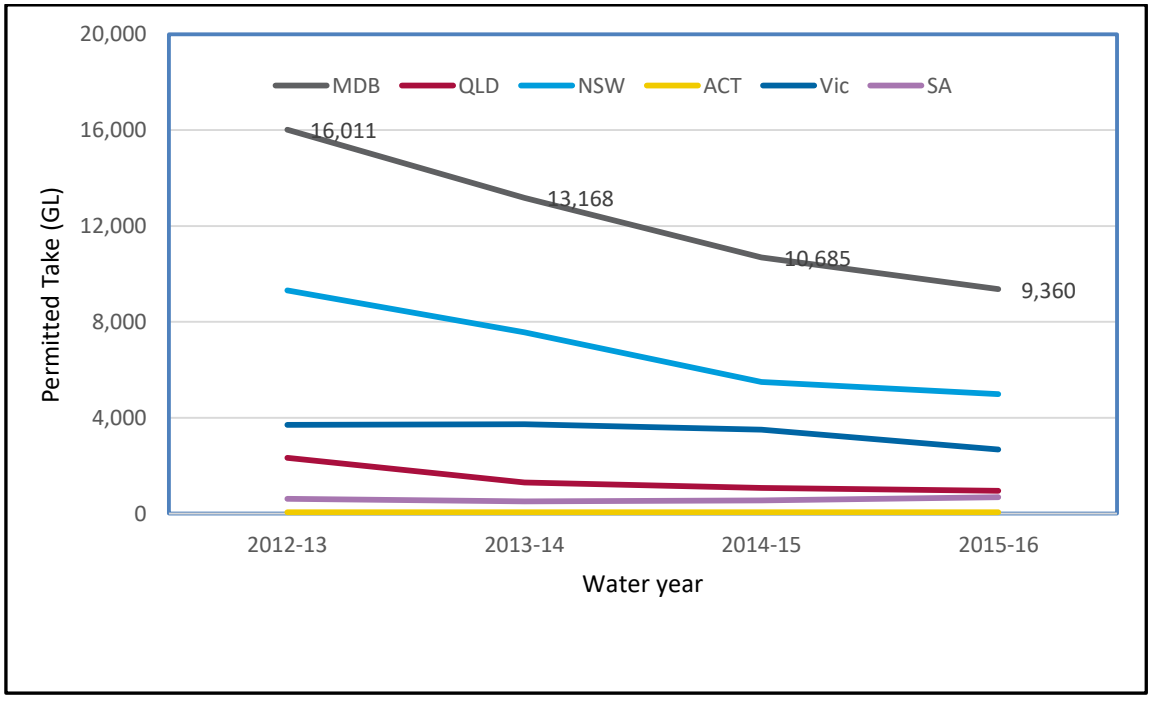


Figure 21 Basin and state scale surface water annual permitted take (GL) 2012–13 to 2015–16

7.2.1. Recommendation

Recommendation 3:

Improving the methods for adjusting annual permitted take to account for environmental water recovery.

During the transition period, an improved methodology — as compared with that used for Cap purposes — has been developed to account for environmental water recovery in the annual permitted take volume. This methodology will be superseded through more sophisticated methods that are expected to be developed by Basin states in the preparation of their WRPs

MDBA will work with Basin states throughout the transition period so that the best available methods for environmental water adjustment are incorporated into water resource plans.

This is fundamental to maintaining the long-term value of water that has been recovered to bridge the gap and hence achieving the SDLs. It is also essential in providing certainty to consumptive and environmental entitlement holders.

7.3. Surface water transitional diversion limits (TDLs)

The TDL for surface water is the BDL reduced each year by the estimated water recovery ('bridging the gap'), which is determined at the beginning of the water year (i.e. as at 1 July). The process and resulting decreasing TDL reflects the progressive reduction in water available for consumptive use.

The Basin scale TDL has been gradually decreasing from the BDL of 13,623 GL towards the SDL of 10,873 GL (Table 28).

Accounting for water recovery already achieved at the start of the transition period, the Basin scale TDL in 2012–13 was 12,537 GL.[21] By 2013–14 the TDL had decreased to 12,324 GL, with reductions to 12,034 GL and 11,931 GL in 2014–15 and 2015–16 respectively.

The TDL for the Intersecting Streams is BDL minus water recovery estimate that contributes to the BDL number in the Basin Plan. A revised BDL number for the Intersecting Streams is expected to emerge through the water resource plan (WRP) and accreditation process. The TDL in the Barwon–Darling is less than SDL because all held environmental water (HEW) recovered is higher than the required reduction amount. However, the HEW recovered amount contributes to the BDL number. Once the shared reduction amount is agreed by States, a revised TDL would follow the next reporting period.

In the Australian Capital Territory, the determination of the TDL has assumed ACT–NSW trade is in place and water recovery of 4.9 GL is considered from 1 July 2015.

[21] Water recovery refers to entitlements held and available for use by environmental water holders. The volumes cited do not include water recovery that is 'contracted', that is, entitlements secured under contracts but not yet transferred from the current owner to the relevant environmental water holder.

Table 25 Surface water BDLs, bridging the gap (BtG) recovery at 1 July and transitional diversion limits (GL) at SDL resource unit scale 2012–13 to 2015–16

	2012–13			2013–14			2014–15			2015–16		
	BDL	BtG as at 1 July	TDL	BDL	BtG as at 1 July	TDL	BDL	BtG as at 1 July	TDL	BDL	BtG as at 1 July	TDL
Queensland												
Paroo	9.9	-	9.9	9.9	-	9.9	9.9	-	9.9	9.9	-	9.9
Warrego	127.7	8.0	119.7	127.7	8.0	119.7	127.7	8.0	119.7	127.7	8.0	119.7
Nebine	31.2	1.0	30.2	31.2	1.0	30.2	31.2	1.0	30.2	31.2	1.0	30.2
Condamine–Balonne	978.3	23.1	955.2	978.3	34.6	943.7	978.3	40.3	938.0	978.3	53.8	924.5
Moonie	84.2	1.1	83.1	84.2	1.1	83.1	84.2	1.1	83.1	84.2	1.1	83.1
Queensland Border Rivers	320.1	4.2	315.9	320.1	5.8	314.3	320.1	6.6	313.5	320.1	8.5	311.6
Queensland total	**1,551.4**	**37.4**	**1,514.0**	**1,551.4**	**50.4**	**1,501.0**	**1,551.4**	**56.9**	**1,494.5**	**1,551.4**	**72.3**	**1,479.1**
New South Wales												
NSW Border Rivers	302.6	0.1	302.5	302.6	0.1	302.5	302.6	0.2	302.4	302.6	0.2	302.4
Intersecting Streams	114.0	0.2	113.8	114.0	0.2	113.8	114.0	0.2	113.8	114.0	0.2	113.8
Gwydir	450.2	42.5	407.7	450.2	42.5	407.7	450.2	42.5	407.7	450.2	46.9	403.3
Namoi	508.3	4.8	503.5	508.3	4.9	503.4	508.3	6.2	502.1	508.3	7.6	500.7
Macquarie –Castlereagh	734.3	53.9	680.4	734.3	61.5	672.8	734.3	73.2	661.1	734.3	75.4	658.9
Lachlan	618.4	48.3	570.1	618.4	48.8	569.6	618.4	49.6	568.8	618.4	49.6	568.8
Murrumbidgee	2,501.1	132.2	2,368.9	2,501.1	162.5	2,338.6	2,501.1	307.1	2,194.0	2,501.1	325.6	2,175.5
Barwon–Darling Watercourse	198.0	22.3	175.7	198.0	22.3	175.7	198.0	23.8	174.2	198.0	25.8	172.2
Lower Darling	60.5	0.4	60.1	60.5	0.4	60.1	60.5	1.0	59.5	60.5	1.0	59.5
NSW Murray	1,811.7	192.7	1,619.0	1,811.7	266.9	1,544.8	1,811.7	280.7	1,531.0	1,811.7	288.9	1,522.8
New South Wales total	**7,299.1**	**497.3**	**6,801.8**	**7,299.1**	**610.0**	**6,689.1**	**7,299.1**	**784.5**	**6,514.6**	**7,299.1**	**821.1**	**6,478.0**
Australian Capital Territory												
Australian Capital Territory total	**52.5**	**-**	**52.5**	**52.5**	**-**	**52.5**	**52.5**	**-**	**52.5**	**52.5**	**4.9**	**47.6**
Victoria												
Victorian Murray	1,707.1	234.0	1,473.1	1,707.1	251.1	1,456.0	1,707.1	297.6	1,409.5	1,707.1	314.4	1,392.7

	2012–13			2013–14			2014–15			2015–16		
	BDL	BtG as at 1 July	TDL	BDL	BtG as at 1 July	TDL	BDL	BtG as at 1 July	TDL	BDL	BtG as at 1 July	TDL
Kiewa	24.6	-	24.6	24.6	-	24.6	24.6	-	24.6	24.6	-	24.6
Ovens	83.4	0.1	83.3	83.4	0.1	83.3	83.4	0.1	83.3	83.4	0.1	83.3
Broken	56.2	0.0	56.2	56.2	0.1	56.1	56.2	0.1	56.1	56.2	0.2	56.0
Goulburn	1,689.4	211.4	1,478.0	1,689.4	228.1	1,461.3	1,689.4	278.3	1,411.1	1,689.4	293.0	1,396.4
Campaspe	152.6	6.3	146.3	152.6	28.9	123.7	152.6	29.0	123.6	152.6	29.0	123.6
Loddon	178.6	9.9	168.7	178.6	9.9	168.7	178.6	11.4	167.2	178.6	11.9	166.7
Wimmera–Mallee	128.5	-	128.5	128.5	22.6	105.9	128.5	22.6	105.9	128.5	22.6	105.9
Victoria total	**4,020.4**	**461.6**	**3,558.8**	**4,020.4**	**540.8**	**3,479.6**	**4,020.4**	**639.0**	**3,381.4**	**4,020.4**	**671.1**	**3,349.3**
South Australia												
South Australian Murray	665.0	90.3	574.7	665.0	98.3	566.7	665.0	108.9	556.1	665.0	122.4	542.6
South Australian Non-Prescribed Areas	3.5	-	3.5	3.5	-	3.5	3.5	-	3.5	3.5	-	3.5
Marne Saunders	2.9	-	2.9	2.9	-	2.9	2.9	-	2.9	2.9	-	2.9
Eastern Mount Lofty Ranges	28.3	-	28.3	28.3	-	28.3	28.3	-	28.3	28.3	-	28.3
South Australia total	**699.7**	**90.3**	**609.4**	**699.7**	**98.3**	**601.4**	**699.7**	**108.9**	**590.8**	**699.7**	**122.4**	**577.3**
Basin total	**13,623.1**	**1,086.5**	**12,536.6**	**13,623.1**	**1,299.5**	**12,323.6**	**13,623.1**	**1,589.3**	**12,033.8**	**13,623.1**	**1,691.8**	**11,931.3**

7.4. Groundwater permitted take

In the case of groundwater systems in the Basin most of the 81 SDL resource units have use levels below 75% of the SDL and for more than 2/3 of the SDL resource units, use is below half of the SDL. Accordingly for such systems, the average SDL can be used as a surrogate in the absence of a more sophisticated method.

However, SDLs are not yet in effect and water recovery to bridge the gap from the BDL to the SDLs is not complete. Consequently, the transitional SDL water accounting and compliance trial is using TDLs as the annual permitted take for groundwater. This is the approach adopted for all groundwater SDL resource units in this report.

For most groundwater SDL resource units, the TDL is the same as the current SDL because the majority of SDL resource units have the same or higher SDL than the associated BDL. Over the reporting period, TDL is different than the SDL only for:

- two SDL resource units in Queensland (Upper Condamine Alluvium (Central Condamine Alluvium) and Upper Condamine Alluvium (Tributaries)) where the Basin Plan set water recovery targets
- seven SDL resource units in New South Wales associated with the Achieving Sustainable Groundwater Entitlements (ASGE) Program that was still progressively coming in to effect during the four years covered by this report.

7.5. Groundwater transitional diversion limits (TDLs)

For most groundwater SDL resource units, the TDL is the same as the current SDL. This is because the majority of SDL resource units are not subject to water recovery to bridge the gap between the BDL and the SDL.

Water recovery to bridge a gap between the BDL and SDL is only required in two SDL resource units, the Queensland Upper Condamine Alluvium (Central Condamine Alluvium) and Upper Condamine Alluvium (Tributaries). However as at 1 July 2015, no groundwater had been recovered to bridge the gap in these two SDL resources units. Consequently, the TDL is the same as the BDL for these resource units.

Table 26 Groundwater transitional diversion limits (TDLs) in SDL resource units subjected to water recovery of HEW under 'bridging the gap' for 2012–13 to 2015–16

SDL resource unit	BDL (GL)	SDL (GL)	HEW 'bridging the gap' (GL)				Transitional diversion limit (GL)			
			2012–13	2013–14	2014–15	2015–16	2012–13	2013–14	2014–15	2015–16
Upper Condamine Alluvium (Central Condamine Alluvium)	81.4	46.0	0.00	0.00	0.00	0.00	81.4	81.4	81.4	81.4
Upper Condamine Alluvium (Tributaries)	45.5	40.5	0.00	0.00	0.00	0.00	45.5	45.5	45.5	45.5

Other SDL resource units where the TDL is different to the SDL over the reporting period are associated with a progressive reduction of groundwater allocations in New South Wales. In 2005, New South Wales introduced the ASGE Program, which aims to ensure the long-term sustainability of the groundwater systems in seven of the groundwater SDL resource units:

- the Upper Namoi Alluvium
- Lower Namoi Alluvium
- Lower Murrumbidgee Alluvium (deep)
- Lower Gwydir Alluvium
- Lower Lachlan Alluvium
- Lower Macquarie Alluvium and
- Lower Murray Alluvium (deep)

At the commencement of the water sharing plans, the entitlements for these systems were reduced. Where a licence holder previously extracted more than their new reduced entitlement, a supplementary water access licence was issued to allow adjustment to the reduction by provision of extra water. The allocation of water under these supplementary water access licences was progressively reduced over a 10-year adjustment period allowing licence holders to adapt. The amount of supplementary water and resulting decreasing TDL from 2012–13 to 2015–16 reflects the progressive reduction in supplementary allocations (Table 27).

In 2015–16, supplementary volumes had reduced to zero in all these areas with the exception of the Lower Lachlan Alluvium, which was reduced to zero on 1 July 2016. Therefore, at the end of the reporting period, the TDL is equal to the current SDL in six of these SDL resource units. In these SDL resource units there are no supplementary volumes available in 2015–16.

Groundwater TDLs at the SDL resource unit level for the four reporting years have been reported in the detailed groundwater data set at Appendix 2. See column headed ‘TDL (GL/y) s.71(1)(b) – permitted take’.

Table 27 Groundwater transitional diversion limits (TDLs) in SDL resource units that had entitlements reduced under the NSW ASGE Program for 2012–13 to 2015–16

SDL resource unit	BDL (GL)	SDL (GL)	Supplementary water (GL)				TDL (GL)			
			2012–13	2013–14	2014–15	2015–16	2012–13	2013–14	2014–15	2015–16
Lower Gwydir Alluvium	33.0	33.0	6.0	4.0	2.0	0.0	39.0	37.0	35.0	33.0
Lower Macquarie Alluvium	70.7	70.7	0.7	0.5	0.3	0.0	71.4	71.2	71.0	70.7
Lower Murray Alluvium (deep)	88.9	88.9	29.1	19.4	9.7	0.0	118.0	108.3	98.6	88.9
Lower Murrumbidgee Alluvium (deep)	273.6	273.6	12.4	8.3	4.1	0.0	286.0	281.9	277.7	273.6
Lower Namoi Alluvium	88.3	88.3	6.3	4.2	2.1	0.0	94.6	92.5	90.4	88.3
Lower Lachlan Alluvium	123.4	117.0	10.6	8.5	6.4	4.2	127.6	125.5	123.4	121.2
Upper Namoi Alluvium	123.4	123.4	12.4	8.3	4.3	0.0	135.8	131.7	127.7	123.4

7.6. Transition assessment of actual take against permitted take and the TDL

> *s.71(1)(g) an assessment of compliance with any long-term annual diversion limit for the water resources of the area, or for a particular part of those water resources, in accordance with the method specified in the Basin Plan*

This section provides an indicative assessment of water take throughout the Basin at the SDL resource unit level. While there are no formal compliance arrangements in operation during the trial, this assessment, uses the framework set out in the Water Act and the Basin Plan that will apply from 1 July 2019.

As set out in earlier sections of this report, the TDL represents the progress of water recovery against the BDL for each year of the transition period (2012–13 to 2018–19). As each year of the transition period progresses, the TDL will approach the SDL until the SDL is achieved by 2019.

During the transition period, annual permitted take is determined with reference to the TDL for that year through a process that accounts for the recovery of water entitlements from the consumptive pool to 'bridge the gap' as at the start of the relevant year. The annual permitted take is then determined based on the best available method for this purpose.

As already discussed, annual actual take has been less than annual permitted take at the Basin scale for both surface water and groundwater in all years of the reporting period. Consequently, there have been annual credits in each year of the reporting period and the Basin scale transitional cumulative balance at the end of 2015–16 had risen to 4,271 GL for surface water and 7,939 GL for groundwater. The transitional cumulative balances will not carryover to the formal compliance framework as the Basin Plan requires the Register of Take to commence on 1July 2019 with a zero balance.

The pattern of cumulative credits evident in these transitional accounts are broadly similar to that observed in the Cap Register. This in part reflects the ongoing use of Cap models for the purpose of calculating the annual permitted take amounts during the transitional period. It also might be due to the potential causes of these credits in the Cap Register which are considered to include:

- Conservative water use decision making. A possible consequence of the millennium drought is that overall, irrigators may have been more conservative in how much crop they plant to ensure they will have enough water to bring the crop through to harvest. This would result in less water use against allocations and the generation of annual Cap credits.
- Cap models used to determine annual Cap targets based on 1993–94 arrangements do not incorporate more recent carryover rules that have been established in the period since this time including in response to the millennium drought. This means that modelled annual Cap targets could be expected to be higher than if carryover were to be incorporated, meaning annual credits are again more likely.
- Annual Cap Credits were relatively small for 2015–16. It is as yet unclear as to the extent the usage below Cap targets in previous years can be expected to continue.

The methods for determining surface water annual permitted take that are developed by Basin states in the WRPs under preparation will be based on planning assumptions with respect to utilisation and use of allocations and carryover. The planning assumptions adopted will influence

the annual permitted take amounts from 2019. Accordingly, any discernible patterns in the accumulation of annual actual take credits or debits will not be apparent for some years after the SDLs take effect from 2019.

The MDBA is preparing guidance material for Basin states about how it will approach the regulation of possible instances of non-compliance with the SDLs under section 6.12 of the Basin Plan, including a guideline on what will be considered a 'reasonable excuse' under this section. The guidance material and MDBA's approach to such matters will be consistent with the Compliance Strategy of the MDBA as it is updated over time.

7.6.1. Transitional assessment — Surface water

Appendix 1 shows the transitional annual credits/debits and the transitional adjusted cumulative balance for each surface water SDL resource unit.

Table 28 and Figure 22 show Basin scale TDL, annual permitted take, annual actual take, annual credits and the adjusted cumulative balance for each of the four years of the reporting period.

The Basin Plan required that the effect of disposal or acquisition of environmental water not be included in the annual permitted take estimates (refer section 10.12(3)) but that the net effect of such activity is used to adjust the cumulative balance of credits/debits that is calculated in the Register of Take (refer section 6.12(1)(a)). This adjustment for each year for each SDL resource unit is shown in Appendix 1. The overall effect at the Basin scale is presented in Table 28.

Table 28 Basin scale surface water TDL, transitional annual permitted take, annual actual take, transitional annual credits and cumulative balance for 2012–13 to 2015–16. All values in GL.

	2012–13	2013–14	2014–15	2015–16
TDL	12,536.6	12,323.6	12,033.8	11,931.3
Permitted take	16,011.1	13,167.7	10,685.3	9,359.8
Actual take	14,092.8	11,656.1	10,135.8	9,109.9
Annual credit	1,918.4	1,511.6	549.5	249.9
Adjustment for disposal or acquisition of environmental water	-0.2	25.2	-4.3	20.6
Adjusted cumulative balance	1,918.1	3,455.0	4,000.1	4,270.6

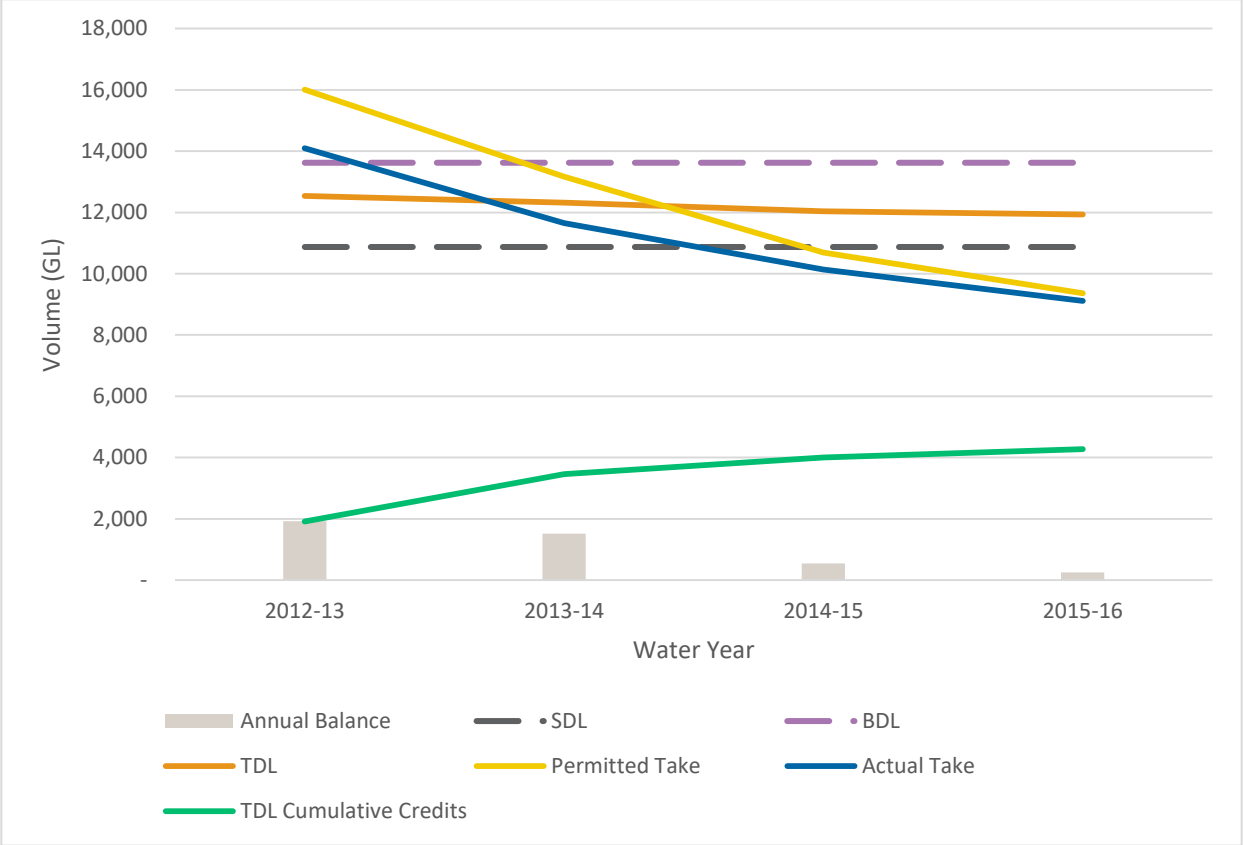


Figure 22 Basin scale TDL, transitional annual permitted take, annual actual take and transitional credits and cumulative TDL credits 2012–13 to 2015–16

At the SDL resource unit scale, there were 17 instances among the 116 assessments of take over the reporting period where annual actual take exceed annual permitted take and an annual debit was recorded in the trial Register of Take. Noting that compliance against the TDL does not apply during the transition period, there were no instances where these annual debits resulted in a cumulative balance debit of 20% or more of the TDL.

7.6.2. Transitional assessment — Groundwater

Appendix 2 shows the transitional annual credits and the transitional adjusted cumulative balance for each groundwater SDL resource unit.

As discussed in section 7.5, for the purpose of the trial of the SDL water accounting and compliance framework, annual permitted take for groundwater is being set at the relevant TDL. Table 29 shows Basin scale TDL / annual permitted take, annual actual take, annual credits and cumulative balance for groundwater across the four years of the reporting period.

Actual take in most groundwater SDL resource units was below permitted take in all years. Across the 81 groundwater SDL resource units, there were only seven instances among the 324 assessments of take where annual actual take exceeded annual permitted take.

There was only one groundwater SDL resource unit where the cumulative debit exceeded 20% over the reporting period. This was the Lower Gwydir Alluvium SDL resource unit in New South Wales.

Table 29 Basin scale groundwater TDL/permitted take, annual actual take, transitional annual credits and TDL cumulative balance for 2012–13 to 2015–16. All values in GL.

	2012-13	2013-14	2014-15	2015-16
TDL/permitted take	3,451	3,427	3,403	3,378
Actual take	1,231	1,398	1,556	1,535
Annual credit	2,220	2,030	1,846	1,843
TDL cumulative balance	2,220	4,249	6,096	7,939

In the New South Wales Lower Gwydir Alluvium SDL resource unit, annual actual take was greater than the permitted take in 2013–14, 2014–15 and 2015–16. New South Wales has advised MDBA that the current levels of annual actual take in this resource unit are being managed within the compliance rules for the NSW long-term average annual extraction limit (state plan limit) under existing state legislative arrangements.

Under these existing state arrangements, carryover of allocations in licence holders' accounts were available to use in these years and users legally extracted volumes within their account rules (refer Appendix 2, column headed 'Actual Take / (Allocation + Carry Over)', which presents actual use compared with the allocation and carryover available in this SDL resource unit).

For the purpose of transitional water take reports, the MDBA has set the permitted take equal to the long-term average SDL, or where a state plan provides for higher diversions, the permitted take is equal to the state plan limit (refer Section 7.4). This is the approach adopted for all groundwater SDL units in this transitional period as a 'road test'.

In the Lower Gwydir Alluvium for the first three years of the reporting period, the state plan limit is used as permitted take. There were progressive reductions in the plan limit through to June 2015, after which time the state plan limit is equal to the Basin Plan SDL.

The cumulative balance of actual take against the permitted take is –8.1 GL at the end of 2014–15 and -10.6 GL at the end of 2015–16. This corresponds to a cumulative debit of 23% and 32%, respectively. This is a situation that, if it were to occur under the Register of Take after

2019, would require NSW to provide a reasonable excuse for this situation or be found to be non-compliant with the SDL.

Further analysis indicates that once the reporting period includes data from 2016–17 (the NSW Water Register reports actual take of 23.1 GL, which results in an estimated annual credit of 9.9 GL), the cumulative balance will return to a debit of less than 20% as of June 2017 (estimated cumulative balance of –0.7 GL or –2%).

All states will need to take account of the changes in annual actual take from SDL resource units in the development of the method for determining annual permitted take that will be applied in the relevant water resource plan.

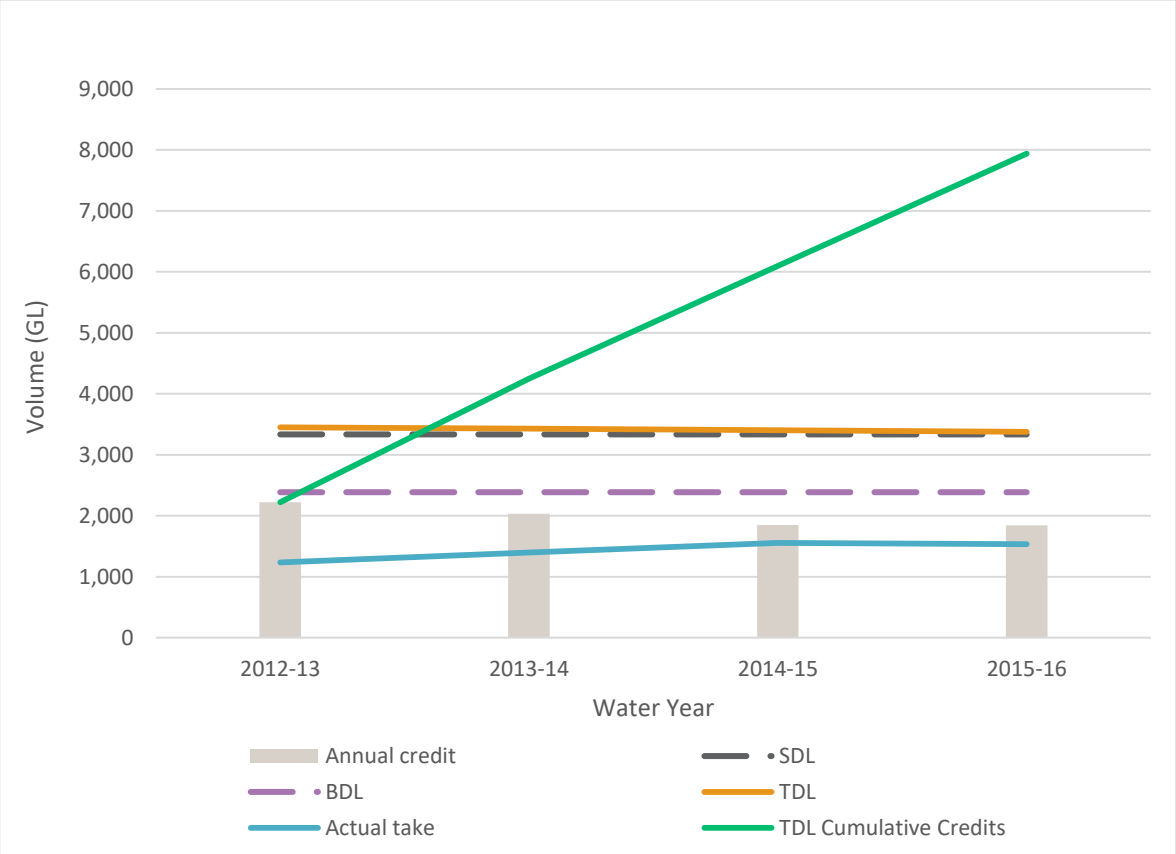


Figure 23 Groundwater Basin scale transitional diversion limit, annual actual take, and annual credits and cumulative balance 2012–13 to 2015–16

Part 3:
Environmental water availability and use

8. Environmental water

In line with objective 1 of the trial of the SDL water accounting and compliance framework, Part 3 of this report sets out information about environmental water as reported to the MDBA in accordance with s.32 of the *Water Act 2007* (Cth) and Matter 9 of Schedule 12 of the Basin Plan. These provisions are reproduced in full below and the relevant sub-provision appears at the beginning of the section that presents the information reported against it.

Water Act 2007— Part 2 — Division 1 Subdivision C — Environmental management

s.32 Authority to identify and account for held environmental water

The Authority must identify and account for held environmental water in the Murray–Darling Basin for each financial year.

Basin Plan 2012 — Schedule 12 – Matters for evaluation and reporting requirements

Matter 9 – The identification of environmental water and the monitoring of its use

Matter 9.1 Volume of water available for the identification and accounting of held environmental water (HEW)

Matter 9.1.1 Volume of HEW entitlements by SDL resource unit

Matter 9.1.2 Carryover and forfeiture of HEW by SDL resource unit

Matter 9.1.3 Volume of HEW used by SDL resource unit

Matter 9.2 – volume of planned environmental water available

Matter 9.2.1 Volume of PEW by WRP Area

This part of the report (Part 3) identifies and accounts for held environmental water in the Murray–Darling Basin for each water year. Information is provided for each year of the reporting period and detailed reporting commences with the 2013–14 water year. This section also makes general reference to the identification of planned environmental water in the Basin.

Water used for environmental purposes is referred to as environmental water. The Water Act (sections 4 and 6) and the Basin Plan recognise two types of environmental water: held environmental water (HEW), and planned environmental water (PEW).

Held environmental water (HEW) is defined as water available under water access rights, water delivery rights and irrigation rights that is used for environmental purposes. Typically, water rights owned by an environmental water holder, such as the Commonwealth Environmental Water Holder (CEWH), are referred to as HEW entitlements and contribute to the majority of the HEW available.

By distinction, planned environmental water (PEW) is environmental water that is generally not callable or associated with any water access rights.

There are some exceptions in New South Wales where PEW exists in the form of environmental water allowances in particular valleys. These exist as volumes in storage that may be called in certain circumstances. PEW is discussed in more detail at the end of this section.

The Basin Plan requires a reduction in long-term average consumptive surface water diversions to achieve the basin wide sustainable diversion limit (SDL) of 10,873 GL. The reduction amount is currently a long-term average volume of 2,750 GL and is in addition to HEW that has been recovered for environmental use prior to 30 June 2009.[22] The volume of the reduction amount is to be made available to achieve the environmental objectives of the Basin Plan.

The Australian Government has committed to secure the reduction amount to achieve the SDL through the recovery of water entitlements that will be registered as HEW and owned by the Commonwealth Environmental Water Holder. This commitment has been made to avoid any impacts on consumptive entitlement holders associated with the reduction in the size of the consumptive pool.

The recovery of entitlements has been prioritised through investment in on- and off-farm irrigation infrastructure projects rather than through the purchase of entitlements. As part of this approach, non-strategic entitlement purchase has been capped at 1,500 GL.

It is important to note that registered HEW entitlements retain the same characteristics as the consumptive entitlements from which they are sourced. For example, a New South Wales Murray general security entitlement registered as HEW will have the same characteristics in terms of access rules, fees, charges and tradability as the original New South Wales Murray general security entitlement previously registered as a consumptive entitlement.

Like consumptive water, a portion of HEW is held in the storages and represents the water allocated to water entitlements that are owned by the various environmental water holders. Like irrigation water, this HEW remains in storage until called upon by the relevant Basin state to meet orders submitted by its owners for use at environmental sites. This water is subject to the same storage rules, storage losses, carryover and forfeit rules as consumptive water held in the storage.

8.1. Determining the long-term average annual volume of HEW

For reporting of HEW entitlements, both the water share volume and a long-term annual average use volume is shown.

The long-term annual average use volume is derived using long-term diversion limit equivalence (LTDLE) factors. These are also known as Cap factors. To derive the long-term annual average volume of an entitlement the water share value is multiplied by the LTDLE factor to give the long-term annual average volume.

For example, if an entitlement has a 50 ML water share value and a LTDLE factor of 0.9, the long-term annual average volume of the entitlement is 50 x 0.9 = 45 ML.

LTDLE factors enable differing entitlements across the Basin to be converted into a common currency to allow for direct comparison between products with differing reliability and expected

[22] This volume is subject to change through amendments to the Basin Plan arising from the northern Basin Review and the operation of SDL adjustment mechanism.

usage under the rules of the relevant water sharing arrangements. LTDLE factors are used to estimate the volume of water recovered to 'bridge the gap'.

In surface water there is a unique LTDLE factor for each class of entitlement in each SDL resource unit. In groundwater, entitlements associated with HEW have been assumed for the purpose of this report to have an LTDLE factor of 1.00, therefore the entitlement volume equals the long-term diversion limit equivalent volume.

The LTDLE factors that are currently being used to estimate the volume of water recovery to bridge the gap and that have been used to determine the LTDLE volumes in this report, are those adopted by the Murray–Darling Basin Ministerial Council in November 2011. The MDBA expects that LTDLE factors will change due to refinements in their estimation that emerge as Basin states bring forward their water resource plans for accreditation or earlier, through the 'planning assumptions' process agreed by Ministerial Council in 2015. This will in turn change the estimates of progress in water recovery towards bridging the gap.

Changes to LTDLE factors may occur because the water resource plans will reflect the best available information about such things as the forecast utilisation of entitlements by various users and the forecast impact of any new or changed water sharing rules introduced by Basin states. Water resource plans must also use the Basin Plan historical climate conditions (1895 to 2009) as the basis for modelling water availability and this differs from the periods used for some of the 2011 factors.

The 'planning assumptions' process agreed by Ministerial Council allowed each state to identify and provide to the MDBA relevant 'planning assumptions' that would support each state's proposed water resource plans. The assumptions include proposed methods that would be used to inform the demonstration of SDL compliance in each SDL resource unit. The planning assumptions enable the calculation of a set of LTDLE factors for the period that the water resource plan operates, and this in turn informs the Australian Government's water recovery strategy.

8.2. Commencement of environmental water data reporting

2013–14 was the first year Basin states and the Commonwealth Environmental Water Holder commenced reporting environmental water data in accordance with Basin Plan requirements. Noting this is the first set of Basin-wide HEW accounts that have been prepared, further improvements are expected over time. Other calculations, including annual permitted take estimates that rely upon HEW data may also be refined and improve over time too.

The seven-year transition period from 2012 to 2019 allows these issues to be identified and addressed before compliance commences on 1 July 2019. In addition, there may be improvements in Basin state reporting of the volume of HEW authorised, used, carried over and forfeited.

8.3. Available held environmental water entitlements

Matter 9.1 Volume of water available for the identification and accounting of held environmental water (HEW)

Total available HEW is made up of three components of water recovery:

1. Entitlements recovered prior to the Basin Plan and/or entitlements recognised as providing environmental benefits when the baseline diversion limit was set.

2. Entitlements recovered after the baseline diversion limit was established that are not gap-bridging because they were not previously part of consumptive water (e.g. evaporation savings).

3. Entitlements recovered to bridge the gap between baseline diversion limit to the SDL (currently a long-term average annual target of 2,750 GL).

Due to the nature of water recovery projects — especially those incorporating significant infrastructure upgrades or renewals — progress in water recovery does not proceed regularly. From investment to realisation of the savings takes time, sometimes in the order of five or more years. There are a number of water recovery projects still underway which are expected to deliver HEW entitlements in the near future. These contribute to bridging the gap.

In terms of describing total HEW recovery and progress towards achieving the current Basin Plan reduction amount of 2,750 GL/y, the following terms are used:

- HEW ‘contracted’, and
- HEW ‘available’.

HEW ‘contracted’ refers to entitlements secured under contracts but not yet transferred from the current owner to the relevant environmental water holder.

HEW ‘available’ refers to entitlements that have been transferred to the ownership of the relevant environmental water holder and are available for use.

Contracted HEW is reported by the MDBA in conjunction with the Department of Agriculture and Water Resources on a quarterly basis. Information on these quarterly updates are available at http://www.mdba.gov.au/managing-water/environmental-water/progress-water-recovery. These impending HEW entitlements are listed in the HEW register maintained by the MDBA when the entitlement becomes ‘available’.

This part of the report discusses HEW available and not HEW contracted.

8.4. Surface water HEW

8.4.1. Surface water HEW available

Section 32 of the Water Act requires the MDBA to identify and account for all HEW in the Murray–Darling Basin. To meet this obligation, Basin states and the Commonwealth Environmental Water Holder report annually on existing and newly obtained HEW entitlements.

Over the reporting period, total surface water HEW available has increased by 907 GL in long-term diversion limit equivalence (LTDLE) terms from 1,880 GL at 30 June 2012 to 2,787 GL at 30 June 2016.

Reporting of surface water HEW entitlements over this period has improved. Basin states have reviewed their entitlements to confirm with greater certainty that individual entitlements are being used for environmental outcomes. Basin states have also identified some additional HEW entitlements that existed at baseline, or generally at 30 June 2009, that were not previously recognised as HEW.

The HEW register is a formal database, maintained by the MDBA to meet the requirements of the Water Act and the Basin Plan. It records all HEW entitlements registered in the Basin and is the source of all volumes presented in this report.

The total volume of surface water HEW entitlements held at each 30 June over the period 2012 to 2016 is shown in Table 30. This table shows all surface water HEW entitlements in the Basin including those entitlements that were HEW before the Basin Plan commenced and those that have been acquired since it commenced.

Table 30 Total surface water held environmental water (HEW) entitlements available as at 30 June for the period 2012 to 2016

	2012		2013		2014		2015		2016	
SDL resource unit	HEW entitlements (GL)	long-term HEW (GL - LTDLE)	HEW entitlements (GL)	long-term HEW (GL - LTDLE)	HEW entitlements (GL)	long-term HEW (GL - LTDLE)	HEW entitlements (GL)	long-term HEW (GL - LTDLE)	HEW entitlements (GL)	long-term HEW (GL - LTDLE)
Queensland										
Paroo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Warrego	16.1	8.0	16.1	8.0	16.1	8.0	16.1	8.0	16.1	8.0
Unsupplemented	16.1	8.0	16.1	8.0	16.1	8.0	16.1	8.0	16.1	8.0
Nebine	5.9	1.0	5.9	1.0	5.9	1.0	5.9	1.0	5.9	1.0
Unsupplemented	5.9	1.0	5.9	1.0	5.9	1.0	5.9	1.0	5.9	1.0
Condamine-Balonne	35.0	23.1	49.6	34.6	57.4	40.3	85.3	53.8	89.8	57.1
Medium	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0
Unsupplemented	35.0	23.1	49.6	34.6	57.3	40.2	62.1	43.7	66.6	47.0
Overland flow licence	0.0	0.0	0.0	0.0	0.0	0.0	23.2	10.0	23.2	10.0
Moonie	1.4	1.1	1.4	1.1	1.4	1.1	1.4	1.1	1.4	1.1
Unsupplemented	1.4	1.1	1.4	1.1	1.4	1.1	1.4	1.1	1.4	1.1
Queensland Border Rivers	11.8	4.2	16.0	5.8	18.3	6.6	23.4	8.5	32.7	12.2
Medium	10.6	3.6	11.7	4.0	13.8	4.7	15.5	5.2	15.5	5.2
Unsupplemented	1.2	0.6	4.3	1.8	4.5	1.9	7.9	3.2	17.2	7.0
Queensland total	**70.2**	**37.4**	**89.0**	**50.4**	**99.1**	**56.9**	**132.1**	**72.3**	**145.9**	**79.4**
New South Wales										
NSW Border Rivers	0.3	0.1	0.3	0.1	0.4	0.2	0.4	0.2	3.0	1.0
General security B	0.3	0.1	0.3	0.1	0.4	0.2	0.4	0.2	1.7	0.7
Supplementary Access	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.4
Intersecting Streams	8.1	8.1	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8
Unregulated	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
Unregulated - special additional high flow	0.0	0.0	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
Gwydir	126.5	42.5	126.5	42.5	130.5	44.2	136.0	48.6	136.0	48.6
High security	0.4	0.4	0.4	0.4	1.6	1.6	5.8	5.8	5.8	5.8
General security	106.6	38.4	106.6	38.4	106.6	38.4	106.6	38.4	106.6	38.4

	2012		2013		2014		2015		2016	
SDL resource unit	HEW entitlements (GL)	long-term HEW (GL - LTDLE)	HEW entitlements (GL)	long-term HEW (GL - LTDLE)	HEW entitlements (GL)	long-term HEW (GL - LTDLE)	HEW entitlements (GL)	long-term HEW (GL - LTDLE)	HEW entitlements (GL)	long-term HEW (GL - LTDLE)
Supplementary Access	19.5	3.7	19.5	3.7	22.2	4.2	23.6	4.5	23.6	4.5
Namoi	6.2	4.8	6.3	4.9	8.2	6.3	9.9	7.6	10.8	8.3
General security	6.2	4.8	6.3	4.9	8.2	6.3	9.9	7.6	10.8	8.3
Macquarie-Castlereagh	129.9	53.9	148.0	61.5	181.2	75.1	187.3	77.3	187.3	77.3
General security	126.6	53.2	144.7	60.8	170.5	71.6	174.6	73.4	174.6	73.4
Supplementary Access	3.3	0.7	3.3	0.7	7.7	1.6	9.7	2.1	9.7	2.1
Unregulated	0.0	0.0	0.0	0.0	2.9	1.9	2.9	1.9	2.9	1.9
Lachlan	124.5	53.3	125.4	53.8	126.2	54.6	126.2	54.6	126.2	54.6
High security	1.7	1.7	1.9	1.9	2.7	2.7	2.7	2.7	2.7	2.7
General security	122.8	51.6	123.5	51.9	123.5	51.9	123.5	51.9	123.5	51.9
Murrumbidgee	442.7	291.3	486.7	321.1	1,037.3	577.5	1,062.6	595.9	1,078.3	607.0
High security	38.1	36.2	40.8	38.7	41.8	39.7	44.2	42.0	44.4	42.2
General security	347.2	221.8	386.0	246.6	394.1	251.8	412.2	263.4	421.5	269.3
Coleambally Irrigation Conveyance	9.2	8.8	10.6	10.1	12.3	11.7	12.4	11.8	12.6	12.0
Murrumbidgee Irrigation Conveyance	20.6	19.8	21.8	21.0	26.2	25.2	31.0	29.7	35.7	34.2
Regulated River Conveyance	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Supplementary Access	26.5	3.7	26.5	3.7	26.5	3.7	26.5	3.7	27.7	3.9
Supplementary Access (Lowbidgee)	0.0	0.0	0.0	0.0	529.1	240.2	529.1	240.2	529.1	240.2
Unregulated	0.0	0.0	0.0	0.0	6.3	4.2	6.3	4.2	6.3	4.2
Barwon-Darling Watercourse	22.3	22.3	22.3	22.3	23.8	23.8	25.8	25.8	28.3	28.3
Unregulated	22.3	22.3	0.0	0.0	1.5	1.5	1.5	1.5	1.5	1.5
Unregulated (A class)	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Unregulated (B class)	0.0	0.0	10.8	10.8	10.8	10.8	11.8	11.8	14.3	14.3
Unregulated (C class)	0.0	0.0	11.5	11.5	11.5	11.5	12.5	12.5	12.5	12.5
Lower Darling	298.8	71.0	298.8	71.0	299.5	71.6	299.5	71.6	301.0	72.8
High security	0.5	0.5	0.5	0.5	0.9	0.8	0.9	0.8	1.0	0.9
General security	48.3	47.4	48.3	47.4	48.6	47.6	48.6	47.6	50.0	48.8
Supplementary Access	250.0	23.1	250.0	23.1	250.0	23.1	250.0	23.1	250.0	23.1

SDL resource unit	2012		2013		2014		2015		2016	
	HEW entitlements (GL)	long-term HEW (GL - LTDLE)	HEW entitlements (GL)	long-term HEW (GL - LTDLE)	HEW entitlements (GL)	long-term HEW (GL - LTDLE)	HEW entitlements (GL)	long-term HEW (GL - LTDLE)	HEW entitlements (GL)	long-term HEW (GL - LTDLE)
NSW Murray	470.4	317.2	561.0	391.4	609.3	430.9	619.4	439.1	632.6	450.0
High security	7.8	7.4	13.7	13.0	22.3	21.2	22.8	21.7	24.8	23.6
General security	349.6	283.0	433.1	350.6	441.8	357.7	450.2	364.5	456.5	369.6
Regulated River Conveyance	0.0	0.0	1.2	1.0	31.9	25.0	32.9	25.8	38.0	29.8
Supplementary Access	100.0	17.8	100.1	17.8	100.2	18.0	100.2	18.0	100.2	18.0
Unregulated	13.0	9.0	13.0	9.0	13.2	9.1	13.2	9.2	13.2	9.2
New South Wales total	**1,629.7**	**864.4**	**1,793.3**	**986.4**	**2,434.2**	**1,302.1**	**2,484.9**	**1,338.5**	**2,521.4**	**1,365.8**
Australian Capital Territory										
Australian Capital Territory (Surface Water)	0.0	0.0	0.0	0.0	0.0	0.0	7.7	4.9	7.7	4.9
NSW Murrumbidgee general security	0.0	0.0	0.0	0.0	0.0	0.0	7.7	4.9	7.7	4.9
Australian Capital Territory total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**7.7**	**4.9**	**7.7**	**4.9**
Victoria										
Victorian Murray	460.3	361.8	478.5	379.0	575.7	440.1	622.5	479.9	650.9	504.1
High reliability	306.4	292.5	324.2	309.4	378.0	360.7	393.9	376.0	416.5	397.7
Low reliability	119.6	41.3	120.0	41.5	123.4	43.3	132.3	46.8	137.7	49.0
Provisional	0.0	0.0	0.0	0.0	0.0	0.0	22.0	20.9	22.4	21.3
Provisional - Unregulated Entitlement	34.3	28.1	34.3	28.1	74.3	36.1	74.3	36.1	74.3	36.1
Kiewa	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ovens	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
High reliability	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Broken	0.1	0.0	0.1	0.1	0.1	0.1	0.3	0.2	0.3	0.2
High reliability	0.0	0.0	0.1	0.1	0.1	0.1	0.3	0.2	0.3	0.2
Low reliability	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Goulburn	496.1	394.7	514.2	411.4	536.3	430.3	588.0	476.9	617.0	501.7
High reliability	302.4	288.4	319.7	304.8	337.4	321.5	347.8	331.8	368.6	352.1
Low reliability	193.7	106.3	194.5	106.6	198.9	108.8	208.5	114.9	215.6	118.4
Provisional	0.0	0.0	0.0	0.0	0.0	0.0	31.7	30.1	32.8	31.2

SDL resource unit	2012		2013		2014		2015		2016	
	HEW entitlements (GL)	long-term HEW (GL - LTDLE)	HEW entitlements (GL)	long-term HEW (GL - LTDLE)	HEW entitlements (GL)	long-term HEW (GL - LTDLE)	HEW entitlements (GL)	long-term HEW (GL - LTDLE)	HEW entitlements (GL)	long-term HEW (GL - LTDLE)
Campaspe	12.0	9.3	12.0	9.4	35.7	32.0	35.7	32.0	35.7	32.0
High reliability	6.5	6.2	6.6	6.3	25.7	24.6	25.7	24.6	25.7	24.6
High reliability/fixed annual losses	0.0	0.0	0.0	0.0	1.7	1.7	1.7	1.7	1.7	1.7
Low reliability	5.4	3.1	5.4	3.1	8.4	5.8	8.4	5.8	8.4	5.8
Loddon	13.4	10.9	13.4	10.9	17.0	14.3	17.4	14.7	17.4	14.7
High reliability	10.7	10.2	10.7	10.2	14.3	13.6	14.8	14.1	14.8	14.1
Low reliability	2.6	0.7	2.6	0.7	2.6	0.7	2.6	0.7	2.6	0.7
Provisional - Regulated Entitlement	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0
Wimmera-Mallee (Surface Water)	40.6	38.2	68.6	60.8	69.6	61.8	69.6	61.8	69.6	61.8
Irrigation product including losses	0.0	0.0	28.0	22.6	28.0	22.6	28.0	22.6	28.0	22.6
Wetlands	0.0	0.0	0.0	0.0	1.0	0.9	1.0	0.9	1.0	0.9
Wimmera Mallee Pipeline Product	40.6	38.2	40.6	38.2	40.6	38.2	40.6	38.2	40.6	38.2
Victoria total	**1,022.5**	**815.1**	**1,086.8**	**871.7**	**1,234.4**	**978.7**	**1,333.6**	**1,065.6**	**1,390.9**	**1,114.6**
South Australia										
SA Murray	175.9	163.5	187.3	174.0	207.4	192.9	222.4	206.4	239.9	222.2
Class 1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Class 3a / 3b	106.7	96.1	115.6	104.0	127.5	114.7	142.5	128.2	160.0	144.0
Class 4	0.1	0.1	37.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Class 7	37.3	35.6	34.2	35.6	37.3	35.6	37.3	35.6	37.3	35.6
Class 9	31.7	31.8	34.2	34.2	42.5	42.5	42.5	42.5	42.5	42.5
SA Non-Prescribed Areas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Marne Saunders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eastern Mount Lofty Ranges	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
South Australia total	**175.9**	**163.5**	**187.3**	**174.0**	**207.4**	**192.9**	**222.4**	**206.4**	**239.9**	**222.2**
Basin total	***2,898.3***	***1,880.4***	***3,156.3***	***2,082.5***	***3,975.1***	***2,530.5***	***4,180.6***	***2,687.8***	***4,305.7***	***2,786.9***

Table 30 shows the NSW Intersecting Streams SDL resource unit has an estimated recovery of 17 GL LTDLE. This figure is based on the entitlements recovered and a LTDLE factor of 1.00. There is some doubt about this value, as the reported diversions over the Cap reporting period remained static at 3 GL/y for over 20 years. In addition, the Authority estimated the baseline watercourse diversions as 3 GL/y in determining the SDLs for the Basin Plan.

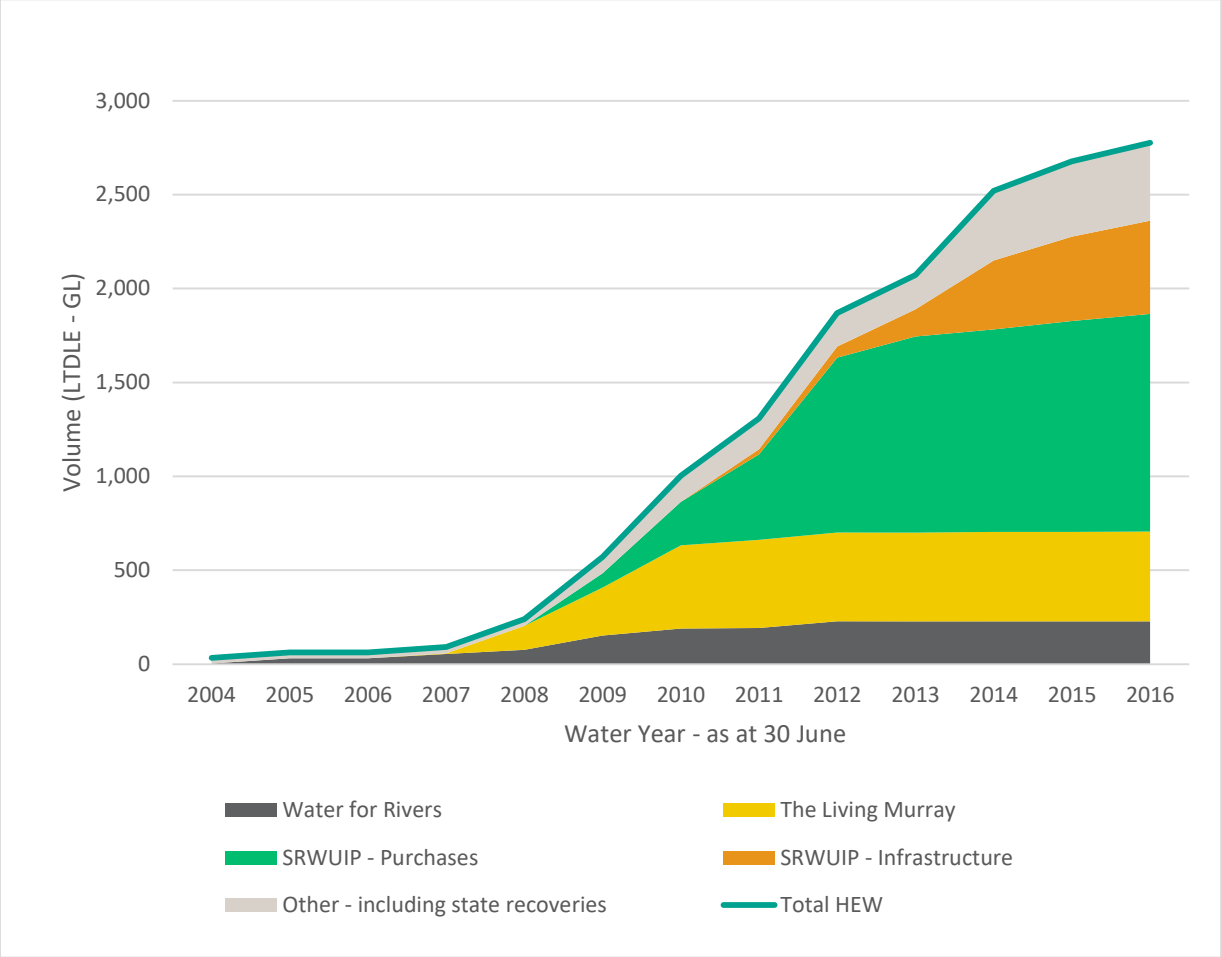
Therefore, whilst there are entitlements that can be utilised by the HEW owner, the long-term value associated with these entitlements will require further work by New South Wales. These values are not used in calculations to determine the TDL or permitted take in this report. Further work is required to improve the understanding of actual diversions in this SDL resource unit and determine an appropriate LTDLE to recognise recoveries in the NSW Intersecting Streams.

HEW entitlements are largely generated from water recovery programs funded by the Australian Government and /or Basin state governments. Water recovery programs commenced in the early 2000s and include:

- Pre-Basin Plan water recovery programs or pre-existing environmental water
    - Water for Rivers – 228 GL LTDLE HEW. This returns 158 GL to the Snowy River and 70 GL HEW for the River Murray
    - The Living Murray initiative – 488 GL LTDLE HEW for the River Murray
    - Victorian government initiatives – 76 GL LTDLE HEW (75 GL for Wimmera–Mallee and 1 GL for the Loddon)
    - South Australian class 9 wetlands entitlement – 34 GL LTDLE HEW
    - New South Wales initiatives – 99 GL LTDLE HEW (72 GL for the Murrumbidgee, 25 GL for the Murray and 2 GL for the Macquarie)
    - NSW Murrumbidgee pre-existing environmental water – 40 GL LTDLE
    - establishing consumptive limits, lower than Cap, in some NSW water sharing plans – contributing 241 GL LTDLE for a lower consumptive limit rather than creating HEW
- Bridging the gap programs under the Basin Plan
    - Australian Government led Sustainable Rural Water Use and Infrastructure Program (SRWIUP)
    - Other initiatives including water gifted to the Australian Government and state based recovery programs

As shown in Figure 24, HEW entitlements have been progressively recovered since 2004 to meet the requirements of state based programs and those of the Basin Plan recovery target. With the commencement of reporting HEW entitlements for the purpose of this report from 2013–14, data from this time forward incorporates pre-existing HEW that was captured in this data.

The rate of increase in HEW entitlements has slowed over the last three years as the remaining gap to achieving the water recovery target draws closer.



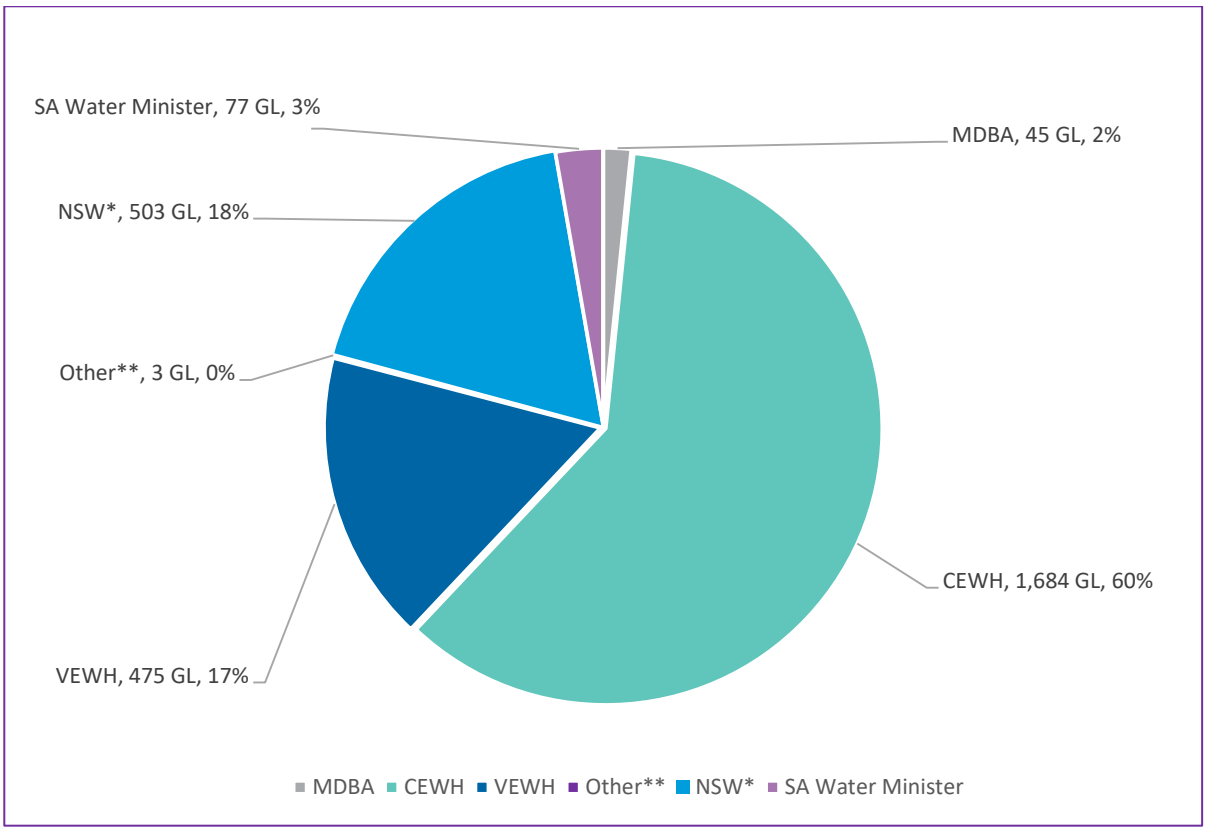
SRWUIP refers to the Australian Government Sustainable Rural Water Use and Infrastructure Program. State recoveries include programs such as New South Wales Riverbank and other small recoveries

Figure 24 Total available held environmental water (HEW) entitlements as at 30 June by recovery program for the period 2004 to 2016.

HEW entitlements are typically transferred or recognised once the program or stages of the program are finished and the water savings or purchases are confirmed and the HEW entitlement is owned by an environmental manager, for example Commonwealth Environmental Water Holder or Victorian Environmental Water Holder.

There are a range of owners of HEW entitlements, reflecting the investment history in environmental water. HEW entitlement holders in the Basin include:

- Commonwealth Environmental Water Holder (CEWH)
- State governments
    - Victorian Environmental Water Holder (VEWH)
    - various New South Wales state government agencies
    - South Australian Minister for Water and the River Murray
- other private organisations



*Various New South Wales state government agencies

** HEW volume held by other private organisations is 3 GL LTDLE and is too small to appear in this chart

Figure 25 Proportions of total HEW available as owned by the different environmental water holders (volumes in GL LTDLE)

As shown in Figure 25, the CEWH holds the largest volume of HEW entitlements in the Basin (60%). This reflects the significant Australian Government investment in water recovery. The CEWH holds HEW entitlements in all Basin states, including HEW recovered for meeting the shared reduction target of 4.9 GL/y in the ACT. The Queensland government does not own any HEW entitlements, instead HEW in Queensland is owned and managed by the CEWH.

Figure 26 shows that as at 30 June 2016, the majority of the HEW entitlements are located in New South Wales and Victoria.

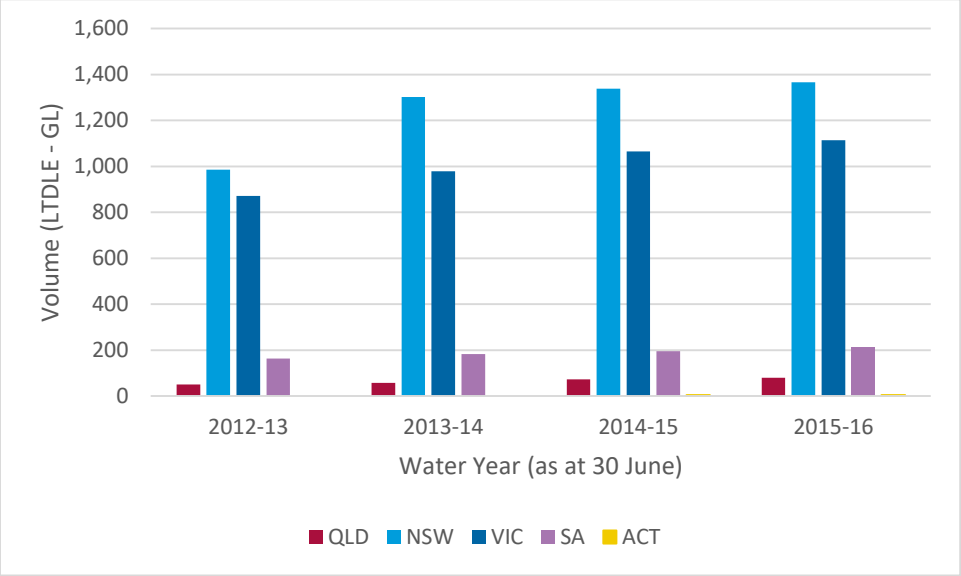


Figure 26 Location of available HEW entitlements by state as at 30 June for each year 2012–13 to 2015–16

The variation of the volume of HEW entitlements across the states shown in Figure 26 is a function of several things. Firstly, investment in HEW can only occur where there are opportunities to generate water savings for conversion to HEW entitlements or where there have been water purchases.

Secondly, the water recovered is aimed at meeting the local reduction target and then once that has been met, the shared reduction target. New South Wales and Victoria have the highest volumes of HEW entitlements, which reflect the larger water recovery targets for these states set out in the Basin Plan. Finally, but not exhaustively, the water must be available within a system that is able to facilitate the delivery of this water to the agreed environmental sites.

8.4.2. Surface water HEW that contributes to bridging the gap

As of 30 June 2016:

- 1,981 GL LTDLE of contracted HEW was estimated to have been secured towards 'bridge the gap'. This represents 72% of the Basin Plan water recovery target of 2,750 GL; and
- 1,807 GL LTDLE of this amount was HEW available to environmental water holders at that time.

The difference between these two values is explained by HEW available entitlements becoming available later than HEW contracted—that is, the transfer of the entitlement occurs after the contract to exchange is recognised. When water recovery programs are completed the difference in these values will disappear as all contracted water is recovered and available for environmental watering.

Figure 27 shows the proportion of available 'bridging the gap' HEW as a compared to all HEW available in long-term average annual volume terms. Table 31 shows the total available volumes of surface water HEW that contribute to bridging the gap at the SDL resource unit level.

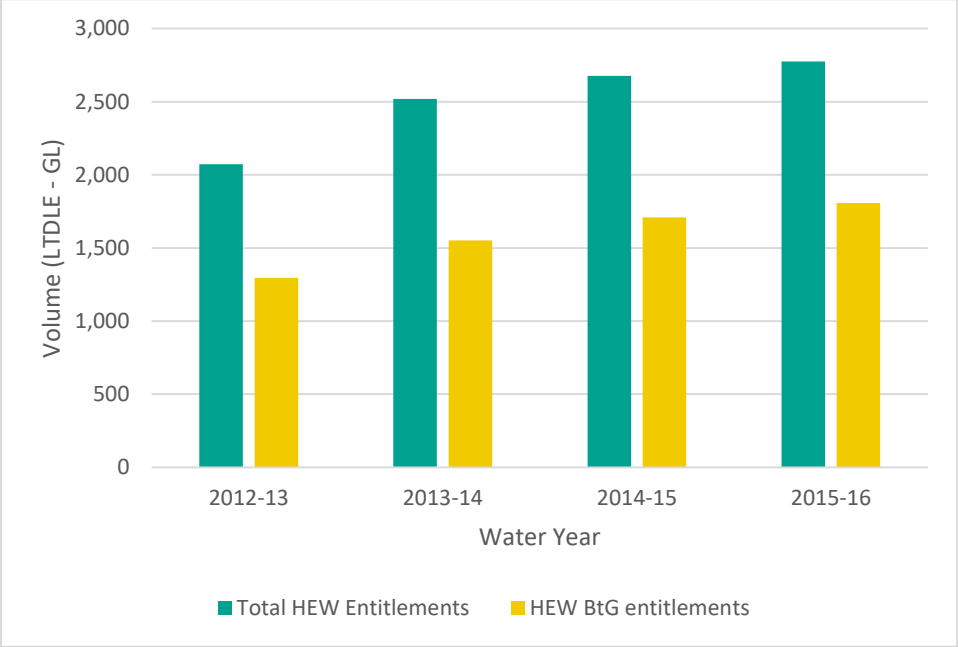


Figure 27 Bridging the gap 'available' HEW as compared to the of total 'available' HEW as at 30 June 2012–13 to 2015–16

Table 31 Total surface water HEW that contributes to 'bridging the gap' as at 30 June for the period 2012 to 2016

	2012		2013		2014		2015		2016	
Surface water SDL resource unit	**HEW entitlements (GL)**	**long-term HEW (GL - LTDLE)**	**HEW entitlements (GL)**	**long-term HEW (GL - LTDLE)**	**HEW entitlements (GL)**	**long-term HEW (GL - LTDLE)**	**HEW entitlements (GL)**	**long-term HEW (GL - LTDLE)**	**HEW entitlements (GL)**	**long-term HEW (GL - LTDLE)**
Queensland										
Paroo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Warrego	16.1	8.0	16.1	8.0	16.1	8.0	16.1	8.0	16.1	8.0
Nebine	5.9	1.0	5.9	1.0	5.9	1.0	5.9	1.0	5.9	1.0
Condamine-Balonne	35.0	23.1	49.6	34.6	57.4	40.3	85.3	53.8	89.8	57.1
Moonie	1.4	1.1	1.4	1.1	1.4	1.1	1.4	1.1	1.4	1.1
Queensland Border Rivers	11.8	4.2	16.0	5.8	18.3	6.6	23.4	8.5	32.7	12.2
Queensland total	**70.2**	**37.4**	**89.0**	**50.4**	**99.1**	**56.9**	**132.1**	**72.3**	**145.9**	**79.4**
New South Wales										
NSW Border Rivers	0.3	0.1	0.3	0.1	0.4	0.2	0.4	0.2	3.0	1.0
Intersecting Streams	8.1	8.1	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8
Gwydir	126.5	42.5	126.5	42.5	126.5	42.5	132.0	46.9	132.0	46.9
Namoi	6.2	4.8	6.3	4.9	8.1	6.2	9.9	7.6	10.8	8.3
Macquarie-Castlereagh	129.9	53.9	148.0	61.5	178.3	73.2	184.4	75.4	184.4	75.4
Lachlan	112.5	48.3	113.4	48.8	114.2	49.6	114.2	49.6	114.2	49.6
Murrumbidgee	223.5	132.2	268.3	162.5	575.7	307.1	601.0	325.6	613.6	334.7
Barwon-Darling Watercourse	22.3	22.3	22.3	22.3	23.8	23.8	25.8	25.8	28.3	28.3
Lower Darling	0.5	0.4	0.5	0.4	1.2	1.0	1.2	1.0	2.7	2.2
NSW Murray	237.4	192.7	328.1	266.9	344.0	280.7	354.1	288.9	367.3	299.8
New South Wales total	**867.2**	**505.2**	**1,031.6**	**627.6**	**1,390.0**	**802.1**	**1,440.9**	**838.7**	**1,474.2**	**864.0**
Australian Capital Territory										
Australian Capital Territory (Surface Water)	0.0	0.0	0.0	0.0	0.0	0.0	7.7	4.9	7.7	4.9
Australian Capital Territory total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**7.7**	**4.9**	**7.7**	**4.9**

	2012		2013		2014		2015		2016	
Surface water SDL resource unit	**HEW entitlements (GL)**	**long-term HEW (GL - LTDLE)**	**HEW entitlements (GL)**	**long-term HEW (GL - LTDLE)**	**HEW entitlements (GL)**	**long-term HEW (GL - LTDLE)**	**HEW entitlements (GL)**	**long-term HEW (GL - LTDLE)**	**HEW entitlements (GL)**	**long-term HEW (GL - LTDLE)**
Victoria										
Victorian Murray	254.7	234.0	272.9	251.1	299.2	274.7	346.0	314.4	374.4	338.7
Kiewa	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ovens	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Broken	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.2	0.3	0.2
Goulburn	230.0	211.4	248.0	228.1	269.6	246.4	321.3	293.0	350.2	317.8
Campaspe	6.8	6.3	6.9	6.4	30.6	29.0	30.6	29.0	30.6	29.0
Loddon	10.8	9.9	10.8	9.9	12.4	11.4	12.9	11.9	12.9	11.9
Wimmera-Mallee (Surface Water)	0.0	0.0	28.0	22.6	28.0	22.6	28.0	22.6	28.0	22.6
Victoria total	**502.4**	**461.6**	**566.8**	**518.2**	**639.9**	**584.2**	**739.0**	**671.1**	**796.3**	**720.2**
South Australia										
SA Murray	100.3	90.2	109.1	98.2	121.0	108.9	136.0	122.4	153.5	138.2
SA Non-Prescribed Areas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Marne Saunders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eastern Mount Lofty Ranges	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
South Australia total	**100.3**	**90.2**	**109.1**	**98.2**	**121.0**	**108.9**	**136.0**	**122.4**	**153.5**	**138.2**
Basin total	***1,540.0***	***1,094.4***	***1,796.4***	***1,294.5***	***2,249.9***	***1,552.1***	***2,455.6***	***1,709.5***	***2,577.5***	***1,806.6***

8.4.3. Surface water HEW to determine the transitional diversion limit

As discussed in earlier sections, total available HEW is made up of three components of water recovery:

1. Entitlements recovered prior to the Basin Plan and/or entitlements recognised as providing environmental benefits when the baseline diversion limit was set.
2. Entitlements recovered after the baseline diversion limit was established that are not gap-bridging because they were not previously part of consumptive water (e.g. evaporation savings).
3. Entitlements recovered to bridge the gap between baseline diversion limit to the SDL (currently a long-term average annual target of 2,750 GL).

The HEW entitlements used to determine the transitional diversional limit (TDL) are only those associated with that component of total HEW available that is associated with water recovery to bridge the gap.

The concept of the TDL is that it represents how much water recovery progress has been made in an SDL resource unit toward bridging the gap from BDL to SDL as at 1 July of the water year in question. Expressed as a formula in its simplest form this means:

TDL = BDL minus gap-bridging HEW available at 1 July.

However, as noted in discussions on Table 30 in section 8.4.1, gap-bridging HEW available recovered from the New South Wales Intersecting Streams SDL resource unit is not deducted from BDL for TDL calculation purposes due to unresolved issues about the long-term average volume of these entitlements. For this SDL resource unit the TDL is set at the SDL.

Prior to calculating the TDL any difference between the 30 June and 1 July available HEW volumes that contribute to bridging the gap is identified. There may be difference in 30 June and 1 July volumes as some water recovery programs give effect to water recovery on 1 July each year.

For example, Victorian bulk entitlements are amended at the start of the water year to reflect the outcomes of the previous year's recovery progress. For the purpose of the trial, these volumes are added to the preceding 30 June (the day prior) HEW entitlements to determine what HEW entitlements that contribute to bridging the gap are available as at 1 July.

Table 32 shows the difference between 30 June and 1 July HEW available that contributes to bridging the gap. Table 33 shows the final HEW available volumes that contribute to bridging the gap that are deducted from the BDL, to determine the TDL for each SDL resource unit, at the State scale. The HEW adjustment to BDL to determine TDL can also be found by SDL resource unit in Table 25 .

Table 32 Difference between 30 June and 1 July bridging the gap HEW by SDL resource units at the commencement of water years 2012–13 through to 2015–16

Surface water SDL resource unit	1 July increase over 30 June 2012 (GL - LTDLE)	1 July increase over 30 June 2013 (GL - LTDLE)	1 July increase over 30 June 2014 (GL - LTDLE)	1 July increase over 30 June 2015 (GL - LTDLE)
Queensland				
Paroo	0.0	0.0	0.0	0.0
Warrego	0.0	0.0	0.0	0.0
Nebine	0.0	0.0	0.0	0.0
Condamine-Balonne	0.0	0.0	0.0	0.0
Moonie	0.0	0.0	0.0	0.0
Queensland Border Rivers	0.0	0.0	0.0	0.0
Queensland total	**0.0**	**0.0**	**0.0**	**0.0**
New South Wales				
NSW Border Rivers	0.0	0.0	0.0	0.0
Intersecting Streams	0.0	0.0	0.0	0.0
Gwydir	0.0	0.0	0.0	0.0
Namoi	0.0	0.0	0.0	0.0
Macquarie-Castlereagh	0.0	0.0	0.0	0.0
Lachlan	0.0	0.0	0.0	0.0
Murrumbidgee	0.0	0.0	0.0	0.0
Barwon-Darling Watercourse	0.0	0.0	0.0	0.0
Lower Darling	0.0	0.0	0.0	0.0
NSW Murray	0.0	0.0	0.0	0.0
New South Wales total	**0.0**	**0.0**	**0.0**	**0.0**
Australian Capital Territory				
Australian Capital Territory (Surface Water)	0.0	0.0	0.0	0.0
Australian Capital Territory total	**0.0**	**0.0**	**0.0**	**0.0**
Victoria				
Victorian Murray	0.0	0.0	22.9	0.0
Kiewa	0.0	0.0	0.0	0.0
Ovens	0.0	0.0	0.0	0.0
Broken	0.0	0.0	0.0	0.0
Goulburn	0.0	0.0	31.9	0.0
Campaspe	0.0	22.6	0.0	0.0
Loddon	0.0	0.0	0.0	0.0
Wimmera-Mallee (Surface Water)	0.0	0.0	0.0	0.0
Victoria total	**0.0**	**22.6**	**54.8**	**0.0**
South Australia				
SA Murray	0.0	0.0	0.0	0.0
SA Non-Prescribed Areas	0.0	0.0	0.0	0.0
Marne Saunders	0.0	0.0	0.0	0.0
Eastern Mount Lofty Ranges	0.0	0.0	0.0	0.0
South Australia total	**0.0**	**0.0**	**0.0**	**0.0**
Basin total	***0.0***	***22.5***	***54.8***	***0.0***

Table 33 Held environmental water (HEW) deducted from BDL to determine TDL as at 1 July 2012 to 2015

Year	All HEW available 30 June (GL - LTDLE)	Deduct Non gap bridging HEW (GL - LTDLE)	Add HEW for 1 July (GL - LTDLE)	HEW recoveries to deduct from BDL (GL - LTDLE)
1 July 2012	1,880.4	794.0	-0.0	1,086.5
1 July 2013	2,082.5	805.6	22.5	1,299.4
1 July 2014	2,530.5	996.0	54.8	1,589.3
1 July 2015	2,687.8	995.9	0.0	1,691.8

8.5. Groundwater HEW

8.5.1. Groundwater HEW available

Groundwater HEW available has increased from 0 GL LTDLE at 30 June 2012 to 8.96 GL LTDLE at 30 June 2016. Groundwater entitlements associated with HEW have been assumed for the purpose of this report to have a LTDLE factor of 1.00, therefore the entitlement volume equals the long-term diversion limit equivalent volume.

Table 34 shows the increase in groundwater HEW volumes across the Basin. By 30 June 2016, groundwater HEW had increased to 8.96 GL compared to 1.28 GL at 30 June 2014 and 30 June 2015. This increase is mainly due to increased HEW entitlements in New South Wales and 'gap-bridging' recovery in the Queensland Upper Condamine Alluvium.

Importantly, the reporting period saw improvements in groundwater HEW data reporting. This is reflected in the more complete data sets available in 2013–14 to 2015–16 as compared with the 2012–13 water year where states were able to provide limited data.

Table 34 Total available groundwater HEW by state as at 30 June for the period 2014 to 2016

Total groundwater HEW (GL)			
Groundwater SDL resource unit	**2014**	**2015**	**2016**
New South Wales			
Billabong Creek Alluvium	0.03	0.03	0.03
Lachlan Fold Belt	0.03	0.03	1.32
Lower Murray Alluvium (shallow; Shepparton Formation)	0.03	0.03	0.03
Lower Murray Alluvium (deep; Renmark Group and Calivil Formation)	1.05	1.05	0.03
Lower Murrumbidgee Alluvium (deep; Calivil Formation and Renmark Group)	0.00	0.00	5.05
Upper Murray Alluvium	0.14	0.14	0.14
New South Wales total	**1.27**	**1.27**	**6.60**
Queensland			
Upper Condamine Alluvium (Central Condamine Alluvium)	0.00	0.00	2.36
Queensland total	**0.00**	**0.00**	**2.36**
Total	***1.27***	***1.27***	***8.96***

The increase in groundwater HEW in New South Wales is the result of HEW entitlements acquired in six groundwater SDL resource units under the NSW Metering Project, a New South Wales led state priority project under the Australian Government Sustainable Rural Water Use

and Infrastructure Program (SRWUIP). These water savings were offered in return for funding and are not part of 'bridging the gap' under the Basin Plan. For this report, this water has not been used to adjust the TDLs.

8.5.2. Groundwater HEW that contributes to bridging the gap

Section 8.5.1 set out the amount of available groundwater HEW throughout the Basin. This section describes the amount of groundwater HEW that contributes to bridging the gap.

As previously noted, the Basin Plan only requires groundwater extractions to be reduced to meet the SDL in two SDL resource units in Queensland, within the Condamine–Balonne water resource plan area (GW21).

The Australian Government has committed to recovering the 40.4 GL required to bridge the gap to the SDL in this WRP area. The required reduction is: 35.4 GL in the Upper Condamine Alluvium (Central Condamine Alluvium) SDL resource unit, and 5 GL in the Upper Condamine Alluvium (Tributaries) SDL resource unit.

Since February 2014, a number of tenders for entitlement purchase have been held in the Upper Condamine Alluvium. These have recovered 2.36 GL as at 30 June 2016, or 6% of the required 40.4 GL target that is to be reached by 2019. Table 34 includes ‘gap-bridging’ groundwater recoveries achieved.

8.5.3. Groundwater HEW to determine the transitional diversion limit

Similar to surface water, ‘gap-bridging’ HEW available is deducted from the groundwater BDL to determine the TDL each year.

No adjustments are made in the reporting period 2012–13 to 2015–16, as the 2.36 GL recovery of HEW made in the Upper Condamine Alluvium (Central Condamine Alluvium) SDL resource unit was completed after 1 July 2015 (see Table 34). This recovery will adjust the TDL in the 2016–17 reporting period.

8.6. Held environmental water authorised for use and actual use

Matter 9.1.2 Carryover and forfeiture of HEW by SDL resource unit

Matter 9.1.3 Volume of HEW used by SDL resource unit

As with consumptive entitlements, the amount of HEW authorised for use each year varies depending on the climatic conditions and allocations, carryover from previous years, trade of allocations and allocation adjustments reflecting applicable rules in state water resource plans (or forfeitures). The net volume of allocations that may be used in an SDL resource unit after accounting for these variables is presented in this report as the HEW authorised for use.

Basin states commenced reporting HEW allocation authorised and used against Matter 9.1.2 and Matter 9.1.3 in the 2013–14 water year.

8.6.1. Surface water HEW authorised for use

The total volume authorised for use may not be finalised until the end of year, as trades may influence whether the allocation is available in one SDL resource unit or another. For example, Table 30 shows South Australia with long-term surface water HEW available ranging between 133 GL and 222 GL, whilst Table 35 shows HEW authorised ranging between 801 GL and 918 GL. This reflects trade into South Australia from other SDL resource units.

The volume of HEW authorised for use is a combination of allocations made to HEW entitlements in the year, HEW allocation carryover from the previous year, trade of HEW allocations between SDL resource units, net trade of HEW allocations for consumptive use, net transfer of HEW allocations to outside the Murray-Darling Basin and return flows from HEW watering activities.

Also, in unregulated surface water systems, HEW authorised for use reflects only the HEW actually recorded as use, not the volume that may be allocated to an account. In unregulated systems allocation is only available to be taken when conditions such as flow height are met. In NSW, therefore, authorised HEW use for unregulated systems and for supplementary access water rights reflects only the actual HEW use that has occurred. For example, Table 35 shows zero HEW authorised in the Barwon–Darling as no extractions of HEW occurred in this period. It is noted that this differs from the way water allocated has been reported for consumptive users. This will be rectified in future reports.

The volume of surface water HEW authorised for use each year, influences the timing and location of environmental watering activities for that year.

Each year, the HEW available can be used for the following purposes:

- Undertaking environmental watering actions—such as delivering environmental flows to specific river reaches, wetlands, floodplains and other important ecological sites; or
- Traded, on a temporary basis to the consumptive pool.

The volumes of HEW authorised over the reporting period are shown in Table 35. HEW data was first reported in 2013–14. There was an increase in authorised HEW over the period of 263 GL from 2,344 GL in 2013–14 to 2,607 GL in 2015–16. This increase is a function of the increasing volume of HEW entitlements over the period, partially offset by generally decreasing allocation volumes in drier weather.

Table 35 HEW authorised for use in 2013–14, 2014–15 and 2015–16 for each SDL resource unit

SDL resource unit	2013–14 (GL)	2014–15 (GL)	2015–16 (GL)
Queensland			
Paroo	0.0	0.0	0.0
Warrego	0.0	2.5	0.9
Nebine	0.0	0.0	1.0
Condamine–Balonne	22.3	17.4	9.5
Moonie	1.4	1.4	0.2
Queensland Border Rivers	10.4	8.2	9.7
Queensland total	**34.1**	**29.6**	**21.2**
New South Wales			
NSW Border Rivers	0.1	0.1	0.2
Intersecting Streams	0.0	0.0	0.0
Gwydir	113.4	81.4	35.6
Namoi	6.1	6.2	6.4
Macquarie–Castlereagh	47.3	28.7	27.3
Lachlan	97.3	76.2	103.4
Murrumbidgee	224.6	318.4	210.9
Barwon–Darling Watercourse	0.0	0.0	0.0
Lower Darling	78.9	49.5	25.0
NSW Murray	220.3	222.1	324.8
New South Wales total	**788.0**	**782.6**	**733.6**
Australian Capital Territory			
Australian Capital Territory (Surface Water)	0.0	0.0	0.0
Australian Capital Territory total	**0.0**	**0.0**	**0.0**
Victoria			
Victorian Murray	557.3	408.8	521.0
Kiewa	0.0	0.0	0.0
Ovens	0.1	0.1	0.1
Broken	0.1	0.9	0.6
Goulburn	75.3	404.6	355.6
Campaspe	20.1	30.7	26.6
Loddon	7.5	9.7	14.1
Wimmera–Mallee (Surface Water)	60.4	45.4	16.4
Victoria total	**720.7**	**900.2**	**934.3**
South Australia			
SA Murray	800.9	809.1	917.6
SA Non-Prescribed Areas	0.0	0.0	0.0
Marne Saunders	0.0	0.0	0.0
Eastern Mount Lofty Ranges	0.0	0.0	0.0
South Australia total	**800.9**	**809.1**	**917.6**
Basin total	***2,343.7***	***2,521.5***	***2,606.6***

8.6.2. Surface water HEW use

Table 36 shows the use of authorised HEW over the period 2013–14 to 2015–16. This table shows an increase in the volume of HEW used over the period from 1,583 GL in 2013–14 to 1,954 GL in 2015–16. This is an increase of 371 GL or approximately 23%.

HEW used as a percentage of the authorised HEW is set out in Table 37. This shows that at the Basin scale there has been an increase in the proportion of HEW being used. HEW used has increased from 68% in 2013–14 to 75% in 2015–16. This, in overall terms, is roughly equivalent to the utilisation by consumptive users (refer section 6.1.1). Some SDL resource units show a reduction, indicating that opportunities may not have been available in that year to use the water for environmental outcomes.

Table 36 Surface water HEW used in 2013–14, 2014–15 and 2015–16 for each SDL resource unit

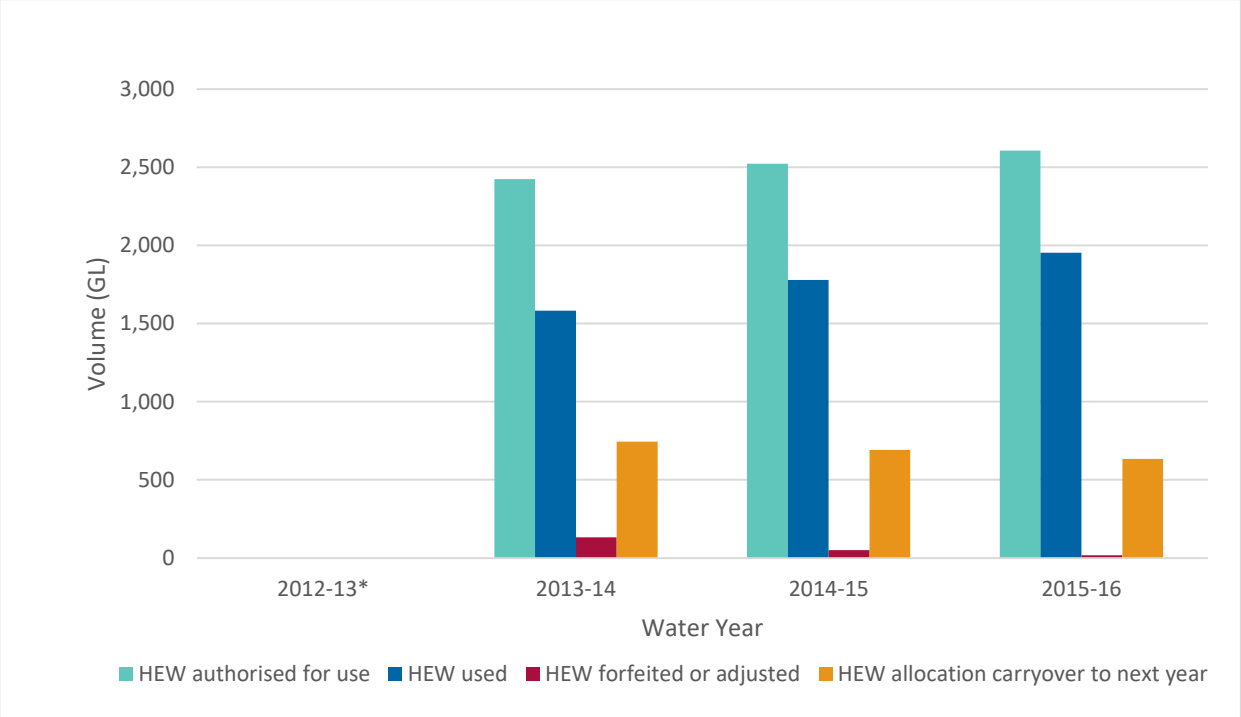
SDL resource unit	2013–14 (GL)	2014–15 (GL)	2015–16 (GL)
Queensland			
Paroo	0.0	0.0	0.0
Warrego	0.0	2.5	0.9
Nebine	0.0	0.0	1.0
Condamine–Balonne	22.3	17.4	9.5
Moonie	1.4	1.4	0.2
Queensland Border Rivers	4.1	1.8	1.1
Queensland total	**27.8**	**23.2**	**12.6**
New South Wales			
NSW Border Rivers	0.0	0.0	0.0
Intersecting Streams	0.0	0.0	0.0
Gwydir	32.3	56.6	7.1
Namoi	0.0	0.0	0.0
Macquarie–Castlereagh	21.0	16.0	19.2
Lachlan	23.0	5.8	48.0
Murrumbidgee	147.8	223.7	115.2
Barwon–Darling Watercourse	0.0	0.0	0.0
Lower Darling	55.2	0.0	0.0
NSW Murray	83.8	63.2	186.1
New South Wales total	**363.2**	**365.4**	**375.6**
Australian Capital Territory			
Australian Capital Territory (Surface Water)	0.0	0.0	0.0
Australian Capital Territory total	**0.0**	**0.0**	**0.0**
Victoria			
Victorian Murray	344.4	166.8	375.5
Kiewa	0.0	0.0	0.0
Ovens	0.1	0.1	0.1
Broken	0.1	0.9	0.5
Goulburn	15.2	342.4	242.6
Campaspe	5.6	30.7	13.7
Loddon	5.8	7.6	7.4
Wimmera–Mallee (Surface Water)	19.8	33.7	8.1
Victoria total	**390.9**	**582.1**	**647.8**
South Australia			
SA Murray	800.9	809.1	917.6
SA Non-Prescribed Areas	0.0	0.0	0.0
Marne Saunders	0.0	0.0	0.0
Eastern Mount Lofty Ranges	0.0	0.0	0.0
South Australia total	**800.9**	**809.1**	**917.6**
Basin total	***1,582.7***	***1,779.8***	***1,953.5***

Table 37 Surface water HEW used as a percentage of water authorised in 2013–14, 2014–15 and 2015–16 for each SDL resource unit

SDL resource unit	2013-14	2014-15	2015-16
Queensland			
Paroo	NA	NA	NA
Warrego	NA	100%	100%
Nebine	NA	NA	100%
Condamine-Balonne	100%	100%	100%
Moonie	100%	100%	100%
Queensland Border Rivers	39%	22%	11%
Queensland total	**81%**	**78%**	**59%**
New South Wales			
NSW Border Rivers	23%	0%	0%
Intersecting Streams	NA	NA	NA
Gwydir	29%	70%	20%
Namoi	0%	0%	0%
Macquarie-Castlereagh	44%	56%	70%
Lachlan	24%	8%	46%
Murrumbidgee	66%	70%	55%
Barwon-Darling Watercourse	NA	NA	NA
Lower Darling	70%	0%	0%
NSW Murray	38%	28%	57%
New South Wales total	**46%**	**47%**	**51%**
Australian Capital Territory			
Australian Capital Territory (Surface Water)	NA	NA	NA
Australian Capital Territory total	**NA**	**NA**	**NA**
Victoria			
Victorian Murray	62%	41%	72%
Kiewa	NA	NA	NA
Ovens	100%	100%	100%
Broken	100%	97%	88%
Goulburn	20%	85%	68%
Campaspe	28%	100%	51%
Loddon	77%	78%	52%
Wimmera-Mallee (Surface Water)	33%	74%	50%
Victoria total	**54%**	**65%**	**69%**
South Australia			
SA Murray	100%	100%	100%
SA Non-Prescribed Areas	NA	NA	NA
Marne Saunders	NA	NA	NA
Eastern Mount Lofty Ranges	NA	NA	NA
South Australia total	**100%**	**100%**	**100%**
Basin total	***68%***	***71%***	***75%***

NA – means that either no HEW was authorised for use in the year or in unregulated systems flow conditions did not provide an opportunity for HEW to be used

Figure 28 shows the surface water HEW authorised for use each year and how it was utilised in that year. As shown in this figure, authorised HEW has increased each year, HEW used has increased, HEW forfeited or adjusted in accounts has decreased and the volume of HEW carried over has declined.



* No data reported for water year 2012–13

Figure 28 Surface water HEW authorised and how it has been utilised at a Basin scale 2013–14 to 2015–16

The use of HEW to deliver environmental watering actions is often co-ordinated among the different owners of the entitlements. Further information about use of HEW under the Basin Plan is available from the MDBA website at: https://www.mdba.gov.au/managing-water/environmental-water and from the websites of the environmental water holders.

If HEW is not used or extracted it may be:

- carried over to the next water year (if carryover provisions apply) or
- forfeited or deducted from the account if there are no carryover provisions or carryover limits are reached or there is a spill from the storage.

As shown in Figure 28 and Figure 29, there was a decrease in the annual volume of HEW carried over across the reporting period. More information about the use of carryover by environmental water holders can be accessed from their respective websites.

A small amount of water was forfeited, largely due to storage spill rules.

Even though owners of HEW have the same set of rights and obligations as other owners of the same class of entitlement, concern has previously been raised that the volume of HEW carried over may be impacting on storages and the rights of other users to that storage. Figure 29 shows

that at a Basin scale, HEW carryover as a proportion of actual storage was 6% at 30 June 2014, and 7% at 30 June 2015 and 2016.

The percentage for a single storage may be different to this and can vary across the Basin. By comparison, consumptive carryover as a proportion of actual storage was 25% at 30 June 2013, 23% at 30 June 2014 and 25% at 30 June 2015.

HEW carryover as a percentage of total carryover represents 20% at 30 June 2014, and 23% at 30 June 2015. HEW data was not available for 2012–13 and consumptive carryover data was not yet available on 30 June 2016, making a comparison over the four years incomplete.

This analysis suggests, at a Basin scale, the volume of HEW carryover is not impacting on storage volumes and represents a small proportion of total carryover. Even so, if a storage was to fill to capacity, the same rules would apply to both HEW carryover and any consumptive carryover.

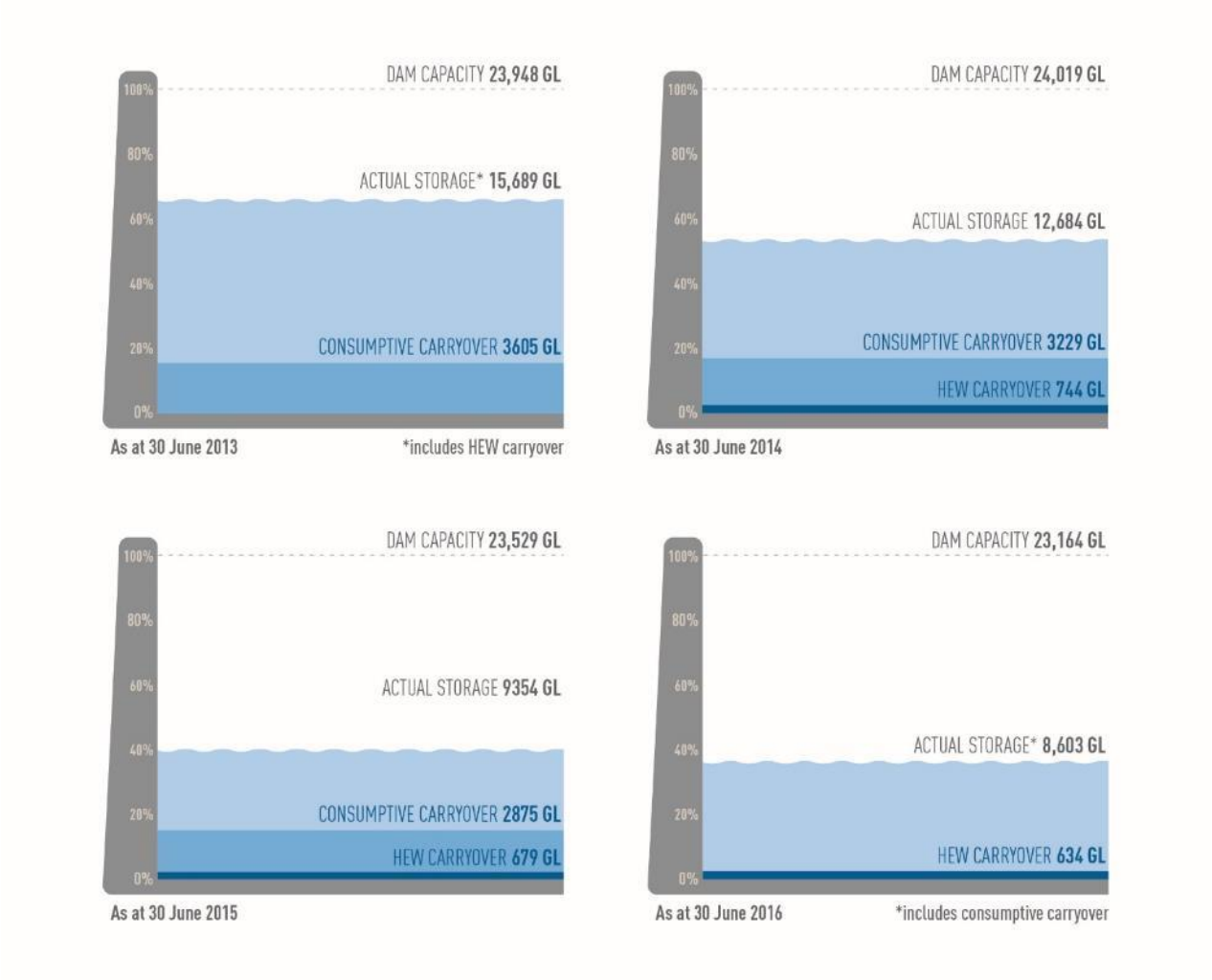


Figure 29 Comparison of consumptive and HEW carryover as a proportion of end of year actual storage 2012–13 to 2015–16 – at a Basin scale

In Figure 29 the dam capacity varies across the reporting period because in:

- 2013–14 an enlarged Cotter Dam in the ACT increased storage by 70 GL,
- 2014–15 in NSW Lake Burrendong storage was decreased and other minor adjustments made decreasing storage by 490 GL, and
- 2015–16 in Victoria Lake Mokoan was removed as it no longer acts as a storage, resulting in a decrease of 365 GL.

8.6.3. Groundwater HEW authorised for use and used

In groundwater systems, the allocation provided for groundwater HEW entitlements is not extracted or used. Groundwater HEW is expected to remain in the groundwater system to provide environmental outcomes, rather than being extracted.

8.7. Planned Environmental Water

Matter 9.2 – volume of planned environmental water available

Matter 9.2.1 Volume of PEW by SDL resource unit

Planned environmental water (PEW) is rules-based environmental water that is not associated with any water access rights and is generally not callable.

This rules-based water may maintain minimum flows, ensure a proportion of water flowing into a storage is passed through the storage and released from the dam, or be the residual water that is prevented from being taken as consumptive use.

In unregulated surface water systems and groundwater SDL resource units, PEW is most often created by a rule that limits the volume of water that can be taken for consumptive use.

As PEW is often an operating rule in a water resource plan, it may provide both environmental and non-environmental benefits. For example, PEW may assist in managing in-stream water quality whilst also meeting conveyance losses or providing minimum flows in a reach to enable take under basic rights.

Section 6 of the Water Act defines PEW for the purpose of Basin Plan implementation. There are PEW arrangements throughout the Basin.

The Water Act and the Basin Plan require that there be no net reduction in the protection of pre-existing PEW in the water resource plans that are being prepared by Basin states. The setting of the Basin Plan SDLs assumed this continued protection. PEW is required to be identified in water resource plans and, once accredited, Basin states will be required to report annually on their compliance on delivering PEW.

Reporting of PEW is a new requirement under the Basin Plan. The MDBA considers that further work is required over the transition period to enable Basin states to improve their reporting of this important element of environmental water.

9. Data improvements to date and future work

9.1. Data improvements over the period and ongoing limitations

The period of this report represents the first four years under which surface water and groundwater data on water authorised, annual permitted take and annual actual water take were reported to the MDBA by Basin states under section 71 of the Water Act. The period of this report also represents the first instances of reporting on held environmental water available and used as required under Matter 9 of Schedule 12 to the Basin Plan.

As discussed earlier in this report, the requirement outlined in s.71 of the Water Act that data for all forms of take defined in the Basin Plan is to be reported is a challenge for Basin states.

Prior to the commencement of the Basin Plan, data for groundwater take, floodplain harvesting, runoff dams, net take by commercial plantations and take under basic rights was not routinely or consistently collected. As a consequence, Basin states and the MDBA have worked together to make sure that the best available information can be provided for all forms of take as required by the Basin Plan.

Improvements are being made and include:

- Reporting by SDL resource unit
- Expanding reporting data on actual water taken from watercourses and regulated rivers to include estimates of actual water taken from basic rights, floodplain harvesting, runoff dams, net take by commercial plantations and groundwater.
- Separately reporting actual water taken by each form of take.

However, the improvements have not been implemented across all Basin states or for all forms of take.

It is also true that important limitations on the data that is reported remain. One example of this is the continued use of the long-term average estimates for some forms of take set out in Schedule 3 of the Basin Plan when reporting annual actual take. While this may currently be the best available information, it does not reflect levels of annual take that will vary in response to climate conditions. This applies to actual take from basic rights, runoff dams and net take by commercial plantations.

This issue is likely to continue until improved methods of estimating actual take for these forms of take are developed but at present it represents a key opportunity to improve the overall integrity of the SDL water accounting and compliance framework.

9.2. Improving data collection and handling

There are opportunities for all Basin states and the MDBA to improve data collection and handling. Current arrangements are labour intensive, subject to delays (for example bad weather preventing access to water meters), and prone to inaccuracy through the use of multiple spreadsheets that do not have appropriate controls in place to prevent unintended data errors.

MDBA encourages the Basin states to continue to improve the efficiency, effectiveness and timeliness of data collection and handling.

For its own part, the MDBA has commissioned a project that will establish a fit–for–purpose data storage and reporting tool. The new tool will adopt best information management practice to ensure the integrity and accuracy of the processing and assessment of reporting data submitted by the Basin states.

9.3. Developing suitable models

The water resource plans that Basin states develop for surface water SDL resource units are expected to contain hydrological models that represent some forms of take. These models will be the new standard upon which formal SDL accounting is based.

The models used for the Cap are representative of water use and water resources available under state rules in place as at 1993–94 and do not cover many requirements needed to determine annual permitted take under the Basin Plan. Basin states are, accordingly, currently looking into different ways to move from Cap models to SDL models for water resource plans.

As an interim step, Basin states are updating their models to reflect the level of development used to determine the BDL — that is, the water use and state water resource management rules in place as at 30 June 2009.

MDBA has an agreement with the Basin states that surface water modelling will move to a common modelling platform called *eWater Source*. However, Basin states are concerned that it may take some years to be confident of the new model platform and it may not be sufficiently developed and proven in time for the water resource plans to be place by 2019.

9.4. Recommendations

Recommendation 4:

Adoption of automated reporting tools where possible to improve the timeliness, accuracy and efficiency of reporting and assessment.

MDBA continue to develop a new automated SDL reporting tool that will enhance the timeliness, accuracy and reporting outputs available from the annual assessment of state reporting data.

10. Appendix 1: Surface water SDL trial water take account

				Basin Plan Chapter 6 Part 4 - Trial Compliance Arrangements					
SDL Res. Unit code	**SDL Resource Unit**	**WRP Area**	**State**	**Long-term averages[1]** (including interceptions)		**Long-term averages as HEW[4] recovery progresses** (TDL[5] reduces to SDL by 2019)			
				BDL[2] (GL/y)	**SDL[3]** (GL/y)	**TDL[5]** (GL/y)			
						2012-13	**2013-14**	**2014-15**	**2015-16**
SS29	Paroo	Warrego-Paroo-Nebine	Qld	9.9	9.9	9.9	9.9	9.9	9.9
SS28	Warrego	Warrego-Paroo-Nebine	Qld	127.7	117.2	119.7	119.7	119.7	119.7
SS27	Nebine	Warrego-Paroo-Nebine	Qld	31.2	29.9	30.2	30.2	30.2	30.2
SS26	Condamine–Balonne	Condamine–Balonne	Qld	978.3	838.1	955.2	943.7	938.0	924.5
SS25	Moonie	Moonie	Qld	84.2	82.3	83.1	83.1	83.1	83.1
SS24	Queensland Border Rivers	Queensland Border Rivers	Qld	320.1	298.5	315.9	314.3	313.5	311.6
SS23	NSW Border Rivers	NSW Border Rivers	NSW	302.6	283.9	302.5	302.5	302.4	302.4
SS17	Intersecting Streams[9]	Intersecting Streams	NSW	114.0	113.8	113.8	113.8	113.8	113.8
SS22	Gwydir	Gwydir	NSW	450.2	389.9	407.7	407.7	407.7	403.3
SS21	Namoi	Namoi	NSW	508.3	479.0	503.5	503.4	502.1	500.7
SS20	Macquarie –Castlereagh	Macquarie –Castlereagh	NSW	734.3	645.4	680.4	672.8	661.1	658.9
SS16	Lachlan	Lachlan	NSW	618.4	570.4	570.1	569.6	568.8	568.8
SS15	Murrumbidgee	Murrumbidgee	NSW	2,501.1	1,938.1	2,368.9	2,338.6	2,194.0	2,175.5
SS19	Barwon–Darling Watercourse[10]	Barwon–Darling Watercourse	NSW	198.0	180.9	175.7	175.7	174.2	172.2
SS18	Lower Darling	New South Wales Murray and Lower Darling	NSW	60.5	45.5	60.1	60.1	59.5	59.5
SS14	NSW Murray	New South Wales Murray and Lower Darling	NSW	1,811.7	1,341.7	1,619.0	1,544.8	1,531.0	1,522.8
SS1	Australian Capital Territory (surface water)[11]	Australian Capital Territory (surface water)	ACT	52.5	47.6	52.5	52.5	52.5	47.6
SS2	Victorian Murray	Victorian Murray	Vic	1,707.1	1,251.7	1,473.1	1,456.0	1,409.5	1,392.7
SS3	Kiewa	Victorian Murray	Vic	24.6	23.3	24.6	24.6	24.6	24.6
SS4	Ovens	Northern Victoria	Vic	83.4	80.3	83.3	83.3	83.3	83.3
SS5	Broken	Northern Victoria	Vic	56.2	54.6	56.2	56.1	56.1	56.0

SDL Res. Unit code	SDL Resource Unit	WRP Area	State	Basin Plan Chapter 6 Part 4 - Trial Compliance Arrangements: Long-term averages[1] (including interceptions) BDL[2] (GL/y)	Long-term averages[1] (including interceptions) SDL[3] (GL/y)	Long-term averages as HEW[4] recovery progresses (TDL[5] reduces to SDL by 2019) TDL[5] (GL/y) 2012-13	2013-14	2014-15	2015-16
SS6	Goulburn	Northern Victoria	Vic	1,689.4	1,153.0	1,478.0	1,461.3	1,411.1	1,396.4
SS7	Campaspe	Northern Victoria	Vic	152.6	120.9	146.3	123.7	123.6	123.6
SS8	Loddon	Northern Victoria	Vic	178.6	155.8	168.7	168.7	167.2	166.7
SS9	Wimmera–Mallee (surface water)	Wimmera-Mallee (surface water)	Vic	128.5	105.5	128.5	105.9	105.9	105.9
SS11	South Australian Murray	South Australia River Murray	SA	665.0	483.1	574.7	566.7	556.1	542.6
SS10	South Australian Non-Prescribed Areas	South Australian Murray Region	SA	3.5	3.5	3.5	3.5	3.5	3.5
SS12	Marne Saunders	Eastern Mount Lofty Ranges	SA	2.9	2.9	2.9	2.9	2.9	2.9
SS13	Eastern Mount Lofty Ranges	Eastern Mount Lofty Ranges	SA	28.3	26.4	28.3	28.3	28.3	28.3
	TOTALS		**MDB**	**13,623.1**	**10,873.1**	**12,536.6**	**12,323.6**	**12,033.8**	**11,931.3**
			Qld	1,551.4	1,375.9	1,514.0	1,501.0	1,494.5	1,479.1
			NSW	7,299.1	5,988.6	6,801.8	6,689.1	6,514.6	6,478.0
			ACT	52.5	47.6	52.5	52.5	52.5	47.6
			Vic	4,020.4	2,945.1	3,558.8	3,479.6	3,381.4	3,349.3
			SA	699.7	515.9	609.4	601.4	590.8	577.3
MKO	Murray-Kiewa-Ovens	BP s6.12(2)(a)	Vic	1,815.1	1,355.3	1,581.1	1,563.9	1,517.4	1,500.6
GBCL	Gbn-Bkn-Camp-Lodd	BP s6.12(2)(b)	Vic	2,076.8	1,484.3	1,849.3	1,809.8	1,758.1	1,742.8

1. Long-term averages figures are based on the historical climate sequence (1895-2009). BDL as per Basin Plan 2012, Schedule 2 to 1 decimal place.
2. BDL is Baseline Diversion Limit- a single number determined as an average of modelled annual variations over 114 year.
3. SDL is Sustainable Diversion Limit: determined as BDL minus amount of water recovered for the environment. Shared reduction determined on basis of default set out in the Basin Plan s6.05(4). Actual recovery in some cases exceeds default amount.
4. HEW is Held Environmental Water recovered to "Bridge the Gap" at 1 July each water year (i.e. increasing towards 2750 GL)
5. TDL is Transitional Diversion Limits that is BDL minus HEW at 1 July each water year. TDL represent an indicative non-binding limit during the Transition Period (i.e. 2012-19)
9. Water recovery that has occurred in the intersecting streams is limited to 0.2 GL based on estimated BDL in Basin Plan.
10. Northern Basin Review considered the water recovery achieved when recommending changes to local and shared reduction targets. In the Barwon-Darling SDL resource unit, HEW over-recovery was considered in the proposed Basin Plan Amendments 2016. At the time of preparation of this report, the Basin Plan Amendments are not adopted by the Commonwealth Minister for Water.
11. Water recovery to meet ACT's shared amount has occurred in NSW Murrumbidgee SDL resource unit.

SDL Resource Unit	Basin Plan Chapter 6 Part 4 - Trial Compliance Arrangements															
	s6.10, s10.10, s10.15: Annual data (including interceptions) *-:determined each year:-*								**s6.11: Difference of annual Transitional Permitted and Actual Take**				**Actual take / Transitional permitted take** (%)			
	Transitional Permitted Take[6] (GL/y) (s71(1)(b))				**Actual Take[7]** (GL/y) (s71(1)(c))				**Annual balance** (GL/y)							
	2012-13	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Paroo	9.8	9.8	9.8	9.8	9.7	9.7	9.7	9.7	0.0	0.0	0.1	0.1	100%	100%	99%	99%
Warrego	88.8	86.5	111.3	100.8	85.7	83.8	90.3	85.9	3.1	2.7	21.0	14.8	96%	97%	81%	85%
Nebine	25.9	26.2	29.2	30.6	25.0	25.0	25.1	26.4	0.9	1.2	4.1	4.2	96%	95%	86%	86%
Condamine–Balonne	1,507.1	891.2	683.6	608.6	1,269.8	876.1	619.1	530.2	237.3	15.2	64.5	78.4	84%	98%	91%	87%
Moonie	92.6	64.6	52.4	51.5	84.6	63.9	54.7	51.8	8.0	0.8	-2.3	-0.3	91%	99%	104%	101%
Queensland Border Rivers	598.3	226.4	192.7	154.8	456.4	223.7	180.9	167.4	141.9	2.7	11.8	-12.6	76%	99%	94%	108%
NSW Border Rivers	446.4	359.5	203.0	295.0	328.4	300.2	170.5	222.4	118.0	59.2	32.5	72.5	74%	84%	84%	75%
Intersecting Streams[9]	116.8	116.8	116.8	116.8	116.8	116.8	116.8	116.8	0.0	0.0	0.0	0.0	100%	100%	100%	100%
Gwydir	555.8	644.7	331.3	308.1	575.4	571.5	291.4	271.4	-19.6	73.2	39.9	36.7	104%	89%	88%	88%
Namoi	595.7	556.7	398.4	383.4	583.5	589.2	372.1	348.0	12.1	-32.5	26.4	35.4	98%	106%	93%	91%
Macquarie –Castlereagh	873.1	576.6	517.2	437.3	773.5	609.2	431.6	448.6	99.6	-32.6	85.6	-11.3	89%	106%	83%	103%
Lachlan	773.6	686.8	533.1	534.2	664.8	562.3	509.4	488.1	108.8	124.5	23.7	46.0	86%	82%	96%	91%
Murrumbidgee	3,278.8	2,726.2	2,270.5	1,829.2	2,789.7	2,340.7	2,195.7	1,828.1	489.1	385.5	74.8	1.0	85%	86%	97%	100%
Barwon–Darling Watercourse[10]	208.8	121.3	54.4	92.7	201.6	90.8	44.0	88.0	7.1	30.6	10.4	4.7	97%	75%	81%	95%
Lower Darling	145.4	113.9	60.7	29.2	102.6	109.6	49.9	16.5	42.8	4.3	10.8	12.7	71%	96%	82%	56%
NSW Murray	2,324.3	1,663.7	1,011.9	964.6	2,012.3	1,601.3	1,379.5	821.5	311.9	62.3	-367.6	143.1	87%	96%	136%	85%
Australian Capital Territory (surface water)[11]	57.3	57.2	55.4	56.7	30.7	30.8	29.0	32.1	26.6	26.5	26.4	24.6	54%	54%	52%	57%
Victorian Murray	1,526.8	1,651.4	1,718.0	1,431.7	1,692.4	1,335.5	1,420.7	1,363.9	-165.6	316.0	297.3	67.7	111%	81%	83%	95%
Kiewa	21.3	21.3	21.5	22.1	20.3	16.2	19.4	19.8	1.0	5.0	2.0	2.3	95%	76%	90%	90%
Ovens	83.8	82.4	80.7	82.4	78.1	75.6	76.3	74.7	5.6	6.8	4.4	7.8	93%	92%	95%	91%
Broken	65.4	62.8	59.8	58.8	55.2	54.9	58.0	53.8	10.2	8.0	1.8	5.0	84%	87%	97%	91%
Goulburn	1,538.2	1,591.0	1,340.5	810.8	1,262.5	1,227.3	1,189.8	1,154.5	275.7	363.8	150.7	-343.6	82%	77%	89%	142%

SDL Resource Unit	Basin Plan Chapter 6 Part 4 - Trial Compliance Arrangements															
	s6.10, s10.10, s10.15: Annual data (including interceptions) -:determined each year:-								s6.11: Difference of annual Transitional Permitted and Actual Take				Actual take / Transitional permitted take (%)			
	Transitional Permitted Take[6] (GL/y) (s71(1)(b))				Actual Take[7] (GL/y) (s71(1)(c))				Annual balance (GL/y)							
	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16
Campaspe	148.8	103.5	88.2	93.7	82.6	65.9	75.1	79.3	66.2	37.6	13.1	14.4	55%	64%	85%	85%
Loddon	208.4	108.9	99.0	102.2	159.7	125.1	119.1	114.3	48.7	-16.3	-20.1	-12.2	77%	115%	120%	112%
Wimmera–Mallee (surface water)	107.8	105.7	95.7	75.1	79.7	77.5	81.3	81.8	28.1	28.1	14.3	-6.8	74%	73%	85%	109%
South Australian Murray	581.7	481.0	524.0	656.9	522.1	442.9	500.9	597.5	59.6	38.1	23.1	59.5	90%	92%	96%	91%
South Australian Non-Prescribed Areas	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	0.0	0.0	0.0	0.0	100%	100%	100%	100%
Marne Saunders	3.3	3.1	3.1	3.1	2.2	2.2	2.3	2.0	1.1	0.9	0.7	1.0	66%	71%	77%	66%
Eastern Mount Lofty Ranges	23.9	25.1	19.9	16.7	23.9	25.1	19.9	12.0	0.0	0.0	0.0	4.7	100%	100%	100%	72%
MDB	**16,011.1**	**13,167.7**	**10,685.3**	**9,359.8**	**14,092.8**	**11,656.1**	**10,135.8**	**9,109.9**	**1,918.4**	**1,511.6**	**549.5**	**249.9**	**88%**	**89%**	**95%**	**97%**
Qld	2,322.5	1,304.7	1,078.9	956.0	1,931.2	1,282.2	979.8	871.4	391.3	22.5	99.2	84.6	83%	98%	91%	91%
NSW	9,318.6	7,566.1	5,497.2	4,990.2	8,148.8	6,891.6	5,560.7	4,649.4	1,169.8	674.5	-63.5	340.8	87%	91%	101%	93%
ACT	57.3	57.2	55.4	56.7	30.7	30.8	29.0	32.1	26.6	26.5	26.4	24.6	54%	54%	52%	57%
Vic	3,700.5	3,727.0	3,503.3	2,676.7	3,430.6	2,978.0	3,039.7	2,942.0	269.9	749.0	463.6	-265.4	93%	80%	87%	110%
SA	612.3	512.6	550.5	680.2	551.6	473.6	526.7	615.0	60.7	39.0	23.8	65.2	90%	92%	96%	90%
Murray-Kiewa-Ovens	1,631.9	1,755.1	1,820.2	1,536.2	1,790.9	1,427.3	1,516.4	1,458.4	-158.9	327.8	303.7	77.8	110%	81%	83%	95%
Gbn-Bkn-Camp-Lodd	1,960.8	1,866.3	1,587.5	1,065.4	1,560.0	1,473.2	1,441.9	1,401.8	400.7	393.1	145.5	-336.4	80%	79%	91%	132%

6. Permitted Take is annual volume determined by a model (where available) after the end of the water year, using the climate for that year plus floodplain harvesting, interceptions and basic rights less the effect of environmental water recovery.
7. Actual Take is an annual volume, the amount of water physically taken out of river system + Interceptions for consumptive use

SDL Resource Unit	Basin Plan Chapter 6 Part 4 - Trial Compliance Arrangements											
	Basin Plan s10.12(3): Net Volume of HEW disposed (added to consumptive) and acquired (removed from consumptive) (GL/y)				**Basin Plan s6.12(1)(a): Transitional adjusted cumulative balance after disposal or acquisition of HEW (if any)** **Adjusted cumulative balance (∑)** (GL/y)				**Basin Plan s6.12(1)(a): Indicative compliance test (non-binding) 20% with long-term TDL** **Adjusted cumulative balance is debit ≤ 20% of TDL = Compliant**			
	2012-13	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Paroo	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0%	0%	1%	2%
Warrego	0.0	0.0	0.0	0.0	3.1	5.8	26.8	41.6	3%	5%	22%	35%
Nebine	0.0	0.0	0.0	0.0	0.9	2.2	6.2	10.5	3%	7%	21%	35%
Condamine–Balonne	0.0	0.0	0.0	0.0	237.3	252.5	317.0	395.4	25%	27%	34%	43%
Moonie	0.0	0.0	0.0	0.0	8.0	8.8	6.4	6.1	10%	11%	8%	7%
Queensland Border Rivers	0.0	0.0	0.0	0.0	141.9	144.6	156.5	143.8	45%	46%	50%	46%
NSW Border Rivers	0.0	0.0	0.0	0.0	118.0	177.2	209.7	282.3	39%	59%	69%	93%
Intersecting Streams[9]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Gwydir	0.0	15.0	0.0	0.5	-19.6	68.6	108.5	145.7	-5%	17%	27%	36%
Namoi	0.0	0.3	0.0	0.0	12.1	-20.1	6.3	41.7	2%	-4%	1%	8%
Macquarie –Castlereagh	0.0	3.0	0.0	0.0	99.6	70.0	155.6	144.2	15%	10%	24%	22%
Lachlan	0.0	3.4	0.0	1.0	108.8	236.7	260.4	307.4	19%	42%	46%	54%
Murrumbidgee	10.1	8.8	-0.3	0.6	499.2	893.5	968.0	969.7	21%	38%	44%	45%
Barwon–Darling Watercourse[10]	0.0	0.0	0.0	0.0	7.1	37.7	48.1	52.7	4%	21%	28%	31%
Lower Darling	0.0	10.0	0.0	0.0	42.8	57.1	68.0	80.7	71%	95%	114%	135%
NSW Murray	-4.1	-8.2	-4.8	0.0	307.8	361.9	-10.5	132.6	19%	23%	-1%	9%
Australian Capital Territory (surface water)[11]	0.0	0.0	0.0	0.0	26.6	53.1	79.5	104.1	51%	101%	151%	219%
Victorian Murray	13.9	3.4	-6.9	0.0	-151.7	167.6	458.1	525.8	-10%	12%	33%	38%
Kiewa	0.0	0.0	0.0	0.0	1.0	6.1	8.1	10.4	4%	25%	33%	42%
Ovens	0.0	0.0	0.0	0.0	5.6	12.4	16.8	24.5	7%	15%	20%	29%
Broken	0.0	0.0	0.0	0.0	10.2	18.1	20.0	25.0	18%	32%	36%	45%
Goulburn	0.0	0.7	8.8	22.4	275.7	640.2	799.7	478.4	19%	44%	57%	34%

	Basin Plan Chapter 6 Part 4 - Trial Compliance Arrangements											
SDL Resource Unit	**Basin Plan s10.12(3): Net Volume of HEW disposed (added to consumptive) and acquired (removed from consumptive)** (GL/y)				**Basin Plan s6.12(1)(a): Transitional adjusted cumulative balance after disposal or acquisition of HEW (if any)** **Adjusted cumulative balance (∑)** (GL/y)				**Basin Plan s6.12(1)(a): Indicative compliance test (non-binding) 20% with long-term TDL** **Adjusted cumulative balance is debit ≤ 20% of TDL = Compliant**			
	2012-13	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Campaspe	-8.0	0.0	0.0	0.0	58.2	95.8	109.0	123.4	40%	77%	88%	100%
Loddon	0.0	0.0	0.0	0.0	48.7	32.4	12.3	0.1	29%	19%	7%	0%
Wimmera–Mallee (surface water)	0.0	0.0	0.0	0.0	28.1	56.2	70.6	63.8	22%	53%	67%	60%
South Australian Murray	-12.0	-11.1	-1.2	-3.9	47.6	74.6	96.5	152.1	8%	13%	17%	28%
South Australian Non-Prescribed Areas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Marne Saunders	0.0	0.0	0.0	0.0	1.1	2.0	2.7	3.7	38%	68%	93%	129%
Eastern Mount Lofty Ranges	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	0%	0%	0%	17%
MDB	**-0.2**	**25.2**	**-4.3**	**20.6**	**1,918.1**	**3,455.0**	**4,000.1**	**4,270.6**	**15%**	**28%**	**33%**	**36%**
Qld	0.0	0.0	0.0	0.0	391.3	413.8	513.0	597.6	26%	28%	34%	40%
NSW	5.9	32.3	-5.1	2.1	1,175.8	1,882.6	1,814.0	2,156.9	17%	28%	28%	33%
ACT	0.0	0.0	0.0	0.0	26.6	53.1	79.5	104.1	51%	101%	151%	219%
Vic	5.8	4.1	2.0	22.3	275.8	1,028.9	1,494.4	1,251.4	8%	30%	44%	37%
SA	-12.0	-11.1	-1.2	-3.9	48.7	76.6	99.2	160.5	8%	13%	17%	28%
Murray-Kiewa-Ovens	13.9	3.4	-6.9	-0.0	-145.0	186.1	483.0	560.8	-9%	12%	32%	37%
Gbn-Bkn-Camp-Lodd	-8.1	0.7	8.8	22.4	392.7	786.5	940.9	626.8	21%	43%	54%	36%

	Other aspects of s71 reporting							
SDL Resource Unit	**Annual authorised (allocated) water including interceptions[8]** (GL/y) (s71(1)(d))				**Actual take / annual authorised water** (%)			
	2012-13	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Paroo	9.7	9.7	9.7	9.7	100%	100%	100%	100%
Warrego	85.8	85.6	91.2	86.7	100%	98%	99%	99%
Nebine	25.0	25.0	25.1	26.4	100%	100%	100%	100%
Condamine–Balonne	1,305.3	903.4	629.1	539.6	97%	97%	98%	98%
Moonie	84.6	63.9	54.7	51.8	100%	100%	100%	100%
Queensland Border Rivers	482.0	234.2	196.6	192.7	95%	96%	92%	87%
NSW Border Rivers	421.7	338.0	199.0	276.5	78%	89%	86%	80%
Intersecting Streams[9]	131.8	137.6	131.3	131.3	89%	85%	89%	89%
Gwydir	845.2	729.2	392.6	308.2	68%	78%	74%	88%
Namoi	723.0	642.1	416.5	388.5	81%	92%	89%	90%
Macquarie –Castlereagh	1,107.9	948.4	741.4	737.9	70%	64%	58%	61%
Lachlan	930.8	926.8	745.3	741.6	71%	61%	68%	66%
Murrumbidgee	3,631.6	2,887.5	2,644.6	2,163.0	77%	81%	83%	85%
Barwon–Darling Watercourse[10]	475.1	471.0	517.2	511.1	42%	19%	9%	17%
Lower Darling	180.7	128.3	96.8	60.7	57%	85%	52%	27%
NSW Murray	2,798.5	2,045.7	1,872.4	1,291.6	72%	78%	74%	64%
Australian Capital Territory (surface water)[11]	85.1	86.7	88.7	87.7	36%	35%	33%	37%
Victorian Murray	2,671.8	1,654.2	1,869.1	2,036.0	67%	86%	81%	72%
Kiewa								
Ovens								

	Other aspects of s71 reporting							
SDL Resource Unit	**Annual authorised (allocated) water including interceptions[8]** (GL/y) (s71(1)(d))				**Actual take / annual authorised water** (%)			
	2012-13	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Broken	1,927.1	1,902.7	1,621.6	1,646.5	81%	77%	89%	85%
Goulburn								
Campaspe								
Loddon								
Wimmera–Mallee (surface water)	212.4	283.5	207.0	191.3	38%	27%	39%	43%
South Australian Murray	659.3	609.5	604.7	672.2	79%	73%	83%	89%
South Australian Non-Prescribed Areas	3.5	3.5	3.5	3.5	100%	100%	100%	100%
Marne Saunders	3.3	3.3	3.2	3.3	66%	67%	73%	62%
Eastern Mount Lofty Ranges	23.9	25.1	28.1	27.8	100%	100%	71%	43%
MDB	**18,825.2**	**15,144.8**	**13,189.4**	**12,185.7**	**75%**	**77%**	**77%**	**75%**
Qld	1,992.4	1,321.8	1,006.3	906.9	97%	97%	97%	96%
NSW	11,246.4	9,254.5	7,757.3	6,610.5	72%	74%	72%	70%
ACT	85.1	86.7	88.7	87.7	36%	35%	33%	37%
Vic	4,811.3	3,840.4	3,697.7	3,873.8	71%	78%	82%	76%
SA	689.9	641.4	639.5	706.8	80%	74%	82%	87%

8. Authorised water for use is the sum of: net carryover volume from previous year; allocations in regulated systems; unregulated entitlements and actual use of supplementary water for NSW; actual use of unregulated streams and losses in diversions for Victoria; actual use of floodplain harvesting, unsupplemented and urban water for Queensland; SA water allocations in EMLR region and authorised water for SA non-prescribed Murray region; Commonwealth and Lake Burley Griffin diversions for the ACT. For the NSW Barwon-Darling this reflects account access moderated by annual use limits and is subject to the actual flows being available to meet pumping thresholds.

11. Appendix 2: Groundwater SDL trial water take account

Groundwater SDL trial water take account at SDL resource unit level.

SDL res. unit code	SDL resource unit	WRP area	State	BDL[1] (GL/y)	SDL[2] (GL/y)	State planning limit[4] (GL/y)	GW HEW[5] at 1 July 2016 (GL/y)	Basic rights[6]	TDL[8] (GL/y) s.71(1)(b) - permitted take[7]			
									2012-13	2013-14	2014-15	2015-16
GS54	Queensland Border Rivers Alluvium	Queensland Border Rivers	Qld	14.0	14.0	20.6		1.44	14.0	14.0	14.0	14.0
GS55	Queensland Border Rivers Fractured Rock	Queensland Border Rivers	Qld	10.1	10.5	10.5		1.51	10.5	10.5	10.5	10.5
GS57	Sediments above the Great Artesian Basin: Border Rivers	Queensland Border Rivers	Qld	0.04	14.4	3.04		0.04	14.4	14.4	14.4	14.4
GS59	Sediments above the Great Artesian Basin: Moonie	Moonie	Qld	0.10	32.5	3.10		0.08	32.5	32.5	32.5	32.5
GS62	St George Alluvium: Moonie	Moonie	Qld	0.01	0.69	0.69		0.01	0.69	0.69	0.69	0.69
GS53	Condamine Fractured Rock	Condamine-Balonne	Qld	0.81	1.48	1.50		0.66	1.48	1.48	1.48	1.48
GS56	Queensland MDB: deep	Condamine-Balonne	Qld	0.00	100.0	0.10		0.00	100.0	100.0	100.0	100.0
GS58	Sediments above the Great Artesian Basin: Condamine–Balonne	Condamine-Balonne	Qld	0.66	18.1	3.66		0.59	18.1	18.1	18.1	18.1
GS61	St George Alluvium: Condamine–Balonne (shallow)	Condamine-Balonne	Qld	0.77	27.7	3.80		0.77	27.7	27.7	27.7	27.7
GS61	St George Alluvium: Condamine–Balonne (deep)	Condamine-Balonne	Qld	12.6	12.6	12.6		0.00	12.6	12.6	12.6	12.6
GS64a	Upper Condamine Alluvium (Central Condamine Alluvium)	Condamine-Balonne	Qld	81.4	46.0	92.0	0.00	6.00	81.4	81.4	81.4	81.4
GS64b	Upper Condamine Alluvium (Tributaries)	Condamine-Balonne	Qld	45.5	40.5	45.5	0.00	3.50	45.5	45.5	45.5	45.5
GS65	Upper Condamine Basalts	Condamine-Balonne	Qld	79.0	79.0	79.0		17.86	79.0	79.0	79.0	79.0
GS60	Sediments above the Great Artesian Basin: Warrego–Paroo–Nebine	Warrego-Paroo-Nebine	Qld	1.21	99.2	9.21		1.11	99.2	99.2	99.2	99.2
GS63	St George Alluvium: Warrego–Paroo–Nebine	Warrego-Paroo-Nebine	Qld	0.12	24.6	0.10		0.12	24.6	24.6	24.6	24.6
GS66	Warrego Alluvium	Warrego-Paroo-Nebine	Qld	0.70	10.2	2.70		0.40	10.2	10.2	10.2	10.2
GS50	Western Porous Rock	Western Porous Rock	NSW	63.1	116.6	530.5		26.75	116.6	116.6	116.6	116.6
GS42	Upper Darling Alluvium	Darling Alluvium	NSW	6.29	6.59	19.12		2.28	6.59	6.59	6.59	6.59
GS23	Lower Darling Alluvium	Darling Alluvium	NSW	2.23	2.23	2.23		0.73	2.23	2.23	2.23	2.23
GS13	Billabong Creek Alluvium	Murray Alluvium	NSW	7.50	7.50	7.50	0.03	0.64	7.50	7.50	7.50	7.50
GS27	Lower Murray Alluvium (shallow)	Murray Alluvium	NSW	81.9	81.9	81.9	0.03	0.99	81.9	81.9	81.9	81.9
GS27	Lower Murray Alluvium (deep)	Murray Alluvium	NSW	88.9	88.9	88.9	1.32	1.53	118.0	108.3	98.6	88.9

Groundwater SDL trial water take account at SDL resource unit level.

SDL res. unit code	SDL resource unit	WRP area	State	BDL[1] (GL/y)	SDL[2] (GL/y)	State planning limit[4] (GL/y)	GW HEW[5] at 1 July 2016 (GL/y)	Basic rights[6]	TDL[8] (GL/y) s.71(1)(b) - permitted take[7]			
									2012-13	2013-14	2014-15	2015-16
GS46	Upper Murray Alluvium	Murray Alluvium	NSW	14.1	14.1	14.1	0.14	0.40	14.1	14.1	14.1	14.1
GS38	Oaklands Basin	Murray Alluvium	NSW	0.00	2.50	0.00		0.00	2.50	2.50	2.50	2.50
GS21	Lake George Alluvium	Murrumbidgee Alluvium	NSW	1.27	1.27	1.27		0.03	1.27	1.27	1.27	1.27
GS28	Lower Murrumbidgee Alluvium (shallow)	Murrumbidgee Alluvium	NSW	26.9	26.9	13.0		3.00	26.9	26.9	26.9	26.9
GS28	Lower Murrumbidgee Alluvium (deep)	Murrumbidgee Alluvium	NSW	273.6	273.6	271.0	5.05	1.00	286.0	281.9	277.7	273.6
GS31	Mid-Murrumbidgee Alluvium	Murrumbidgee Alluvium	NSW	53.5	53.5	53.5		0.80	53.5	53.5	53.5	53.5
GS12	Belubula Alluvium	Lachlan Alluvium	NSW	2.88	2.88	2.88		0.04	2.88	2.88	2.88	2.88
GS25	Lower Lachlan Alluvium	Lachlan Alluvium	NSW	123.4	117.0	112.0		4.00	127.6	125.5	123.4	121.2
GS44	Upper Lachlan Alluvium	Lachlan Alluvium	NSW	94.2	94.2	94.2		6.28	94.2	94.2	94.2	94.2
GS10	Adelaide Fold Belt	Lachlan and South Western Fractured Rock	NSW	3.61	6.90	26.0		2.14	6.90	6.90	6.90	6.90
GS19	Kanmantoo Fold Belt	Lachlan and South Western Fractured Rock	NSW	8.9	18.7	121.5		8.15	18.7	18.7	18.7	18.7
GS20	Lachlan Fold Belt	Lachlan and South Western Fractured Rock	NSW	142.4	259.0	901.8	0.03	74.31	259.0	259.0	259.0	259.0
GS39	Orange Basalt	Lachlan and South Western Fractured Rock	NSW	10.7	10.7	16.2		1.16	10.7	10.7	10.7	10.7
GS51	Young Granite	Lachlan and South Western Fractured Rock	NSW	7.11	7.11	9.50		0.76	7.11	7.11	7.11	7.11
GS11	Bell Valley Alluvium	Macquarie-Castlereagh Alluvium	NSW	3.29	3.29	3.29		0.01	3.29	3.29	3.29	3.29
GS14	Castlereagh Alluvium	Macquarie-Castlereagh Alluvium	NSW	0.62	0.62	0.62		0.08	0.62	0.62	0.62	0.62
GS15	Coolaburragundy-Talbragar Alluvium	Macquarie-Castlereagh Alluvium	NSW	3.47	3.47	3.47		0.07	3.47	3.47	3.47	3.47
GS16	Cudgegong Alluvium	Macquarie-Castlereagh Alluvium	NSW	2.53	2.53	2.53		0.03	2.53	2.53	2.53	2.53
GS26	Lower Macquarie Alluvium	Macquarie-Castlereagh Alluvium	NSW	70.7	70.7	69.3		1.73	71.4	71.2	71.0	70.7
GS45	Upper Macquarie Alluvium	Macquarie-Castlereagh Alluvium	NSW	17.9	17.9	17.9		0.30	17.9	17.9	17.9	17.9
GS34	NSW GAB Surat Shallow	New South Wales Great Artesian Basin Shallow	NSW	6.6	15.5	143.3		0.98	15.5	15.5	15.5	15.5
GS35	NSW GAB Warrego Shallow	New South Wales Great Artesian Basin Shallow	NSW	0.7	33.4	115.7		0.65	33.4	33.4	33.4	33.4
GS36	NSW GAB Central Shallow	New South Wales Great Artesian Basin Shallow	NSW	0.25	8.83	145.6		1.16	8.83	8.83	8.83	8.83

Groundwater SDL trial water take account at SDL resource unit level.

SDL res. unit code	SDL resource unit	WRP area	State	BDL[1] (GL/y)	SDL[2] (GL/y)	State planning limit[4] (GL/y)	GW HEW[5] at 1 July 2016 (GL/y)	Basic rights[6]	TDL[8] (GL/y) s.71(1)(b) - permitted take[7]			
									2012-13	2013-14	2014-15	2015-16
GS29	Lower Namoi Alluvium	Namoi Alluvium	NSW	88.3	88.3	89.3		3.30	94.6	92.5	90.4	88.3
GS30	Manilla Alluvium	Namoi Alluvium	NSW	1.23	1.23	1.23		0.02	1.23	1.23	1.23	1.23
GS40	Peel Valley Alluvium	Namoi Alluvium	NSW	9.34	9.34	9.34		0.24	9.34	9.34	9.34	9.34
GS47	Upper Namoi Alluvium	Namoi Alluvium	NSW	123.4	123.4	124.9		2.83	135.8	131.7	127.7	123.4
GS48	Upper Namoi Tributary Alluvium	Namoi Alluvium	NSW	1.77	1.77	1.77		0.04	1.77	1.77	1.77	1.77
GS24	Lower Gwydir Alluvium	Gwydir Alluvium	NSW	33.0	33.0	33.0		0.70	39.0	37.0	35.0	33.0
GS43	Upper Gwydir Alluvium	Gwydir Alluvium	NSW	0.72	0.72	0.72		0.07	0.72	0.72	0.72	0.72
GS17	Gunnedah-Oxley Basin MDB	Eastern Porous Rock	NSW	22.1	114.5	205.6		5.78	114.5	114.5	114.5	114.5
GS41	Sydney Basin MDB	Eastern Porous Rock	NSW	3.1	17.2	60.4		0.47	17.2	17.2	17.2	17.2
GS18	Inverell Basalt	New England Fractured Rock and Northern Basalts	NSW	4.15	4.15	25.8		1.07	4.15	4.15	4.15	4.15
GS22	Liverpool Ranges Basalt	New England Fractured Rock and Northern Basalts	NSW	2.16	2.16	19.1		1.83	2.16	2.16	2.16	2.16
GS37	New England Fold Belt	New England Fractured Rock and Northern Basalts	NSW	32.9	55.1	276.0		18.57	55.1	55.1	55.1	55.1
GS49	Warrumbungle Basalt	New England Fractured Rock and Northern Basalts	NSW	0.55	0.55	5.71		0.54	0.55	0.55	0.55	0.55
GS32	NSW Border Rivers Alluvium	New South Wales Border Rivers Alluvium	NSW	8.40	8.40	8.40		0.24	8.40	8.40	8.40	8.40
GS33	NSW Border Rivers Tributary Alluvium	New South Wales Border Rivers Alluvium	NSW	0.41	0.41	0.41		0.14	0.41	0.41	0.41	0.41
GS52	Australian Capital Territory (Groundwater)	Australian Capital Territory (groundwater)	ACT	1.70	3.16	7.25		0.00	3.16	3.16	3.16	3.16
GS8	Goulburn-Murray: Shepparton Irrigation Region	Goulburn-Murray	Vic	244.1	244.1	244.1		0.00	244.1	244.1	244.1	244.1
GS8	Goulburn-Murray: Highlands	Goulburn-Murray	Vic	38.3	50.5	38.3		3.85	50.5	50.5	50.5	50.5
GS8	Goulburn-Murray: Sedimentary Plain	Goulburn-Murray	Vic	203.5	203.5	214.0		15.38	203.5	203.5	203.5	203.5
GS8	Goulburn-Murray: deep	Goulburn-Murray	Vic	0.0	20.0	0.0		0.00	20.0	20.0	20.0	20.0
GS9	Wimmera-Mallee: Highlands	Wimmera-Mallee	Vic	1.26	2.14	1.30		0.28	2.14	2.14	2.14	2.14
GS9	Wimmera-Mallee: Sedimentary Plain	Wimmera-Mallee	Vic	68.9	190.7	68.9		1.10	190.7	190.7	190.7	190.7
GS9	Wimmera-Mallee: deep	Wimmera-Mallee	Vic	0.0	20.0	0.0		0.00	20.0	20.0	20.0	20.0

Groundwater SDL trial water take account at SDL resource unit level.

SDL res. unit code	SDL resource unit	WRP area	State	BDL[1] (GL/y)	SDL[2] (GL/y)	State planning limit[4] (GL/y)	GW HEW[5] at 1 July 2016 (GL/y)	Basic rights[6]	TDL[8] (GL/y) s.71(1)(b) - permitted take[7]			
									2012-13	2013-14	2014-15	2015-16
GS3	Mallee (Pliocene Sands)	South Australian Murray Region	SA	0.0	41.4	0.0		0.00	41.4	41.4	41.4	41.4
GS3	Mallee (Murray Group Limestone)	South Australian Murray Region	SA	65.7	65.7	63.6		2.28	65.7	65.7	65.7	65.7
GS3	Mallee (Renmark Group)	South Australian Murray Region	SA	0.00	2.00	0.00		0.00	2.00	2.00	2.00	2.00
GS5	Peake–Roby–Sherlock (unconfined limestone)	South Australian Murray Region	SA	3.41	3.41	3.41		0.19	3.41	3.41	3.41	3.41
GS5	Peake-Roby-Sherlock (confined strata - Buccleuch formation and Renmark Group)	South Australian Murray Region	SA	2.58	2.58	2.58		0.41	2.58	2.58	2.58	2.58
GS6	SA Murray (Groundwater)	South Australian Murray Region	SA	1.8	64.8	0.0		1.80	64.8	64.8	64.8	64.8
GS7	SA Murray Salt Interception Schemes	South Australian Murray Region	SA	11.1	28.6	0.0		0.00	28.6	28.6	28.6	28.6
GS1	Angas Bremer (Quaternary)	Eastern Mount Lofty Ranges	SA	0.00	1.09	0.25		0.00	1.09	1.09	1.09	1.09
GS1	Angas Bremer (Murray Group Limestone)	Eastern Mount Lofty Ranges	SA	6.57	6.57	6.60		0.07	6.57	6.57	6.57	6.57
GS2	Eastern Mount Lofty Ranges	Eastern Mount Lofty Ranges	SA	34.7	38.5	38.5		2.14	38.5	38.5	38.5	38.5
GS4	Marne Saunders (fractured rock)	Eastern Mount Lofty Ranges	SA	2.09	2.09	2.10		0.09	2.09	2.09	2.09	2.09
GS4	Marne Saunders (Murray Group Limestone including overlying Quaternary sediments)	Eastern Mount Lofty Ranges	SA	2.38	2.38	2.40		0.18	2.38	2.38	2.38	2.38
GS4	Marne Saunders (Renmark Group)	Eastern Mount Lofty Ranges	SA	0.50	0.50	0.50		0.00	0.50	0.50	0.50	0.50
TOTALS			**MDB**	**2,385.5**	**3,333.6**	**4,712.5**	**6.6**	**237.7**	**3,451.4**	**3,427.1**	**3,402.8**	**3,378.3**
			Qld	247.0	531.5	288.1	-	34.1	571.9	571.9	571.9	571.9
			NSW	1,450.0	1,808.4	3,730.5	6.6	175.8	1,885.9	1,861.5	1,837.2	1,812.7
			ACT	1.7	3.2	7.3	-	-	3.2	3.2	3.2	3.2
			Vic	556.0	730.9	566.7	-	20.6	730.9	730.9	730.9	730.9
			SA	130.8	259.7	119.9	-	7.2	259.7	259.7	259.7	259.7

	Basin Plan Chapter 6 Part 4 - Trial compliance arrangements																			
	Actual take[9] (GL/y) s.71(1)(c) - actual take				**Actual take/TDL** (%)				**Debit / credit[10]** (TDL - actual) (GL/y)				**Cumulative balance** (Cumulative annual TDL - annual actual) (GL/y)				**Indicative compliance test (Non-binding) 20% with long-term TDL[13]** (Cumulative balance / TDL) Basin Plan s6.12(1)(a)			
SDL resource unit	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Queensland Border Rivers Alluvium	8.85	11.32	11.79	12.82	63%	81%	84%	92%	5.1	2.7	2.2	1.2	5.1	7.8	10.0	11.2	37%	56%	72%	80%
Queensland Border Rivers Fractured Rock	9.52	9.52	9.52	10.16	90%	90%	90%	97%	1.0	1.0	1.0	0.4	1.0	2.0	3.0	3.4	10%	19%	29%	32%
Sediments above the Great Artesian Basin: Border Rivers	0.02	0.03	0.03	0.04	0%	0%	0%	0%	14.4	14.4	14.4	14.3	14.4	28.7	43.1	57.4	100%	200%	299%	399%
Sediments above the Great Artesian Basin: Moonie	0.08	0.08	0.30	0.32	0%	0%	1%	1%	32.4	32.4	32.2	32.2	32.4	64.9	97.1	129.3	100%	200%	299%	398%
St George Alluvium: Moonie	0.01	0.01	0.01	0.01	1%	1%	1%	1%	0.7	0.7	0.7	0.7	0.7	1.4	2.0	2.7	99%	197%	296%	395%
Condamine Fractured Rock	0.32	0.32	0.58	1.07	22%	22%	39%	72%	1.2	1.2	0.9	0.4	1.2	2.3	3.2	3.6	78%	157%	217%	245%
Queensland MDB: deep	0.00	0.00	0.00	0.10	0%	0%	0%	0%	100.0	100.0	100.0	99.9	100.0	200.0	300.0	399.9	100%	200%	300%	400%
Sediments above the Great Artesian Basin: Condamine–Balonne	0.46	0.50	0.50	0.66	3%	3%	3%	4%	17.7	17.6	17.6	17.5	17.7	35.3	53.0	70.4	97%	195%	292%	388%
St George Alluvium: Condamine–Balonne (shallow)	0.77	0.77	0.77	1.12	3%	3%	3%	4%	26.9	26.9	26.9	26.6	26.9	53.9	80.8	107.4	97%	194%	292%	388%
St George Alluvium: Condamine–Balonne (deep)	9.50	11.62	11.62	11.61	75%	92%	92%	92%	3.1	1.0	1.0	1.0	3.1	4.1	5.1	6.1	25%	32%	40%	48%
Upper Condamine Alluvium (Central Condamine Alluvium)	32.33	55.09	41.08	41.96	40%	68%	50%	52%	49.1	26.3	40.3	39.4	49.1	75.4	115.7	155.1	60%	93%	142%	191%
Upper Condamine Alluvium (Tributaries)	33.89	32.89	30.58	32.65	74%	72%	67%	72%	11.6	12.6	14.9	12.9	11.6	24.2	39.1	52.0	26%	53%	86%	114%
Upper Condamine Basalts	65.09	70.11	69.26	72.66	82%	89%	88%	92%	13.9	8.9	9.7	6.3	13.9	22.7	32.4	38.7	18%	29%	41%	49%
Sediments above the Great Artesian Basin: Warrego–Paroo–Nebine	0.80	0.86	0.78	1.24	1%	1%	1%	1%	98.4	98.3	98.4	97.9	98.4	196.7	295.1	393.0	99%	198%	298%	396%
St George Alluvium: Warrego–Paroo–Nebine	0.09	0.11	0.11	0.12	0%	0%	0%	0%	24.5	24.5	24.5	24.5	24.5	49.0	73.5	97.9	100%	199%	299%	398%
Warrego Alluvium	0.64	0.64	0.72	0.72	6%	6%	7%	7%	9.6	9.6	9.5	9.5	9.6	19.2	28.7	38.3	94%	188%	281%	374%
Western Porous Rock	34.99	36.66	29.91	35.79	30%	31%	26%	31%	81.6	79.9	86.7	80.8	81.6	161.5	248.2	329.0	70%	139%	213%	282%
Upper Darling Alluvium	2.80	3.50	4.00	4.20	43%	53%	61%	64%	3.8	3.1	2.6	2.4	3.8	6.9	9.5	11.9	57%	104%	144%	180%
Lower Darling Alluvium	0.73	0.73	0.77	0.78	33%	33%	35%	35%	1.5	1.5	1.5	1.5	1.5	3.0	4.5	5.9	67%	135%	200%	265%

	Basin Plan Chapter 6 Part 4 - Trial compliance arrangements																			
	Actual take[9] (GL/y) s.71(1)(c) - actual take				**Actual take/TDL** (%)				**Debit / credit[10]** (TDL - actual) (GL/y)				**Cumulative balance** (Cumulative annual TDL - annual actual) (GL/y)				**Indicative compliance test (Non-binding) 20% with long-term TDL[13]** (Cumulative balance / TDL) Basin Plan s6.12(1)(a)			
SDL resource unit	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Billabong Creek Alluvium	1.97	2.14	2.08	3.28	26%	29%	28%	44%	5.5	5.4	5.4	4.2	5.5	10.9	16.3	20.5	74%	145%	217%	274%
Lower Murray Alluvium (shallow)	2.26	4.10	5.90	5.40	3%	5%	7%	7%	79.6	77.8	76.0	76.5	79.6	157.4	233.4	309.9	97%	192%	285%	378%
Lower Murray Alluvium (deep)	56.17	45.19	67.49	85.50	48%	42%	68%	96%	61.8	63.1	31.1	3.4	61.8	124.9	156.0	159.4	52%	115%	158%	179%
Upper Murray Alluvium	12.29	10.66	9.87	11.18	87%	76%	70%	79%	1.8	3.4	4.2	2.9	1.8	5.3	9.5	12.4	13%	37%	67%	88%
Oaklands Basin	0.00	0.00	0.00	0.00	0%	0%	0%	0%	2.5	2.5	2.5	2.5	2.5	5.0	7.5	10.0	100%	200%	300%	400%
Lake George Alluvium	1.05	0.44	0.42	0.62	83%	35%	33%	49%	0.2	0.8	0.8	0.6	0.2	1.0	1.9	2.5	17%	82%	149%	200%
Lower Murrumbidgee Alluvium (shallow)	5.25	6.47	7.15	6.21	20%	24%	27%	23%	21.6	20.4	19.7	20.7	21.6	42.0	61.8	82.4	80%	156%	230%	307%
Lower Murrumbidgee Alluvium (deep)	179.58	230.25	300.31	268.45	63%	82%	108%	98%	106.4	51.6	- 22.6	5.2	106.4	158.0	135.5	140.6	37%	56%	49%	51%
Mid-Murrumbidgee Alluvium	35.50	36.06	40.08	32.43	66%	67%	75%	61%	18.0	17.4	13.4	21.1	18.0	35.4	48.8	69.9	34%	66%	91%	131%
Belubula Alluvium	1.44	0.84	0.60	0.72	50%	29%	21%	25%	1.4	2.0	2.3	2.2	1.4	3.5	5.8	7.9	50%	121%	200%	275%
Lower Lachlan Alluvium	87.21	104.90	120.47	97.53	68%	84%	98%	80%	40.4	20.6	2.9	23.7	40.4	61.0	63.9	87.6	32%	49%	52%	72%
Upper Lachlan Alluvium	44.24	42.26	57.20	55.65	47%	45%	61%	59%	49.9	51.9	37.0	38.5	49.9	101.8	138.8	177.3	53%	108%	147%	188%
Adelaide Fold Belt	2.14	2.14	2.14	2.14	31%	31%	31%	31%	4.8	4.8	4.8	4.8	4.8	9.5	14.3	19.0	69%	138%	207%	276%
Kanmantoo Fold Belt	8.15	8.65	8.15	8.15	44%	46%	44%	44%	10.6	10.1	10.6	10.6	10.6	20.6	31.2	41.7	56%	110%	167%	223%
Lachlan Fold Belt	80.55	82.05	78.80	79.69	31%	32%	30%	31%	178.5	177.0	180.2	179.3	178.5	355.4	535.6	714.9	69%	137%	207%	276%
Orange Basalt	1.86	1.69	1.61	1.65	17%	16%	15%	15%	8.8	9.0	9.1	9.0	8.8	17.8	26.8	35.9	83%	167%	252%	336%
Young Granite	1.90	1.76	1.44	2.19	27%	25%	20%	31%	5.2	5.4	5.7	4.9	5.2	10.6	16.2	21.2	73%	149%	228%	298%
Bell Valley Alluvium	1.37	1.35	1.44	1.41	42%	41%	44%	43%	1.9	1.9	1.9	1.9	1.9	3.9	5.7	7.6	58%	117%	174%	231%
Castlereagh Alluvium	0.08	0.08	0.08	0.08	13%	13%	13%	13%	0.5	0.5	0.5	0.5	0.5	1.1	1.6	2.2	87%	174%	261%	348%
Coolaburragundy-Talbragar Alluvium	1.40	2.08	1.72	2.19	40%	60%	50%	63%	2.1	1.4	1.8	1.3	2.1	3.5	5.2	6.5	60%	100%	150%	187%
Cudgegong Alluvium	1.23	1.79	2.34	1.91	49%	71%	92%	75%	1.3	0.7	0.2	0.6	1.3	2.0	2.2	2.9	51%	81%	88%	113%

	Basin Plan Chapter 6 Part 4 - Trial compliance arrangements																			
	Actual take[9] (GL/y) s.71(1)(c) - actual take				**Actual take/TDL** (%)				**Debit / credit**[10] (TDL - actual) (GL/y)				**Cumulative balance** (Cumulative annual TDL - annual actual) (GL/y)				**Indicative compliance test (Non-binding) 20% with long-term TDL**[13] (Cumulative balance / TDL) Basin Plan s6.12(1)(a)			
SDL resource unit	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Lower Macquarie Alluvium	36.74	40.32	45.92	47.13	51%	57%	65%	67%	34.7	30.9	25.0	23.6	34.7	65.6	90.6	114.2	49%	92%	128%	161%
Upper Macquarie Alluvium	13.69	14.05	15.34	15.95	76%	78%	86%	89%	4.3	3.9	2.6	2.0	4.3	8.1	10.7	12.7	24%	45%	60%	71%
NSW GAB Surat Shallow	2.55	2.16	2.20	1.19	16%	14%	14%	8%	13.0	13.3	13.3	14.3	13.0	26.3	39.6	53.9	84%	170%	255%	348%
NSW GAB Warrego Shallow	0.65	0.65	0.65	0.65	2%	2%	2%	2%	32.7	32.7	32.7	32.7	32.7	65.5	98.2	130.9	98%	196%	294%	392%
NSW GAB Central Shallow	1.16	1.16	1.16	1.16	13%	13%	13%	13%	7.7	7.7	7.7	7.7	7.7	15.3	23.0	30.7	87%	174%	261%	347%
Lower Namoi Alluvium	61.09	104.30	105.05	92.96	65%	113%	116%	105%	33.5	- 11.8	- 14.6	- 4.7	33.5	21.7	7.1	2.4	35%	23%	8%	3%
Manilla Alluvium	0.17	0.25	0.24	0.26	14%	20%	20%	21%	1.1	1.0	1.0	1.0	1.1	2.0	3.0	4.0	86%	166%	246%	325%
Peel Valley Alluvium	7.96	8.66	7.19	6.60	85%	93%	77%	71%	1.4	0.7	2.2	2.7	1.4	2.1	4.2	7.0	15%	22%	45%	74%
Upper Namoi Alluvium	90.12	113.64	102.37	93.72	66%	86%	80%	76%	45.6	18.1	25.3	29.7	45.6	63.7	89.0	118.7	34%	48%	70%	96%
Upper Namoi Tributary Alluvium	0.55	0.39	0.21	0.23	31%	22%	12%	13%	1.2	1.4	1.6	1.5	1.2	2.6	4.2	5.7	69%	147%	235%	322%
Lower Gwydir Alluvium	29.33	46.38	43.33	35.54	75%	125%	124%	108%	9.6	- 9.4	- 8.3	- 2.5	9.6	0.2	- 8.1	- 10.6	25%	1%	-23%	-32%
Upper Gwydir Alluvium	0.07	0.07	0.07	0.07	10%	10%	10%	10%	0.7	0.7	0.7	0.7	0.7	1.3	2.0	2.6	90%	181%	271%	361%
Gunnedah-Oxley Basin MDB	9.59	11.90	12.47	11.84	8%	10%	11%	10%	104.9	102.6	102.0	102.6	104.9	207.4	309.4	412.0	92%	181%	270%	360%
Sydney Basin MDB	0.47	0.47	0.47	0.47	3%	3%	3%	3%	16.7	16.7	16.7	16.7	16.7	33.4	50.1	66.8	97%	195%	292%	389%
Inverell Basalt	1.07	1.07	1.17	1.58	26%	26%	28%	38%	3.1	3.1	3.0	2.6	3.1	6.2	9.1	11.7	74%	148%	220%	282%
Liverpool Ranges Basalt	1.83	1.85	1.83	1.84	85%	86%	85%	85%	0.3	0.3	0.3	0.3	0.3	0.6	1.0	1.3	15%	29%	45%	59%
New England Fold Belt	19.76	20.13	19.89	19.99	36%	37%	36%	36%	35.3	35.0	35.2	35.1	35.3	70.3	105.5	140.6	64%	128%	192%	255%
Warrumbungle Basalt	0.54	0.54	0.54	0.54	98%	98%	98%	98%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2%	4%	6%	8%
NSW Border Rivers Alluvium	2.84	5.59	5.41	3.98	34%	67%	64%	47%	5.6	2.8	3.0	4.4	5.6	8.4	11.4	15.8	66%	100%	135%	188%
NSW Border Rivers Tributary Alluvium	0.16	0.17	0.17	0.17	39%	41%	41%	41%	0.3	0.2	0.2	0.2	0.3	0.5	0.7	1.0	61%	120%	178%	237%
Australian Capital Territory (Groundwater)	0.58	0.46	0.76	0.96	18%	15%	24%	30%	2.6	2.7	2.4	2.2	2.6	5.3	7.7	9.9	82%	167%	243%	312%

	Basin Plan Chapter 6 Part 4 - Trial compliance arrangements																			
	Actual take[9] (GL/y) s.71(1)(c) - actual take				**Actual take/TDL** (%)				**Debit / credit**[10] (TDL - actual) (GL/y)				**Cumulative balance** (Cumulative annual TDL - annual actual) (GL/y)				**Indicative compliance test (Non-binding) 20% with long-term TDL**[13] (Cumulative balance / TDL) Basin Plan s6.12(1)(a)			
SDL resource unit	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Goulburn-Murray: Shepparton Irrigation Region	41.28	35.51	43.68	79.45	17%	15%	18%	33%	202.9	208.6	200.5	164.7	202.9	411.5	612.0	776.7	83%	169%	251%	318%
Goulburn-Murray: Highlands	9.91	5.52	19.92	13.09	20%	11%	39%	26%	40.5	44.9	30.5	37.4	40.5	85.5	116.0	153.4	80%	169%	230%	304%
Goulburn-Murray: Sedimentary Plain	101.24	98.43	136.46	141.53	50%	48%	67%	70%	102.2	105.0	67.0	61.9	102.2	207.2	274.2	336.2	50%	102%	135%	165%
Goulburn-Murray: deep	0.00	0.00	0.00	0.00	0%	0%	0%	0%	20.0	20.0	20.0	20.0	20.0	40.0	60.0	80.0	100%	200%	300%	400%
Wimmera-Mallee: Highlands	0.62	0.60	0.72	0.46	29%	28%	34%	22%	1.5	1.5	1.4	1.7	1.5	3.1	4.5	6.2	71%	143%	209%	288%
Wimmera-Mallee: Sedimentary Plain	9.94	9.18	12.33	7.33	5%	5%	6%	4%	180.7	181.5	178.3	183.3	180.7	362.2	540.6	723.9	95%	190%	284%	380%
Wimmera-Mallee: deep	0.00	0.00	0.00	0.00	0%	0%	0%	0%	20.0	20.0	20.0	20.0	20.0	40.0	60.0	80.0	100%	200%	300%	400%
Mallee (Pliocene Sands)	0.00	0.00	0.00	0.00	0%	0%	0%	0%	41.4	41.4	41.4	41.4	41.4	82.8	124.3	165.7	100%	200%	300%	400%
Mallee (Murray Group Limestone)	41.00	34.57	37.73	34.98	62%	53%	57%	53%	24.7	31.2	28.0	30.8	24.7	55.9	83.9	114.6	38%	85%	128%	174%
Mallee (Renmark Group)	0.00	0.00	0.00	0.00	0%	0%	0%	0%	2.0	2.0	2.0	2.0	2.0	4.0	6.0	8.0	100%	200%	300%	400%
Peake–Roby–Sherlock (unconfined limestone)	0.19	0.19	0.19	0.19	6%	6%	6%	6%	3.2	3.2	3.2	3.2	3.2	6.4	9.6	12.9	94%	189%	283%	378%
Peake-Roby-Sherlock (confined strata - Buccleuch formation and Renmark Group)	1.80	1.11	0.61	0.50	70%	43%	24%	19%	0.8	1.5	2.0	2.1	0.8	2.2	4.2	6.3	30%	87%	163%	244%
SA Murray (Groundwater)	1.80	1.80	1.80	1.80	3%	3%	3%	3%	63.0	63.0	63.0	63.0	63.0	126.0	188.9	251.9	97%	194%	292%	389%
SA Murray Salt Interception Schemes	9.94	11.31	9.55	11.85	35%	40%	33%	41%	18.7	17.3	19.1	16.8	18.7	36.0	55.1	71.9	65%	126%	192%	251%
Angas Bremer (Quaternary)	0.00	0.00	0.00	0.00	0%	0%	0%	0%	1.1	1.1	1.1	1.1	1.1	2.2	3.3	4.4	100%	200%	300%	400%
Angas Bremer (Murray Group Limestone)	2.06	1.74	1.44	1.20	31%	26%	22%	18%	4.5	4.8	5.1	5.4	4.5	9.3	14.5	19.8	69%	142%	220%	302%
Eastern Mount Lofty Ranges	2.13	2.13	2.13	9.58	6%	6%	6%	25%	36.4	36.4	36.4	28.9	36.4	72.8	109.1	138.1	94%	189%	283%	359%
Marne Saunders (fractured rock)	0.49	0.36	0.43	0.59	23%	17%	21%	28%	1.6	1.7	1.7	1.5	1.6	3.3	5.0	6.5	77%	159%	239%	311%
Marne Saunders (Murray Group Limestone including overlying Quaternary sediments)	1.60	1.34	1.40	1.53	67%	56%	59%	64%	0.8	1.0	1.0	0.8	0.8	1.8	2.8	3.6	33%	76%	117%	153%

	Basin Plan Chapter 6 Part 4 - Trial compliance arrangements																			
	Actual take[9] (GL/y) s.71(1)(c) - actual take				**Actual take/TDL** (%)				**Debit / credit[10]** (TDL - actual) (GL/y)				**Cumulative balance** (Cumulative annual TDL - annual actual) (GL/y)				**Indicative compliance test (Non-binding) 20% with long-term TDL[13]** (Cumulative balance / TDL) Basin Plan s6.12(1)(a)			
SDL resource unit	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Marne Saunders (Renmark Group)	0.00	0.00	0.00	0.00	0%	0%	0%	0%	0.5	0.5	0.5	0.5	0.5	1.0	1.5	2.0	100%	200%	300%	400%
MDB	**1,231.4**	**1,397.7**	**1,556.4**	**1,535.3**	**36%**	**41%**	**46%**	**45%**	**2,220.0**	**2,029.5**	**1,846.4**	**1,843.0**	**2,220.0**	**4,249.4**	**6,095.8**	**7,938.8**	64%	124%	179%	235%
Qld	162.4	193.9	177.6	187.2	28%	34%	31%	33%	409.5	378.0	394.2	384.6	409.5	787.5	1,181.8	1,566.4	72%	138%	207%	274%
NSW	844.5	999.5	1,109.7	1,043.0	45%	54%	60%	58%	1,041.4	862.0	727.6	769.7	1,041.4	1,903.4	2,630.9	3,400.6	55%	102%	143%	188%
ACT	0.6	0.5	0.8	1.0	18%	15%	24%	30%	2.6	2.7	2.4	2.2	2.6	5.3	7.7	9.9	82%	167%	243%	312%
Vic	163.0	149.2	213.1	241.9	22%	20%	29%	33%	567.9	581.6	517.8	489.0	567.9	1,149.5	1,667.3	2,156.3	78%	157%	228%	295%
SA	61.0	54.6	55.3	62.2	23%	21%	21%	24%	198.7	205.1	204.4	197.5	198.7	403.8	608.2	805.7	77%	155%	234%	310%

	Other aspects of s.71 reporting[14]															
	Allocation[11] + Basic Rights (GL/y) s.71(1)(d) - water allocations				Carry Over[12] (GL/y) s.71(1)(d) - carry over				Allocation + Carry Over (GL/y) s.71(1)(d) - water allocations				Actual Take / (Allocation + Carry Over) (%)			
SDL resource unit	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16
Queensland Border Rivers Alluvium	20.6	20.6	20.6	20.6	0.0	0.0	0.0	0.0	20.6	20.6	20.6	20.6	43%	55%	57%	62%
Queensland Border Rivers Fractured Rock	10.2	10.2	10.2	10.2	0.0	0.0	0.0	0.0	10.2	10.2	10.2	10.2	94%	94%	94%	100%
Sediments above the Great Artesian Basin: Border Rivers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57%	86%	86%	100%
Sediments above the Great Artesian Basin: Moonie	0.1	0.1	0.3	0.3	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.3	79%	79%	93%	100%
St George Alluvium: Moonie	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%	100%	100%	100%
Condamine Fractured Rock	0.8	0.8	1.1	1.1	0.0	0.0	0.0	0.0	0.8	0.8	1.1	1.1	39%	39%	54%	100%
Queensland MDB: deep	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0%	0%	0%	100%
Sediments above the Great Artesian Basin: Condamine–Balonne	0.7	0.7	0.7	0.7	0.0	0.0	0.0	0.0	0.7	0.7	0.7	0.7	70%	76%	76%	100%
St George Alluvium: Condamine–Balonne (shallow)	0.8	0.8	0.8	1.1	0.0	0.0	0.0	0.0	0.8	0.8	0.8	1.1	100%	100%	100%	100%
St George Alluvium: Condamine–Balonne (deep)	10.2	12.6	12.6	11.6	0.0	0.0	0.0	0.0	10.2	12.6	12.6	11.6	93%	92%	92%	100%
Upper Condamine Alluvium (Central Condamine Alluvium)	60.9	60.9	60.9	60.9	43.1	29.5	37.9	34.0	104.0	90.4	98.8	94.9	31%	61%	42%	44%
Upper Condamine Alluvium (Tributaries)	43.0	41.7	41.7	41.8	7.8	7.8	8.5	9.3	50.8	49.5	50.2	51.1	67%	66%	61%	64%
Upper Condamine Basalts	79.0	79.0	78.8	79.0	3.7	3.7	3.8	4.1	82.7	82.7	82.6	83.1	79%	85%	84%	87%
Sediments above the Great Artesian Basin: Warrego–Paroo–Nebine	1.3	1.3	1.2	1.2	0.0	0.0	0.0	0.0	1.3	1.3	1.2	1.2	60%	65%	63%	100%
St George Alluvium: Warrego–Paroo–Nebine	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	75%	92%	92%	100%
Warrego Alluvium	0.6	0.6	0.7	0.7	0.0	0.0	0.0	0.0	0.6	0.6	0.7	0.7	100%	100%	100%	100%
Western Porous Rock	59.0	59.0	62.3	62.6	5.4	5.7	5.4	5.4	64.4	64.7	67.7	68.0	54%	57%	44%	53%
Upper Darling Alluvium	5.6	5.8	5.8	5.8	0.0	0.0	0.0	0.0	5.6	5.8	5.8	5.8	50%	60%	69%	72%
Lower Darling Alluvium	1.7	1.7	1.7	1.7	0.0	0.0	0.0	0.0	1.7	1.7	1.7	1.7	44%	44%	46%	47%
Billabong Creek Alluvium	7.2	7.2	7.2	7.6	0.0	2.9	5.7	0.0	7.2	10.1	12.9	7.6	28%	21%	16%	43%
Lower Murray Alluvium (shallow)	83.4	80.3	80.3	78.7	31.2	33.4	29.6	29.3	114.6	113.7	109.9	108.0	2%	4%	5%	5%
Lower Murray Alluvium (deep)	113.9	105.2	95.5	86.0	41.8	41.5	41.9	41.9	155.6	146.6	137.4	127.9	36%	31%	49%	67%
Upper Murray Alluvium	41.6	41.6	41.6	41.6	15.0	13.7	15.5	14.1	56.7	55.3	57.1	55.7	22%	19%	17%	20%

	Other aspects of s.71 reporting[14]															
	Allocation[11] + Basic Rights (GL/y) s.71(1)(d) - water allocations				Carry Over[12] (GL/y) s.71(1)(d) - carry over				Allocation + Carry Over (GL/y) s.71(1)(d) - water allocations				Actual Take / (Allocation + Carry Over) (%)			
SDL resource unit	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16
Oaklands Basin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Lake George Alluvium	1.3	1.3	1.3	1.3	0.0	0.0	0.0	0.0	1.3	1.3	1.3	1.3	83%	35%	33%	49%
Lower Murrumbidgee Alluvium (shallow)	8.2	8.2	8.2	8.2	5.2	5.2	4.9	4.7	13.4	13.4	13.1	12.9	39%	48%	54%	48%
Lower Murrumbidgee Alluvium (deep)	283.7	279.6	275.5	276.4	252.0	260.7	242.8	229.2	535.7	540.3	518.3	505.6	34%	43%	58%	53%
Mid-Murrumbidgee Alluvium	82.7	82.7	82.5	83.0	0.2	16.7	18.0	17.6	83.0	99.4	100.5	100.6	43%	36%	40%	32%
Belubula Alluvium	8.3	8.3	8.3	8.3	0.0	2.2	3.1	2.5	8.3	10.5	11.4	10.8	17%	8%	5%	7%
Lower Lachlan Alluvium	123.2	121.1	119.0	112.6	52.8	61.2	56.4	47.3	176.0	182.3	175.3	160.0	50%	58%	69%	61%
Upper Lachlan Alluvium	184.0	179.7	179.7	179.7	19.0	33.2	47.6	31.3	203.0	212.8	227.3	210.9	22%	20%	25%	26%
Adelaide Fold Belt	4.3	4.3	4.3	4.3	0.2	0.2	0.2	0.2	4.5	4.5	4.5	4.5	48%	48%	47%	47%
Kanmantoo Fold Belt	8.9	9.7	8.9	8.9	0.1	0.1	0.1	0.1	9.0	9.7	9.0	9.0	91%	89%	91%	91%
Lachlan Fold Belt	139.6	148.5	145.2	148.4	5.8	2.0	10.3	8.0	145.4	150.5	155.5	156.4	55%	55%	51%	51%
Orange Basalt	10.7	11.0	11.0	10.7	0.7	0.9	1.0	1.0	11.4	11.9	11.9	11.7	16%	14%	13%	14%
Young Granite	7.1	7.1	7.1	7.1	0.6	0.6	1.1	0.6	7.7	7.7	8.2	7.7	25%	23%	18%	28%
Bell Valley Alluvium	4.6	4.6	4.6	4.6	0.0	0.0	-0.0	0.0	4.6	4.6	4.6	4.6	30%	29%	31%	31%
Castlereagh Alluvium	0.7	0.7	0.7	0.7	0.0	0.0	0.0	0.0	0.7	0.7	0.7	0.7	12%	12%	12%	12%
Coolaburragundy-Talbragar Alluvium	6.1	6.1	6.1	6.1	0.0	-0.0	0.0	0.0	6.1	6.1	6.1	6.1	23%	34%	28%	36%
Cudgegong Alluvium	13.7	13.7	13.7	13.7	0.0	-0.2	0.0	0.0	13.7	13.6	13.7	13.7	9%	13%	17%	14%
Lower Macquarie Alluvium	71.4	70.7	70.4	69.5	27.6	26.3	26.4	27.0	99.0	97.0	96.8	96.5	37%	42%	47%	49%
Upper Macquarie Alluvium	32.5	32.5	32.5	32.5	0.0	0.0	-0.3	0.0	32.5	32.5	32.2	32.5	42%	43%	48%	49%
NSW GAB Surat Shallow	6.7	6.7	6.7	6.8	0.0	0.0	0.0	1.4	6.7	6.7	6.7	8.2	38%	32%	33%	15%
NSW GAB Warrego Shallow	0.7	0.7	0.7	0.7	0.0	0.0	0.0	0.0	0.7	0.7	0.7	0.7	100%	100%	100%	98%
NSW GAB Central Shallow	1.2	1.2	1.2	1.2	0.0	0.0	0.0	0.0	1.2	1.2	1.2	1.2	100%	99%	97%	98%
Lower Namoi Alluvium	95.6	93.5	91.4	89.3	79.7	80.0	74.7	63.8	175.3	173.4	166.0	153.1	35%	60%	63%	61%

	Other aspects of s.71 reporting[14]															
	Allocation[11] + Basic Rights (GL/y) s.71(1)(d) - water allocations				Carry Over[12] (GL/y) s.71(1)(d) - carry over				Allocation + Carry Over (GL/y) s.71(1)(d) - water allocations				Actual Take / (Allocation + Carry Over) (%)			
SDL resource unit	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16
Manilla Alluvium	3.5	3.5	3.5	3.3	0.0	0.0	0.0	0.0	3.5	3.5	3.5	3.3	5%	7%	7%	8%
Peel Valley Alluvium	49.1	43.3	36.2	39.1	18.8	18.6	18.7	18.6	67.9	61.9	54.9	57.7	12%	14%	13%	11%
Upper Namoi Alluvium	135.8	127.7	123.7	118.9	108.5	107.5	101.6	92.9	244.3	235.1	225.3	211.8	37%	48%	45%	44%
Upper Namoi Tributary Alluvium	3.6	3.2	3.4	3.7	0.0	0.0	0.0	0.0	3.6	3.2	3.4	3.7	15%	12%	6%	6%
Lower Gwydir Alluvium	39.0	37.0	35.1	33.1	26.4	26.7	23.2	16.8	65.3	63.7	58.3	49.9	45%	73%	74%	71%
Upper Gwydir Alluvium	1.3	1.3	1.3	1.3	0.0	0.0	0.0	0.0	1.3	1.3	1.3	1.3	6%	6%	6%	6%
Gunnedah-Oxley Basin MDB	23.6	29.8	28.5	29.4	4.5	0.0	4.1	5.2	28.1	29.8	32.6	34.5	34%	40%	38%	34%
Sydney Basin MDB	3.0	3.0	3.7	3.0	0.0	0.0	0.0	2.4	3.0	3.0	3.7	5.4	15%	16%	13%	9%
Inverell Basalt	4.1	4.2	4.1	4.1	0.6	0.6	0.6	0.6	4.8	4.8	4.8	4.8	22%	22%	25%	33%
Liverpool Ranges Basalt	2.2	2.3	2.3	2.3	0.0	0.0	0.1	0.1	2.3	2.3	2.3	2.3	81%	81%	79%	79%
New England Fold Belt	26.2	38.6	28.1	39.7	0.9	1.0	11.8	1.0	27.2	39.6	39.8	40.7	73%	51%	50%	49%
Warrumbungle Basalt	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6	86%	86%	86%	86%
NSW Border Rivers Alluvium	16.1	16.1	16.1	16.1	0.0	0.0	-0.0	0.0	16.1	16.1	16.1	16.1	18%	35%	34%	25%
NSW Border Rivers Tributary Alluvium	1.7	1.7	1.7	1.7	0.0	0.0	0.0	0.0	1.7	1.7	1.7	1.7	9%	10%	10%	10%
Australian Capital Territory (Groundwater)	1.0	1.0	1.6	1.5	0.0	0.0	0.0	0.0	1.0	1.0	1.6	1.5	56%	45%	47%	65%
Goulburn-Murray: Shepparton Irrigation Region	147.5	196.7	194.8	191.7	0.0	0.0	0.0	0.0	147.5	196.7	194.8	191.7	28%	18%	22%	41%
Goulburn-Murray: Highlands	42.1	32.5	39.7	39.2	0.0	0.0	0.0	0.0	42.1	32.5	39.7	39.2	24%	17%	50%	33%
Goulburn-Murray: Sedimentary Plain	218.8	232.2	221.2	221.8	0.0	21.6	23.4	25.8	218.8	253.8	244.6	247.6	46%	39%	56%	57%
Goulburn-Murray: deep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Wimmera-Mallee: Highlands	1.6	2.1	3.8	2.6	0.0	0.0	0.0	0.0	1.6	2.1	3.8	2.6	39%	29%	19%	18%
Wimmera-Mallee: Sedimentary Plain	18.3	24.7	17.0	18.3	0.0	0.0	0.0	0.0	18.3	24.7	17.0	18.3	54%	37%	72%	40%
Wimmera-Mallee: deep	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0%	0%	0%	0%

	Other aspects of s.71 reporting[14]															
	Allocation[11] + Basic Rights (GL/y) s.71(1)(d) - water allocations				Carry Over[12] (GL/y) s.71(1)(d) - carry over				Allocation + Carry Over (GL/y) s.71(1)(d) - water allocations				Actual Take / (Allocation + Carry Over) (%)			
SDL resource unit	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16
Mallee (Pliocene Sands)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Mallee (Murray Group Limestone)	62.6	62.6	62.6	62.6	0.0	0.0	0.0	0.0	62.6	62.6	62.6	62.6	65%	55%	60%	56%
Mallee (Renmark Group)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Peake–Roby–Sherlock (unconfined limestone)	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5	39%	39%	39%	39%
Peake-Roby-Sherlock (confined strata - Buccleuch formation and Renmark Group)	2.3	2.3	2.3	2.3	0.0	0.0	0.0	0.0	2.3	2.3	2.3	2.3	77%	48%	26%	21%
SA Murray (Groundwater)	1.8	1.8	1.8	1.8	0.0	0.0	0.0	0.0	1.8	1.8	1.8	1.8	100%	100%	100%	100%
SA Murray Salt Interception Schemes	28.6	28.6	28.6	28.6	0.0	0.0	0.0	0.0	28.6	28.6	28.6	28.6	35%	40%	33%	41%
Angas Bremer (Quaternary)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Angas Bremer (Murray Group Limestone)	6.6	6.6	6.6	6.6	1.4	1.3	1.4	0.6	8.0	7.9	8.0	7.1	26%	22%	18%	17%
Eastern Mount Lofty Ranges	2.1	2.1	32.0	33.9	0.0	0.0	0.0	0.0	2.1	2.1	32.0	33.9	100%	100%	7%	28%
Marne Saunders (fractured rock)	2.0	2.0	2.0	2.0	0.3	0.3	0.3	0.3	2.4	2.3	2.4	2.4	21%	15%	18%	25%
Marne Saunders (Murray Group Limestone including overlying Quaternary sediments)	2.3	2.3	2.3	2.3	0.1	0.2	0.1	0.3	2.4	2.5	2.4	2.6	67%	53%	58%	59%
Marne Saunders (Renmark Group)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%	0%	0%	0%
MDB	**2,483.8**	**2,532.2**	**2,510.5**	**2,499.5**	**753.3**	**805.0**	**819.7**	**737.3**	**3,237.2**	**3,337.2**	**3,330.2**	**3,236.8**	38%	42%	47%	47%
Qld	228.2	229.3	229.7	229.5	54.6	41.0	50.2	47.4	282.8	270.3	279.9	276.9	57%	72%	63%	68%
NSW	1,717.3	1,704.7	1,661.6	1,654.2	696.9	740.6	744.3	662.9	2,414.2	2,445.2	2,405.9	2,317.1	35%	41%	46%	45%
ACT	1.0	1.0	1.6	1.5	-	-	-	-	1.0	1.0	1.6	1.5	56%	45%	47%	65%
Vic	428.4	488.3	478.8	473.6	-	21.6	23.4	25.8	428.4	509.9	502.2	499.4	38%	29%	42%	48%
SA	108.9	109.0	138.8	140.6	1.8	1.8	1.9	1.2	110.7	110.8	140.6	141.8	55%	49%	39%	44%

	Carry Over / (Allocation + Carry Over) (%)				Actual Take Measurement Method 2015-16	
SDL resource unit	2012-13	2013-14	2014-15	2015-16	Non-metered (GL/y)	% metered
Queensland Border Rivers Alluvium	8%	9%	8%	8%	6.14	52%
Queensland Border Rivers Fractured Rock	0%	0%	0%	0%	10.16	0%
Sediments above the Great Artesian Basin: Border Rivers	0%	0%	0%	0%	0.04	0%
Sediments above the Great Artesian Basin: Moonie	0%	28%	44%	0%	0.32	0%
St George Alluvium: Moonie	27%	29%	27%	27%	0.01	0%
Condamine Fractured Rock	27%	28%	30%	33%	1.07	0%
Queensland MDB: deep	27%	25%	27%	25%	0.10	0%
Sediments above the Great Artesian Basin: Condamine–Balonne	0%	0%	0%	0%	0.66	0%
St George Alluvium: Condamine–Balonne (shallow)	0%	0%	0%	0%	1.12	0%
St George Alluvium: Condamine–Balonne (deep)	39%	39%	38%	36%	11.61	0%
Upper Condamine Alluvium (Central Condamine Alluvium)	47%	48%	47%	45%	6.00	86%
Upper Condamine Alluvium (Tributaries)	0%	17%	18%	17%	28.60	12%
Upper Condamine Basalts	0%	21%	27%	23%	67.31	7%
Sediments above the Great Artesian Basin: Warrego–Paroo–Nebine	30%	34%	32%	30%	1.24	0%
St George Alluvium: Warrego–Paroo–Nebine	9%	16%	21%	15%	0.12	3%
Warrego Alluvium	4%	4%	5%	5%	0.72	0%
Western Porous Rock	1%	1%	1%	1%	26.75	25%
Upper Darling Alluvium	4%	1%	7%	5%	2.28	46%
Lower Darling Alluvium	6%	8%	8%	8%	0.73	6%
Billabong Creek Alluvium	8%	8%	13%	8%	0.64	80%
Lower Murray Alluvium (shallow)	0%	0%	0%	0%	0.99	82%
Lower Murray Alluvium (deep)	0%	0%	0%	0%	1.53	98%
Upper Murray Alluvium	0%	0%	0%	0%	0.40	96%

	Carry Over / (Allocation + Carry Over) (%)				Actual Take Measurement Method 2015-16	
SDL resource unit	2012-13	2013-14	2014-15	2015-16	Non-metered (GL/y)	% metered
Oaklands Basin	0%	-1%	0%	0%	0.00	0%
Lake George Alluvium	28%	27%	27%	28%	0.03	95%
Lower Murrumbidgee Alluvium (shallow)	0%	0%	-1%	0%	3.00	52%
Lower Murrumbidgee Alluvium (deep)	0%	0%	0%	17%	1.00	100%
Mid-Murrumbidgee Alluvium	0%	0%	0%	2%	0.80	98%
Belubula Alluvium	0%	0%	0%	1%	0.04	94%
Lower Lachlan Alluvium	45%	46%	45%	42%	4.00	96%
Upper Lachlan Alluvium	0%	0%	0%	0%	6.28	89%
Adelaide Fold Belt	28%	30%	34%	32%	2.14	0%
Kanmantoo Fold Belt	44%	46%	45%	44%	8.15	0%
Lachlan Fold Belt	0%	0%	0%	0%	74.31	7%
Orange Basalt	40%	42%	40%	34%	1.16	30%
Young Granite	0%	0%	0%	0%	0.76	65%
Bell Valley Alluvium	16%	0%	13%	15%	0.01	99%
Castlereagh Alluvium	1%	0%	0%	45%	0.08	0%
Coolaburragundy-Talbragar Alluvium	13%	13%	13%	13%	0.07	97%
Cudgegong Alluvium	2%	2%	3%	4%	0.03	98%
Lower Macquarie Alluvium	3%	2%	29%	2%	1.73	96%
Upper Macquarie Alluvium	2%	2%	2%	2%	0.30	98%
NSW GAB Surat Shallow	0%	0%	0%	0%	0.98	18%
NSW GAB Warrego Shallow	0%	0%	0%	0%	0.65	0%
NSW GAB Central Shallow	8%	9%	8%	8%	1.16	0%
Lower Namoi Alluvium	0%	0%	0%	0%	3.30	96%

	Carry Over / (Allocation + Carry Over) (%)				Actual Take Measurement Method 2015-16	
SDL resource unit	2012-13	2013-14	2014-15	2015-16	Non-metered (GL/y)	% metered
Manilla Alluvium	0%	0%	0%	0%	0.02	92%
Peel Valley Alluvium	0%	28%	44%	0%	0.24	96%
Upper Namoi Alluvium	27%	29%	27%	27%	2.83	97%
Upper Namoi Tributary Alluvium	27%	28%	30%	33%	0.04	83%
Lower Gwydir Alluvium	27%	25%	27%	25%	0.70	98%
Upper Gwydir Alluvium	0%	0%	0%	0%	0.07	0%
Gunnedah-Oxley Basin MDB	0%	0%	0%	0%	5.78	51%
Sydney Basin MDB	39%	39%	38%	36%	0.47	0%
Inverell Basalt	47%	48%	47%	45%	1.07	32%
Liverpool Ranges Basalt	0%	17%	18%	17%	1.83	1%
New England Fold Belt	0%	21%	27%	23%	18.57	7%
Warrumbungle Basalt	30%	34%	32%	30%	0.54	0%
NSW Border Rivers Alluvium	9%	16%	21%	15%	0.24	94%
NSW Border Rivers Tributary Alluvium	4%	4%	5%	5%	0.14	18%
Australian Capital Territory (Groundwater)	0%	0%	0%	0%	0.00	100%
Goulburn-Murray: Shepparton Irrigation Region	0%	0%	0%	0%	0.00	100%
Goulburn-Murray: Highlands	0%	0%	0%	0%	3.85	71%
Goulburn-Murray: Sedimentary Plain	0%	8%	10%	10%	15.38	89%
Goulburn-Murray: deep	0%	0%	0%	0%	0.00	0%
Wimmera-Mallee: Highlands	0%	0%	0%	0%	0.28	40%
Wimmera-Mallee: Sedimentary Plain	0%	0%	0%	0%	1.10	85%
Wimmera-Mallee: deep	0%	0%	0%	0%	0.00	0%

	Carry Over / (Allocation + Carry Over) (%)				Actual Take Measurement Method 2015-16	
SDL resource unit	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**Non-metered (GL/y)**	**% metered**
Mallee (Pliocene Sands)	0%	0%	0%	0%	0.00	0%
Mallee (Murray Group Limestone)	0%	0%	0%	0%	2.28	93%
Mallee (Renmark Group)	0%	0%	0%	0%	0.00	0%
Peake–Roby–Sherlock (unconfined limestone)	0%	0%	0%	0%	0.19	0%
Peake-Roby-Sherlock (confined strata - Buccleuch formation and Renmark Group)	0%	0%	0%	0%	0.41	18%
SA Murray (Groundwater)	0%	0%	0%	0%	1.80	0%
SA Murray Salt Interception Schemes	0%	0%	0%	0%	0.00	100%
Angas Bremer (Quaternary)	0%	0%	0%	0%	0.00	0%
Angas Bremer (Murray Group Limestone)	17%	17%	18%	8%	0.07	94%
Eastern Mount Lofty Ranges	0%	0%	0%	0%	2.14	78%
Marne Saunders (fractured rock)	14%	13%	14%	14%	0.09	85%
Marne Saunders (Murray Group Limestone including overlying Quaternary sediments)	5%	8%	4%	13%	0.18	88%
Marne Saunders (Renmark Group)	0%	0%	0%	0%	0.00	0%
MDB	**23%**	**24%**	**25%**	**23%**	**338.8**	**78%**
Qld	19%	15%	18%	17%	135.2	28%
NSW	29%	30%	31%	29%	175.8	83%
ACT	0%	0%	0%	0%	-	100%
Vic	0%	4%	5%	5%	20.6	91%
SA	2%	2%	1%	1%	7.2	88%

Groundwater SDL trial water take account by Water Resource Plan Areas.			Basin Plan Chapter 6 Part 4 - Trial compliance arrangements																	
									TDL[8] (GL/y) s.71(1)(b) - permitted take7				Actual Take[9] (GL/y) s.71(1)(c) - actual take				Actual Take/TDL (%)			
WRP Area	WRP area	State	BDL[1] (GL/y)	SDL[2] (GL/y)	2017 SDL[3]	State Planning Limit[4] (GL/y)	GW HEW[5] at 1 July 2016 (GL/y)	Basic Rights[6]	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16
GW19	Queensland Border Rivers	Qld	24.1	38.9	38.9	34.1	0.00	2.99	38.9	38.9	38.9	38.9	18.4	20.9	21.3	23.0	47%	54%	55%	59%
GW20	Moonie	Qld	33.2	33.2	3.8	0.00	0.09	33.2	33.2	33.2	33.2	33.2	0.1	0.1	0.3	0.3	0%	0%	1%	1%
GW21	Condamine-Balonne	Qld	325.4	325.4	238.2	0.00	29.38	365.8	365.8	365.8	365.8	365.8	142.4	171.3	154.4	161.8	39%	47%	42%	44%
GW22	Warrego-Paroo-Nebine	Qld	134.0	134.0	12.0	0.00	1.63	134.0	134.0	134.0	134.0	134.0	1.5	1.6	1.6	2.1	1%	1%	1%	2%
GW6	Western Porous Rock	NSW	63.1	116.6	530.5	0.00	26.75	63.1	116.6	116.6	116.6	116.6	63.1	116.6	530.5	0.00	30%	31%	26%	31%
GW7	Darling Alluvium	NSW	8.5	8.8	21.4	0.00	3.01	8.5	8.8	8.8	8.8	8.8	8.5	8.8	21.4	0.00	40%	48%	54%	56%
GW8	Murray Alluvium	NSW	192.4	194.9	192.4	1.52	3.56	192.4	224.0	214.3	204.6	194.9	192.4	194.9	192.4	1.52	32%	29%	42%	54%
GW9	Murrumbidgee Alluvium	NSW	355.2	355.2	338.7	5.05	4.83	355.2	367.6	363.5	359.4	355.2	355.2	355.2	338.7	5.05	60%	75%	97%	87%
GW10	Lachlan Alluvium	NSW	220.4	214.0	209.1	0.00	10.32	220.4	224.7	222.5	220.4	218.3	220.4	214.0	209.1	0.00	59%	67%	81%	71%
GW11	Lachlan and South Western Fractured Rock	NSW	172.7	302.4	1,075.0	0.03	86.52	172.7	302.4	302.4	302.4	302.4	172.7	302.4	1,075.0	0.03	31%	32%	30%	31%
GW12	Macquarie-Castlereagh Alluvium	NSW	98.6	98.6	97.2	0.00	2.22	98.6	99.3	99.1	98.8	98.6	98.6	98.6	97.2	0.00	55%	60%	68%	70%
GW13	New South Wales Great Artesian Basin Shallow	NSW	7.5	57.7	404.6	0.00	2.79	7.5	57.7	57.7	57.7	57.7	7.5	57.7	404.6	0.00	8%	7%	7%	5%
GW14	Namoi Alluvium	NSW	224.0	224.0	226.5	0.00	6.43	224.0	242.7	236.5	230.4	224.0	224.0	224.0	226.5	0.00	66%	96%	93%	86%
GW15	Gwydir Alluvium	NSW	33.7	33.7	33.7	0.00	0.77	33.7	39.7	37.7	35.7	33.7	33.7	33.7	33.7	0.00	74%	123%	122%	106%
GW16	Eastern Porous Rock	NSW	25.2	131.6	266.1	0.00	6.25	25.2	131.6	131.6	131.6	131.6	25.2	131.6	266.1	0.00	8%	9%	10%	9%
GW17	New England Fractured Rock and Northern Basalts	NSW	39.8	62.0	326.6	0.00	22.01	39.8	62.0	62.0	62.0	62.0	39.8	62.0	326.6	0.00	37%	38%	38%	39%
GW18	New South Wales Border Rivers Alluvium	NSW	8.8	8.8	8.8	0.00	0.38	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	0.00	34%	65%	63%	47%
GW1	Australian Capital Territory (groundwater)	ACT	3.2	3.2	7.3	0.00	0.00	3.2	3.2	3.2	3.2	3.2	0.6	0.5	0.8	1.0	18%	15%	24%	30%
GW2	Goulburn-Murray	Vic	518.1	555.8	496.5	0.00	19.23	518.1	518.1	518.1	518.1	518.1	152.4	139.5	200.1	234.1	29%	27%	39%	45%
GW3	Wimmera-Mallee	Vic	212.8	212.8	70.2	0.00	1.38	212.8	212.8	212.8	212.8	212.8	10.6	9.8	13.1	7.8	5%	5%	6%	4%
GW4	South Australian Murray Region	SA	208.5	206.4	69.6	0.00	4.68	208.5	208.5	208.5	208.5	208.5	54.7	49.0	49.9	49.3	26%	23%	24%	24%
GW5	Eastern Mount Lofty Ranges	SA	51.1	51.1	50.4	0.00	2.48	51.1	51.1	51.1	51.1	51.1	6.3	5.6	5.4	12.9	12%	11%	11%	25%

			Basin Plan Chapter 6 Part 4 - Trial compliance arrangements											
			Debit / Credit[10] (TDL - Actual) (GL/y)				**Cumulative Balance** (Cumulative annual TDL - annual actual) (GL/y)				**Indicative Compliance Test (Non-binding) 20% with Long-term TDL[13]** (Cumulative Balance / TDL) Basin Plan s6.12(1)(a)			
WRP area	**WRP area**	**State**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
GW19	Queensland Border Rivers	Qld	20.5	18.0	17.6	15.9	20.5	38.5	56.1	72.0	53%	99%	144%	185%
GW20	Moonie	Qld	33.1	33.1	32.9	32.9	33.1	66.2	99.1	132.0	100%	199%	299%	398%
GW21	Condamine-Balonne	Qld	223.4	194.5	211.4	204.0	223.4	417.9	629.3	833.2	61%	114%	172%	228%
GW22	Warrego-Paroo-Nebine	Qld	132.5	132.4	132.4	131.9	132.5	264.9	397.3	529.2	99%	198%	296%	395%
GW6	Western Porous Rock	NSW	81.6	79.9	86.7	80.8	81.6	161.5	248.2	329.0	70%	139%	213%	282%
GW7	Darling Alluvium	NSW	5.3	4.6	4.0	3.8	5.3	9.9	13.9	17.8	60%	112%	158%	201%
GW8	Murray Alluvium	NSW	151.3	152.2	119.3	89.6	151.3	303.5	422.7	512.3	68%	142%	207%	263%
GW9	Murrumbidgee Alluvium	NSW	146.2	90.3	11.4	47.5	146.2	236.5	247.9	295.4	40%	65%	69%	83%
GW10	Lachlan Alluvium	NSW	91.8	74.5	42.1	64.4	91.8	166.3	208.5	272.9	41%	75%	95%	125%
GW11	Lachlan and South Western Fractured Rock	NSW	207.8	206.1	210.3	208.6	207.8	413.9	624.1	832.7	69%	137%	206%	275%
GW12	Macquarie-Castlereagh Alluvium	NSW	44.8	39.4	32.0	29.9	44.8	84.2	116.1	146.0	45%	85%	118%	148%
GW13	New South Wales Great Artesian Basin Shallow	NSW	53.4	53.8	53.7	54.7	53.4	107.1	160.8	215.5	92%	186%	279%	373%
GW14	Namoi Alluvium	NSW	82.8	9.3	15.3	30.3	82.8	92.1	107.5	137.7	34%	39%	47%	61%
GW15	Gwydir Alluvium	NSW	10.3	- 8.7	- 7.7	- 1.9	10.3	1.6	- 6.1	- 8.0	26%	4%	-17%	-24%
GW16	Eastern Porous Rock	NSW	121.6	119.3	118.7	119.3	121.6	240.8	359.5	478.9	92%	183%	273%	364%
GW17	New England Fractured Rock and Northern Basalts	NSW	38.8	38.4	38.5	38.0	38.8	77.1	115.7	153.7	63%	124%	187%	248%
GW18	New South Wales Border Rivers Alluvium	NSW	5.8	3.1	3.2	4.7	5.8	8.9	12.1	16.8	66%	101%	137%	190%
GW1	Australian Capital Territory (groundwater)	ACT	2.6	2.7	2.4	2.2	2.6	5.3	7.7	9.9	82%	167%	243%	312%
GW2	Goulburn-Murray	Vic	365.6	378.6	318.0	284.0	365.6	744.2	1,062.2	1,346.2	71%	144%	205%	260%
GW3	Wimmera-Mallee	Vic	202.2	203.0	199.8	205.0	202.2	405.3	605.0	810.1	95%	190%	284%	381%
GW4	South Australian Murray Region	SA	153.8	159.6	158.7	159.2	153.8	313.4	472.0	631.3	74%	150%	226%	303%
GW5	Eastern Mount Lofty Ranges	SA	44.9	45.6	45.7	38.2	44.9	90.4	136.1	174.4	88%	177%	266%	341%

		Other aspects of s.71 reporting																					
		Allocation[11] + Basic Rights (GL/y) s.71(1)(d) - water allocations				**Carry Over[12]** (GL/y) s.71(1)(d) - carry over				**Allocation + Carry Over** (GL/y) s.71(1)(d) - water allocations				**Actual Take / (Allocation + Carry Over)** (%)				**Carry Over / (Allocation + Carry Over)** (%)				**Actual Take Measurement Method 2015-16**	
WRP area	**WRP area**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**Non-metered (GL/y)**	**% metered**
GW19	Queensland Border Rivers	30.8	30.8	30.8	30.8	0.0	-	-	0.0	30.8	30.8	30.8	30.8	60%	68%	69%	75%	-	-	-	-	16.3	29%
GW20	Moonie	0.1	0.1	0.3	0.3	0.0	-	-	0.0	0.1	0.1	0.3	0.3	81%	81%	93%	100%	-	-	-	-	0.3	0%
GW21	Condamine-Balonne	195.3	196.4	196.5	196.3	54.6	41.0	50.2	47.4	249.9	237.4	246.7	243.7	57%	72%	63%	66%	0.2	0.2	0.2	0.2	116.5	28%
GW22	Warrego-Paroo-Nebine	2.1	2.1	2.1	2.1	0.0	-	-	0.0	2.1	2.1	2.1	2.1	73%	77%	77%	100%	-	-	-	-	2.1	0%
GW6	Western Porous Rock	48.4	48.4	62.6	62.6	5.4	5.7	5.4	5.4	59.0	59.0	62.3	62.6	59%	62%	48%	57%	0.1	0.1	0.1	0.1	26.8	25%
GW7	Darling Alluvium	7.4	7.5	7.5	7.5	0.0	-	-	0.0	7.2	7.5	7.5	7.5	49%	57%	64%	67%	-	-	-	-	3.0	40%
GW8	Murray Alluvium	249.1	236.3	226.6	215.3	88.0	91.5	92.7	85.2	246.1	234.3	224.7	214.0	30%	27%	38%	49%	0.4	0.4	0.4	0.4	3.6	97%
GW9	Murrumbidgee Alluvium	378.5	374.4	370.2	368.9	257.4	282.6	265.7	251.5	375.9	371.8	367.4	368.9	59%	73%	95%	83%	0.7	0.8	0.7	0.7	4.8	98%
GW10	Lachlan Alluvium	315.6	313.5	311.4	309.2	71.8	96.6	107.1	81.1	315.5	309.1	307.0	300.6	42%	48%	58%	51%	0.2	0.3	0.3	0.3	10.3	93%
GW11	Lachlan and South Western Fractured Rock	180.2	180.2	180.2	180.2	7.3	3.7	12.6	9.8	170.7	180.6	176.5	179.4	55%	53%	52%	52%	0.0	0.0	0.1	0.1	86.5	8%
GW12	Macquarie-Castlereagh Alluvium	129.0	128.8	128.5	128.3	27.6	26.1	26.1	27.0	129.0	128.2	128.0	127.0	42%	47%	52%	54%	0.2	0.2	0.2	0.2	2.2	97%
GW13	New South Wales Great Artesian Basin Shallow	8.6	8.6	8.6	8.7	0.0	-	-	1.4	8.5	8.5	8.5	8.6	51%	47%	47%	35%	-	-	-	0.2	2.8	7%
GW14	Namoi Alluvium	286.6	271.3	258.0	254.3	207.0	206.1	195.0	175.3	287.6	271.2	258.2	254.3	56%	84%	83%	76%	0.7	0.8	0.8	0.7	6.4	97%
GW15	Gwydir Alluvium	40.4	38.2	36.3	34.3	26.4	26.7	23.2	16.8	40.2	38.3	36.4	34.4	73%	121%	119%	104%	0.7	0.7	0.6	0.5	0.8	98%
GW16	Eastern Porous Rock	32.4	32.4	32.4	32.4	4.5	-	4.1	7.6	26.6	32.8	32.2	32.4	38%	38%	40%	38%	0.2	-	0.1	0.2	6.3	49%
GW17	New England Fractured Rock and Northern Basalts	46.7	46.7	46.7	46.8	1.6	1.6	12.4	1.7	33.2	45.6	35.1	46.7	70%	52%	67%	51%	0.0	0.0	0.4	0.0	22.0	8%
GW18	New South Wales Border Rivers Alluvium	17.9	17.9	17.9	17.9	0.0	-	-0.0	0.0	17.9	17.9	17.9	17.9	17%	32%	31%	23%	-	-	-	-	0.4	91%
GW1	Australian Capital Territory (groundwater)	1.0	1.0	1.6	1.5	0.0	-	-	0.0	1.0	1.0	1.6	1.5	56%	45%	47%	65%	-	-	-	-	0.0	100%
GW2	Goulburn-Murray	408.5	461.5	455.7	452.7	0.0	21.6	23.4	25.8	408.5	483.0	479.0	478.5	37%	29%	42%	49%	-	0.0	0.0	0.1	19.2	92%
GW3	Wimmera-Mallee	19.9	26.8	23.2	20.9	0.0	-	-	0.0	19.9	26.8	23.2	20.9	53%	36%	56%	37%	-	-	-	-	1.4	82%
GW4	South Australian Murray Region	95.8	95.8	95.8	95.8	0.0	-	-	0.0	95.8	95.8	95.8	95.8	57%	51%	52%	51%	-	-	-	-	4.7	91%
GW5	Eastern Mount Lofty Ranges	13.0	13.1	42.9	44.8	1.8	1.8	1.9	1.2	14.9	15.0	44.8	46.0	42%	37%	12%	28%	0.1	0.1	0.0	0.0	2.5	81%

1. BDL is Baseline Diversion Limit as in Schedule 4 of the Basin Plan
2. SDL is Sustainable Diversion Limit as in Schedule 4 of the Basin Plan
3. Sustainable Diversion Limit after the proposed groundwater Basin Plan amendments are adopted
4. State plan limit or entitlement Volume
5. HEW is Held Environmental Water recovered to "Bridge the Gap" or acquired under the Sustainable Rural Water Use and Infrastructure Program (SRWUIP) as at 1 July 2016
6. Basic Rights - Groundwater take under basic rights generally covers water used for stock and domestic purposes, the Basin states estimate this take using estimation methods
7. Permitted Take - the use of annual permitted take is a new concept in accounting for groundwater resources. The MDBA has been working with the states to determine how the permitted take will be incorporated into the Basin Plan accounting and compliance that will come into effect after 2019. For the purpose of the transition period field test, annual permitted take for groundwater is being set at the TDL.
8. TDL is Transitional Diversion Limits. Groundwater TDL is the same as the SDL for majority of the SDL resource units except for the Queensland Upper Condamine Alluvium where water recovery to bridge a gap between the BDL and SDL is required and for the SDL resource units that are associated with an ongoing reduction of groundwater entitlements in NSW. TDL represent an indicative non-binding limit during the Transition Period (i.e. 2012-19)
9. Actual take is the total quantity (volume) of water actually taken by each form of take from the SDL resource unit during a water accounting period which includes take from groundwater and take under basic rights
10. Debit/Credit - Transitional Diversion Limit minus actual take
11. Allocation - Water allocation means a specific volume of water allocated to a water access entitlement in a given water accounting period
12. Carry over - Volume of carry over that is available for take
13. Lower Gwydir Alluvium Actual Take - If 2016-17 actual take is considered, the outlook indicates actual take will be within TDL
14. The volumes in these columns may have been adjusted by the MDBA as required based on data provided by states i.e. NSW did not provide the data as it is for all columns for their SDL resource units

12. Appendix 3: Status of Cap models

Cap Valley	Status of Cap models and Cap compliance to 30 June 2016
Queensland	
Condamine – Balonne	An IQQM Cap model was provisionally accredited by the Authority in 2013 for use until 2015. Though accreditation has lapsed, the model remains the best available information with which to determine Cap compliance. Since 1997–98 there have been no special audits triggered in the Condamine–Balonne Cap valley. As at 30 June 2016, the valley has recorded a cumulative credit of 1,309.22 GL.
Queensland Border Rivers – Macintyre Brook	An IQQM Cap model was provisionally accredited by the Authority in 2013 for use until 2015, on the condition that Queensland and NSW would work to develop a common Cap model. Though this accreditation has lapsed, the model remains the best available information with which to determine Cap compliance. Since 1997–98 there have been no special audits triggered in the Border Rivers–Macintyre Brook Cap valley. As at 30 June 2016, the valley has recorded a cumulative credit of 450.54 GL.
Moonie	An IQQM Cap model was provisionally accredited by the Authority in 2010 for use until 2012. Though accreditation has lapsed, the model remains the best available information with which to determine Cap compliance. There has been an apparent exceedance of the Cap in the Moonie Cap valley in water years 2014–15 and 2015–16. These will be subject to a special audit under Schedule E of the *Murray Darling Basin Agreement*. The Moonie Cap valley does not operate under a cumulative cap, with the apparent exceedances being of 2.32 GL and 0.32 GL, respectively.
Nebine	An IQQM Cap model was provisionally accredited by the Authority in 2010 for use until 2012. An SDL model is available through the accredited Warrego–Paroo–Nebine Water Resource Plan. Cap compliance under Schedule E will continue to be assessed against the Cap model until 2019. Since 1997–98 there have been no special audits triggered in the Nebine Cap valley. The Nebine Cap valley does not operate under a cumulative cap, with the annual balance not entering deficit for the reporting period.
Warrego	An IQQM Cap model was provisionally accredited by the Authority in 2010 for use until 2012. An SDL model is available through the accredited Warrego–Paroo–Nebine Water Resource Plan. Cap compliance under Schedule E will continue to be assessed against the Cap model until 2019. Since 1997–98 there have been no special audits triggered in the Warrego Cap valley. The Warrego Cap valley does not operate under a cumulative cap, with the annual balance not entering deficit for the reporting period.
Paroo	An IQQM Cap model was provisionally accredited by the Authority in 2010 for use until 2012. An SDL model is available through the accredited Warrego–Paroo–Nebine Water Resource Plan. Cap compliance under Schedule E will continue to be assessed against the Cap model until 2019. Since 1997–98 there have been no special audits triggered in the Paroo Cap valley. The Paroo Cap valley does not operate under a cumulative cap, with the annual balance not entering deficit for the reporting period.

Cap Valley	Status of Cap models and Cap compliance to 30 June 2016
New South Wales	
Intersecting Streams	There was no Cap target in the Intersecting Streams for the reporting period.
NSW Border Rivers	An IQQM Cap model was provisionally accredited by the Authority in 2013 for use until 2015, on the condition that Queensland and NSW would work to develop a common Cap model. Though this accreditation has lapsed, the model remains the best available information with which to determine Cap compliance. Since 1997–98 there has been one special audit triggered in the NSW Border Rivers Cap valley, for the water year 1999–00. As at 30 June 2016, the valley has recorded a cumulative credit of 568.39 GL.
Gwydir	An IQQM Cap model was accredited by the Authority in 2009 and was available to determine Cap compliance for the reporting period. Since 1997–98 there have been two special audits triggered in the Gwydir Cap valley — these occurred for the water years 1999–00 and 2001–02. As at 30 June 2016, the valley has recorded a cumulative credit of 344.58 GL.
Namoi – Peel	The Namoi–Peel Cap valley features two models. An IQQM Cap model for the Namoi was accredited in 2005 and was available to determine Cap compliance within the valley. An IQQM Cap model for the Peel was accredited by the Authority in 2009 and was available to determine Cap compliance within the valley. Since 1997–98 there has been one special audit triggered in the Namoi–Peel Cap valley for the water year 2000–01. As at 30 June 2016, the valley has recorded a cumulative credit of 488.01 GL.
Macquarie – Castlereagh – Bogan	An IQQM Cap model was accredited by the Authority in 2012 and was available to determine Cap compliance for the reporting period. Since 1997–98 there has been one special audit triggered in the Macquarie–Castlereagh–Bogan Cap valley for the water year 2002–03. As at 30 June 2016, the valley has recorded a cumulative credit of 1,028.78 GL.
Barwon – Darling – Lower Darling	The Barwon–Darling–Lower Darling Cap valley features two models. An IQQM model for the Barwon–Darling was provisionally accredited by the Authority in 2014 for use until 2015. Though accreditation has lapsed, the model remains the best available information with which to determine Cap compliance within the Barwon–Darling component of this Cap valley. An MSM Cap model for the Lower Darling was accredited by the Authority in 2015 and was available for use to determine Cap compliance within the Lower Darling component of this Cap valley. Since 1997–98 there have been six special audits triggered in the Barwon–Darling–Lower Darling Cap valley — these occurred for the waters years 2000–01, 2003–04, 2004–05, 2005–06, 2007–08 and 2008–09. As at 30 June 2016, the valley has recorded a cumulative credit of 595.22 Gl.
Lachlan	An IQQM Cap model was accredited in 2002 and was available to determine Cap compliance for the reporting period. Since 1997–98 there have been three special audits triggered in the Lachlan Cap valley. These occurred for the water years 2000–01, 2001–02 and 2002–03. As at 30 June 2016, the valley has recorded a cumulative credit of 366.91 GL.
Murrumbidgee	An IQQM model was accredited by the Authority in 2011 and was available to determine Cap compliance for the reporting period. Since 1997–98 there have been no special audits triggered in the Murrumbidgee Cap valley. As at 30 June 2016, the valley has recorded a cumulative credit of 2,473.23 GL.

Cap Valley	Status of Cap models and Cap compliance to 30 June 2016
Murray	An MSM Cap model was accredited in 2008 and was available to determine Cap compliance for the reporting period. Since 1997–98 there have been no special audits triggered in the Murray Cap valley. As at 30 June 2016, the valley has recorded a cumulative credit of 1,395.71 GL.
Australian Capital Territory	A Regression Cap model was accredited by the Authority in 2013 for use until 2019 and was available to determine Cap compliance for the reporting period. Since 1997–98 there have been no special audits triggered in the Australian Capital Territory Cap valley. As at 30 June 2016, the valley has recorded a cumulative credit of 248.92 GL.
Victoria	
Goulburn–Broken–Loddon	A GSM REALM[23] Cap model was accredited in 2007 and was available to determine Cap compliance for the reporting period. Since 1997–98 there have been no special audits triggered in the Goulburn–Broken–Loddon Cap valley. As at 30 June 2016, the valley has recorded a cumulative credit of 2,728.11 GL.
Campaspe	A GSM REALM Cap model was originally accredited in 2007. Amendments made to the GSM REALM Cap model were also accredited in 2012 and were available to determine Cap compliance for the reporting period. Since 1997–98 there have been no special audits triggered in the Campaspe Cap valley. As at 30 June 2016, the valley has recorded a cumulative credit of 460.86 GL.
Wimmera–Mallee	A W-M REALM Cap model was accredited by the Authority in 2013 and was available to determine Cap compliance for the reporting period. Since 1997–98 there have been no special audits triggered in the Wimmera–Mallee Cap valley. As at 30 June 2016, the valley has recorded a cumulative credit of 133.12 GL.
Murray–Kiewa–Ovens	An MSM Cap model was accredited in 2008 and was available to determine Cap compliance for the reporting period. Since 1997–98 there have been no special audits triggered in the Murray–Kiewa–Ovens Cap valley. As at 30 June 2016, the valley has recorded a cumulative credit of 2,861.16 GL.
South Australia	
Metro Adelaide & Associated Country Areas	There is currently no model available to determine Cap compliance within the Metro Adelaide & Associated Country Areas Cap Valley. In the absence of an accredited model, this Cap valley operates under the existing five year rolling cap arrangement outlined in the *Murray Darling Basin Agreement.* Since 1997–98 there have been no special audits triggered in the Metro Adelaide & Associated Country Areas Cap valley. As at 30 June 2016, the five year rolling cap was 401.03 GL against a target of 650 GL.
Lower Murray Swamps	No Cap model is required in the Lower Murray Swamps Cap valley as the annual Cap target is a fixed volume limit adjusted for trade and environmental water. Since 1997–98 there have been no special audits triggered in the Lower Murray Swamps Cap valley. As at 30 June 2016, the valley has recorded a cumulative credit of 144.90 GL.
Country Towns	No Cap model is required for the Country Towns Cap valley as the annual Cap target is a fixed volume limit adjusted for trade and environmental water. Since 1997–98 there have been no special audits triggered in the Country Towns Cap valley. As at 30 June 2016, the valley has recorded a cumulative credit of 75.07 GL.

[23] Goulburn Simulation Model- Resource Allocation Model

Cap Valley	Status of Cap models and Cap compliance to 30 June 2016
All Other Purposes	A Regression Cap model was accredited in 2004 and was available to determine Cap compliance for the reporting period. Since 1997–98 there have been no special audits triggered in the All Other Purposes Cap valley. As at 30 June 2016, the valley has recorded a cumulative credit of 1,030.57 GL.

Notes to Appendix 3:

Model Accreditation

A requirement of Schedule E of the *Murray Darling Basin Agreement* is the development of models for determining the annual Cap targets in each designated Cap valley. These models must be accredited by the Authority before use. Once complete, these models are given to an independent auditor to assess their suitability to meet requirements for models listed in Schedule. The Authority takes on board recommendations from the independent auditor before accrediting models for use. In some cases this has led to provisional accreditation pending further work from the relevant body. Prior to 2009, models were accredited by the Ministerial Council.

Compliance and Special Audits

For each water year, states must monitor and report to the MDBA on the compliance of each designated Cap valley with the Cap targets. Using this information, the MDBA maintains a Cap Register [24] tracking the cumulative balance of annual actual diversions and Cap targets. If an apparent exceedance of the Cap is found during this process the Authority must direct the Independent Audit Group (IAG) to conduct a special audit of that Cap valley.

An apparent exceedance may be:

- The diversions for the Metro Adelaide & Associated Country Areas exceeding 650 GL over a five year period.
- The diversions in the Warrego, Paroo, Moonie or Nebine exceeding the annual diversion target within those valleys.
- The cumulative debit recorded in the Cap Register exceeding 20% of the average annual diversion in all other valleys.[25]

If called upon to perform a special audit, the IAG will consider a range of evidence before reporting their determination within six months of receiving direction. If the IAG determines that the state has exceeded the Cap, the Authority will declare the state in breach of the Cap and report the matter to the Ministerial Council.

With the declaration of breach, a state must report to the next Ministerial Council stating the reasons why the breach occurred, the action proposed or taken to return the Cap Register to balance and the period that the Cap valleys model predicts it will take to return to balance. When the Authority is satisfied that the Cap valley has returned to balance and complying with the Cap, the Authority will revoke the declaration of breach and report this to the next Ministerial Council meeting.

[24] Available on the MDBA website: https://www.mdba.gov.au/publications/mdba-reports/water-take-compliance-reports

[25] Excludes NSW Intersecting Streams

13. Appendix 4: State nominated methods for annualising environmental water recovery under the Cap arrangements

Cap valley	Nominated method	Method Description
New South Wales		
Intersecting Streams	Not applicable	Not applicable
Border Rivers	**Usage Method**	1. The usage method adjusts the annual targets by the volume of environmental allocation used (that is physically taken out of the river system) for environmental benefits. 2. The adjustment also includes an estimate of water traded for environmental use of a non-environmental (consumptive) allocation or any environmental allocation traded back to consumptive pool. 3. For Cap valleys in NSW and Victoria, adjustment is made for Snowy transfers where applicable.
Gwydir		
Namoi/Peel		
Macquarie/Castlereagh/Bogan		
Barwon–Darling/Lower Darling		
Lachlan		
Murrumbidgee		
Murray		
Victoria		
Goulburn/Broken/Loddon Cap valley	**Usage Method**	1. The usage method adjusts the annual targets by the volume of environmental allocation used (that is physically taken out of the river system) for environmental benefits. 2. The adjustment also includes an estimate of water traded for environmental use of a non-environmental (consumptive) allocation or any environmental allocation traded back to consumptive pool. 3. For Cap valleys in NSW and Victoria, adjustment is made for Snowy transfers where applicable.
Campaspe		
Murray/Kiewa/Ovens Cap valley		
Wimmera–Mallee	**Use of Model**	A model calibrated to the new (lower) diversion limit post environmental water recovery is used to determine annual division targets.
South Australia		
Metropolitan Adelaide & associated country areas	Not applicable	Not applicable

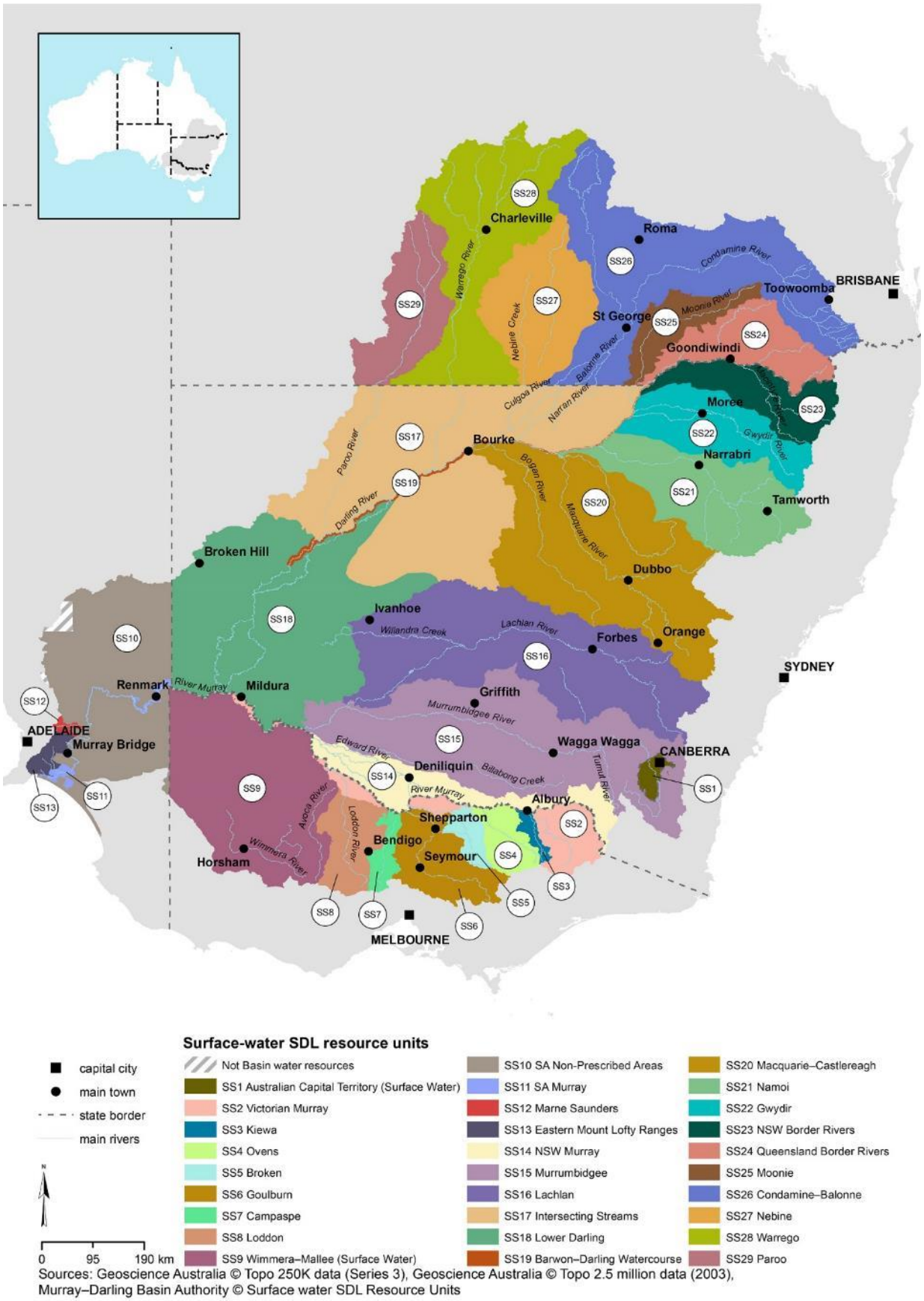
Cap valley	Nominated method	Method Description
Lower Murray swamps	**Simple or Bundled Scaling**	1. The long-term diversion limit equivalent (LTDLE) volume of environmental water recovered for all classes together is scaled by the ratio of annual diversion target to the total long-term diversion limit before recovery. The LTDLE HEW recovered is annualised. 2. Subtract it from pre-adjusted annual permitted take to determine annual permitted take for consumptive use.
Country towns		
All other purposes		
Queensland		
Condamine/Balonne	**Use of Model**	The model is run with all entitlements including HEW to give total Cap target, then the target under individual HEW entitlements is deducted from the total.
Border Rivers		
Moonie		
Nebine		
Warrego		
Paroo		
Australian Capital Territory	Not applicable	Not applicable

14. Appendix 5: Environmental water adjustment under the trial of SDL water accounting and compliance

SDL resource unit	State's nominated method	Method Description
Queensland		
Paroo	**Use of Model:** The model of an SDL resource unit is configured to the long-term diversion limit to determine the annual permitted take for consumptive use.	1. A model is run in an annual mode from the start of the accounting period with the climatic input for the water year added. The determination of annual modelled environmental water is based on the assumption of 100% utilisation of environmental entitlements. 2. The model determines a combined number of annual permitted take for both consumptive and environmental pools. 3. In post process, the modelled limit for environmental entitlements is subtracted from the combined number to determine annual permitted take for consumptive use.
Warrego		
Nebine		
Condamine–Balonne		
Moonie		
Queensland Border Rivers		
New South Wales		
NSW Border Rivers	**Scaling by Allocations:** The environmental water recovery (HEW) for each class of entitlements is separately annualised based on their modelled allocations. The annualised amount is removed from the pre-adjusted annual permitted take to determine the annual permitted take for consumptive use. The method uses data for: 1. High and general security entitlements: % modelled allocations , 2. Supplementary entitlements and unregulated systems: access period in days or months when water is available for use	As an initial Step, modelled annual Cap targets are scaled down to the relevant NSW plan limit (as it compares to the long-term average Cap for that area). 1. The long-term diversion limit equivalent (LTDLE) volume of on-allocation (high and general security) environmental water (HEW) is separately scaled by the ratio of annual modelled % allocation to the long-term modelled % allocation for that type of entitlement before recovery. The LTDLE HEW recovered is annualised. 2. The long-term diversion limit equivalent (LTDLE) volume of off-allocation (supplementary or unregulated system) environmental water (HEW) is scaled by the ratio of annual access period (days or months) to the long-term access period (days or months) made for that type of class before recovery. The LTDLE HEW recovered is annualised. 3. Make sum total of annualised environmental water volume for all classes. 4. Subtract it from pre-adjusted annual permitted take to determine annual permitted take for consumptive use.
Intersecting Streams		
Gwydir		
Namoi		
Macquarie–Castlereagh		
Lachlan		
Murrumbidgee		
Barwon–Darling Watercourse		
Lower Darling		
NSW Murray		
Australian Capital Territory	No environmental water held within the Australian Capital Territory in 2013–14 – no adjustment to determination of annual permitted take required	N/A
Victoria		
Victorian Murray		

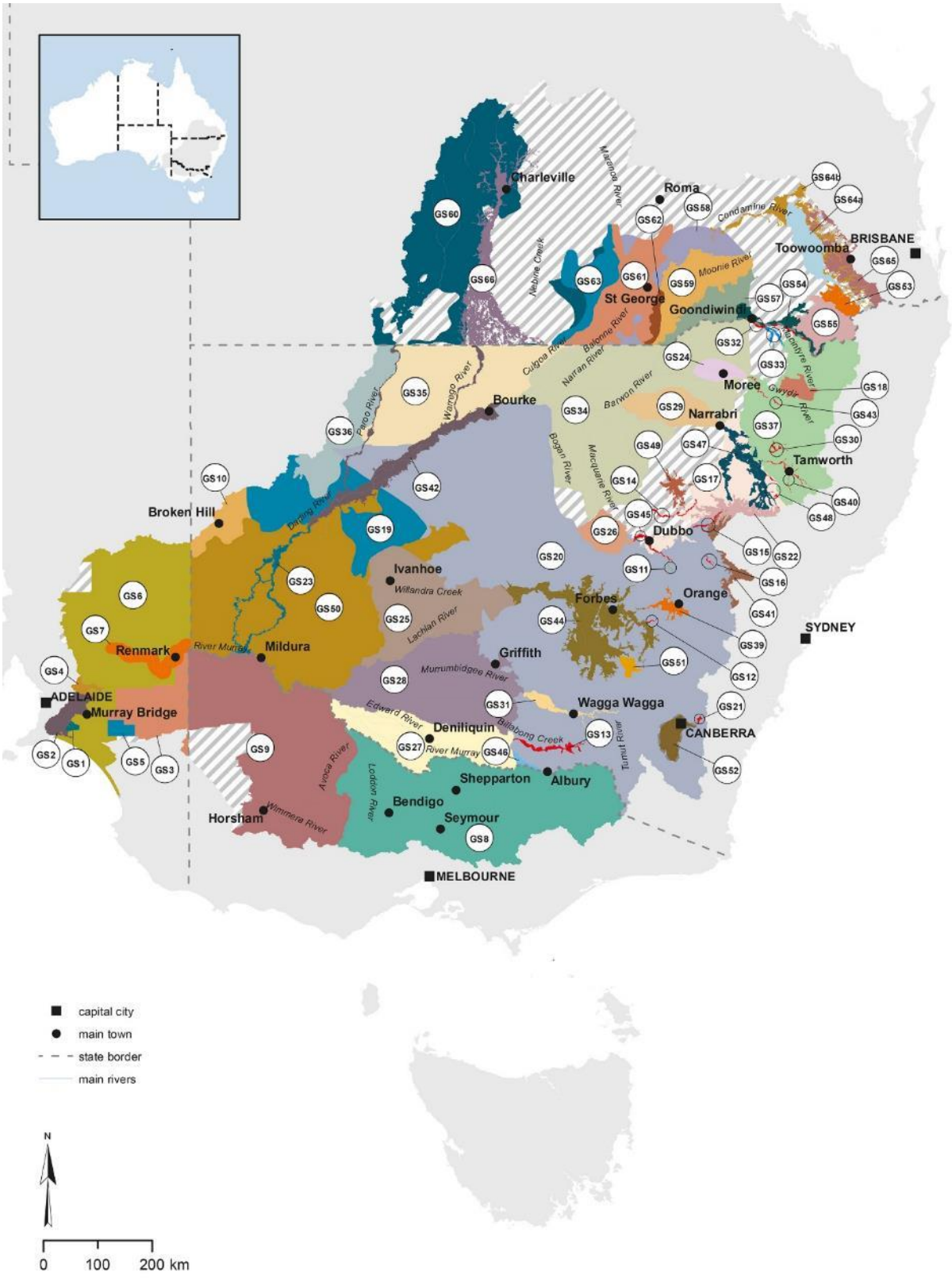
SDL resource unit	State's nominated method	Method Description
Kiewa	**Scaling by Entitlement Types:** The environmental water recovery (HEW) for each class of entitlements (high and low reliability) is separately annualised based on their modelled entitlement volume. The annualised amount is removed from the pre-adjusted annual permitted take to determine the annual permitted take for consumptive use.	1. The long-term diversion limit equivalent (LTDLE) volume of environmental water (high reliability and general reliability) is separately scaled by the ratio of annual modelled diversion target to the long-term modelled limit for that type of entitlement before recovery. The LTDLE HEW recovered is annualised. 2. Make sum total of annualised environmental water volume for all classes. 3. Subtract it from pre-adjusted annual permitted take to determine annual permitted take for consumptive use.
Ovens		
Broken		
Goulburn		
Campaspe		
Loddon		
Wimmera–Mallee	**Use of Model:** The model of an SDL resource unit is configured to the long-term diversion limit as set out by the Basin Plan to determine annual permitted take.	A model configured to new diversion limit post environmental water recovery is used to determine annual permitted take for consumptive use.
South Australia		
SA Murray	**Simple or Bundled Scaling:** The environmental water recovery (HEW) for all classes/entitlements is annualised based on their sum total of modelled volume. The annualised amount is removed from the pre-adjusted annual permitted take to determine the annual permitted take for consumptive use.	1. The long-term diversion limit equivalent (LTDLE) volume of environmental water recovered for all classes together is scaled by the ratio of annual diversion target to the total long-term diversion limit before recovery. The LTDLE HEW recovered is annualised. 2. Subtract it from pre-adjusted annual permitted take to determine annual permitted take for consumptive use.
SA Non-Prescribed Areas	No environmental water held within SA Non-Prescribed Areas in 2013–14 – no adjustment to determination of annual permitted take required	N/A
Marne Saunders	No environmental water held within Marne Saunders in 2013–14 – no adjustment to determination of annual permitted take required	N/A
Eastern Mount Lofty Ranges	No environmental water held within Eastern Mount Lofty Ranges in 2013–14 – no adjustment to determination of annual permitted take required	N/A

15. Appendix 6: Surface water SDL resource units



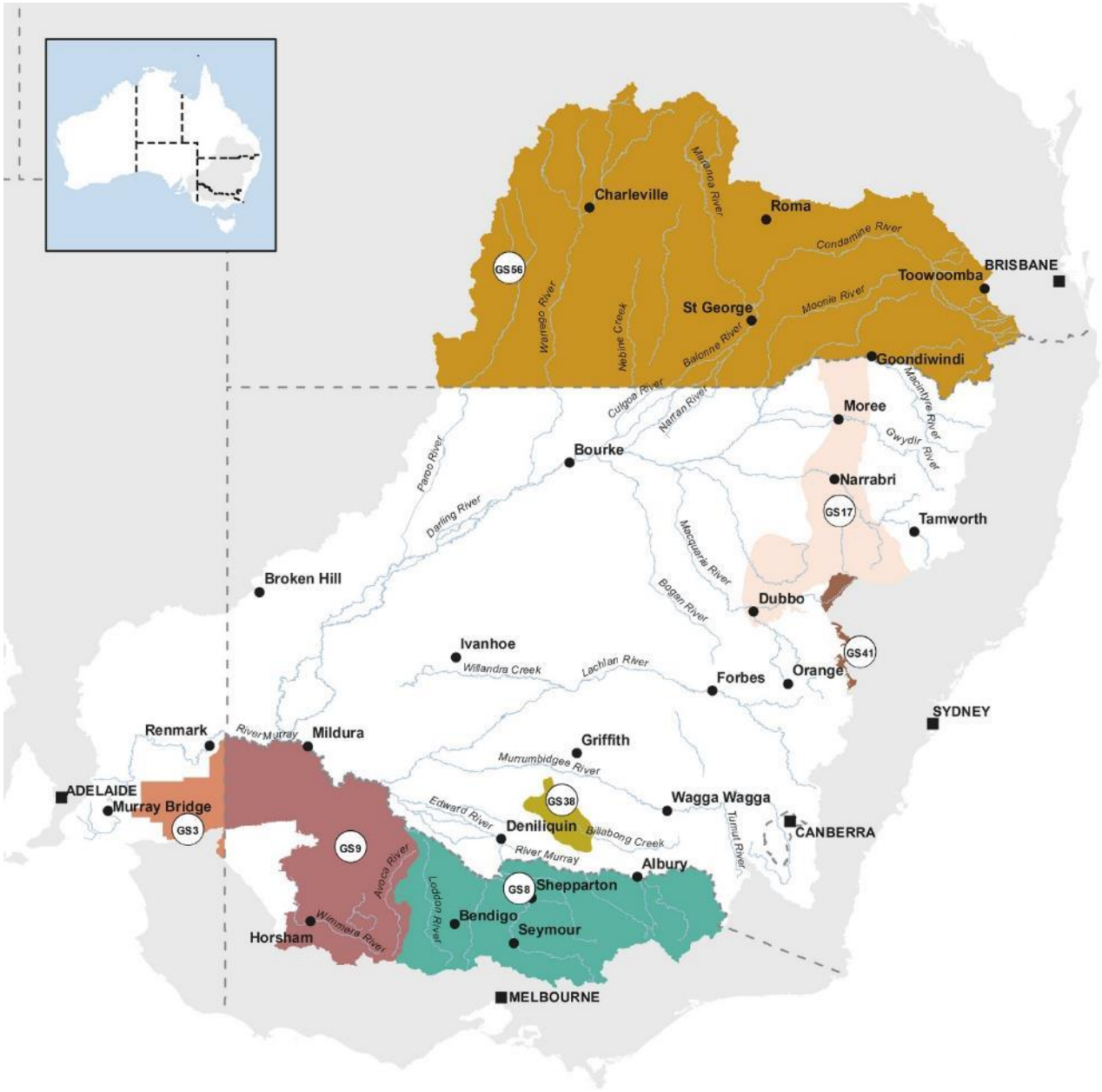
Sources: Geoscience Australia © Topo 250K data (Series 3), Geoscience Australia © Topo 2.5 million data (2003), Murray–Darling Basin Authority © Surface water SDL Resource Units

16. Appendix 7: Groundwater SDL resource units



Sources: Geoscience Australia © Topo 250K data (Series 3), Geoscience Australia © Topo 2.5 million data (2003), Murray–Darling Basin Authority © Groundwater SDL Resource Units

Groundwater SDL resource units, other than deep groundwater SDL resource units



Sources: Geoscience Australia © Topo 250K data (Series 3), Geoscience Australia © Topo 2.5 million data (2003), Murray–Darling Basin Authority © Groundwater SDL Resource Units

17. Appendix 8 – Core concepts and useful links

1 Legislative background

The *Water Act 2007* (Cth) and the *Basin Plan 2012* provide the legislative background that informs the requirements of this water take report.

A.1.1 Water Act 2007 (Cth)

Section 71

Section 71 sets out reporting obligations of the Basin states to provide the MDBA with information regarding the use and management of all Basin water resources for an annual water accounting period.

Section 32

Section 32 requires the MDBA to identify and account for all held environmental water on an annual basis, including all water access entitlements recovered for the environment through reforms prior to the Basin Plan.

Schedule 1

Schedule 1 of the Water Act contains the Murray–Darling Basin Agreement. Schedule E of this agreement establishes a long-term Cap on surface water use in river valleys across the Basin. Schedule 1 also requires each Basin State to report to the MDBA on a range of matters.

The Water Act is available online via the Federal Register of Legislation <https://www.legislation.gov.au/Home/>

A.1.2 The Basin Plan 2012

Schedule 2 of the Basin Plan sets out the long-term average sustainable diversion limits (SDLs) for each surface-water SDL resource unit within the 20 water resource plan areas for surface water. It also includes estimates by the MDBA of the quantity of water represented by the SDLs. Long-term average sustainable diversion limits (SDLs) are the maximum long-term annual average quantities of water that can be taken on a sustainable basis from Basin water resources as a whole, and from each SDL resource unit, from 2019. They are the means for ensuring that consumption of water is maintained at an environmentally sustainable level.

Schedule 3 of the Basin Plan sets out the baseline diversion limits (BDL) for each surface water SDL resource unit within the 20 surface-water water resource plan areas, and includes estimates by the MDBA of the quantity of water represented by the BDL, in Gigalitres per year. BDLs define a baseline from which to measure reductions in diversions. A surface water baseline diversion limit is the sum of the long-term annual average limits (or where there is currently no limit, the long-term annual average take) for all forms of take from a surface water SDL resource unit.

Schedule 4 of the Basin Plan sets out the baseline diversion limits (BDLs) and the long-term average sustainable diversion limits (SDLs) for each groundwater SDL resource unit within the 23 groundwater water resource plan areas. Groundwater BDLs are the best estimates of the

MDBA of the quantity of water that could be taken under the state planning regimes when the Basin Plan was made. Groundwater SDLs are the maximum long-term average annual average quantities of water that can be taken on a sustainable basis from each SDL resource unit. They are the means for ensuring that consumption of water is maintained at an environmentally sustainable level of take.

Schedule 12 of the Basin Plan sets out reporting requirements for MDBA, Basin states and the Commonwealth. As part of this reporting, under Matter 9 of Schedule 12, MDBA, Basin states and the Commonwealth are required to identify environmental water, both held and planned environmental water and monitor its use. Matter 9 reporting is broken up into 3 areas, these are:

- Matter 9.1 Identification and accounting of held environmental water;
- Matter 9.2 Identification and accounting of planned environmental water; and
- Matter 9.3 Monitoring the use of environmental water.

Contained in this report is the Basin State information received for Matter 9.1. The report for Matter 9.3 is provided in *Basin Plan annual report 2013–14*[26] *published on the MDBA website*.

Reporting on planned environmental water has occurred for the 2013–14 water year. However, as reporting annually on planned environmental water is in its infancy, the results of these reports are not yet published. The MDBA is working with Basin states on providing better ways of reporting estimates on the amount of planned environmental water in the Basin.

The Basin Plan 2012 is available online via the Federal Register of Legislation. <https://www.legislation.gov.au/Home/>

A.2 Core concepts with regard to take

A.2.1 What is take?

The term ‘take’ means the take of water from a water resource. Take includes taking the water by means of:

- diverting it from a main river system into an irrigation district or other distribution network
- pumping water directly from the river or aquifer
- diverting water as the water flows across the land into a dam
- intercepting water before it reaches a river to grow a commercial forestry plantation.

A.2.2 Forms of take

The Basin Plan defines forms of take as:

- take from a watercourse/unregulated river
- take from a regulated river
- take by floodplain harvesting
- take by runoff dams
- net take by commercial plantations
- take from groundwater

[26] Basin Plan annual report 2013–14 <https://www.mdba.gov.au/publications/mdba-reports/basin-plan-annual-report-2013–14>

- take under basic rights.

A.2.3 Sustainable diversion limits

The Basin Plan establishes sustainable diversion limits (SDLs) for surface and groundwater. The SDL is the limit on how much water can be sustainably taken for consumptive uses (including domestic, urban and agricultural use) from an SDL resource unit. The SDL includes all forms of take and is a volume in Gigalitres per year (GL/y). The SDL is also a long-term annual average limit.

There is an SDL volume for each SDL resource unit and take is reported for each SDL resource unit in a water resource plan (WRP) area.

The SDLs take effect from 1 July 2019 through accredited water resource plans.

A.2.3.1 Surface water SDL resource units

The boundaries of the 29 surface water SDL resource units as defined by the Murray–Darling Basin Plan can be found on the MDBA website http://www.mdba.gov.au/

A.2.3.2 Groundwater SDL resource units

The boundaries of the 66 groundwater SDL resource units as defined by the Murray–Darling Basin Plan can be found on the MDBA website http://www.mdba.gov.au/

This includes 7 groundwater SDL resource units for deep groundwater that can be found on the MDBA website http://www.mdba.gov.au/

Note that there are six WRP areas that apply to both surface water and groundwater, therefore the total number of WRP areas is 36. The WRP areas incorporate a total of 110 SDL resource units.

A number of other maps and alternative formats for the above maps are available on the MDBA website http://www.mdba.gov.au/

A.2.4 Reporting Take

Take is accounted for over a water accounting period, which follows the 12 month period 1 July to 30 June. The Basin states report take of surface water and groundwater to the MDBA. The MDBA is responsible for assessing the data before recording it on a register of take for each SDL resource unit. The purpose of this register is to record compliance by Basin states with the SDL for each SDL resource unit. Compliance commences in the first water accounting period after 30 June 2019 following the commencement of an accredited water resource plan.

A.2.5 Annual actual take and annual permitted take

For a water accounting period, annual permitted take is the sum of the maximum quantities of water permitted to be taken by each form of take for consumptive use from an SDL resource unit. The water resource plan must have a method to determine annual permitted take for each form of take in each SDL resource unit in the WRP area. This method must be designed to be applied at the end of each water accounting period. The water resources available during the accounting period are a very important consideration in the method.

Because of varying water availability between water accounting periods, annual permitted take will vary and will rarely, if ever, equal the SDL. Importantly, while annual permitted take can vary, the SDL of each resource unit in the WRP area must be complied with over the term of the water resource plan.

For the same water accounting period, annual actual take is the sum of the quantities of water actually taken by each form of take for consumptive use from the SDL resource unit.

A water resource plan must have rules to ensure that annual actual take does not exceed annual permitted take. If applicable, water allocation rules need to be included.

Data provided annually by Basin states comes from a range of sources including: state registers and databases; outputs from state river models; estimates from surveys and other methods. Therefore, data may range from very accurate and reliable to potentially limited or with high levels of uncertainty. This range of data sources is acceptable to be added together to calculate either the annual permitted take or actual take. The Basin Plan provides some flexibility with this data uncertainty by allowing the Basin State to have a cumulative balance of actual take over permitted take of up to 20% of the SDL before the Basin State would be considered non-compliant, for an SDL resource unit.

A.2.6 Roles and responsibilities

The Basin Plan has established two main roles with regards to the plan: the MDBA as the regulator of the Basin Plan and the Basin states as the implementers.

Basin states are responsible for managing the water activities within their state, in accordance with the accredited water resource plans. Each year the states report the water take and the MDBA records the Basin State's assessment of compliance with SDLs.

A.2.7 Implementation process

The Basin Plan's management arrangements implement SDLs in each SDL resource unit, which are within a water resource plan area. A water resource plan area may include several SDL resource units. Basin states are responsible for preparing water resource plans for these water resource plan areas. A water resource plan has to ensure that the SDL of each resource unit in the water resource plan area is complied with over the term of the water resource plan.

Basin states are developing water resource plans during this transition period to 1 July 2019. Basin states propose water resource plans to the MDBA, who then assess them and provide recommendations to the Commonwealth Water Minister whether a water resource plan should be accredited or not. The Commonwealth Water Minister considers the recommendations and makes a decision whether to accredit a water resource plan or not. Accredited water resource plans will have effect until either it ceases to have effect or until three years after an amendment to the Basin Plan that affects water resource plan accreditations.

A.3 Useful links

This section includes links to key legislation, reports, maps and other information sources referred to throughout this report. While this report is intended to standalone, the links below may

be useful for readers seeking further information for context, background, or as a starting point to explore this report in more detail.

A.3.1 Reports

MDBA Annual Reports:

The Basin Plan annual report tracks the progress of the Basin Plan and associated water reforms. The 2012–13, 2013–14, 2014–15 and 2015–16 reports are available on the MDBA website <http://www.mdba.gov.au/>

The Commonwealth Water Act 2007 <https://www.legislation.gov.au/Home/>

The Basin Plan 2012 <https://www.legislation.gov.au/Home/>

Environmental Water Recovery Progress <http://www.mdba.gov.au/>

18. Glossary

Actual take	Total quantity of water actually taken from the water resources of a water resource plan area during a water accounting period.
Allocation	The annual volume of water to which the holder of an access licence is entitled as recorded in the water allocation account for the licence.
Baseline Diversion Limit	Baseline diversion limit (BDL) means the baseline limit of take from a sustainable diversion limit (SDL) resource unit. The baseline limit is: ○ for a surface water SDL resource unit — the quantity of water calculated in accordance with column 2 of the table in Basin Plan Schedule 3 for that SDL resource unit. ○ for a groundwater SDL resource unit — quantity of water calculated in accordance with column 3 of the table in Basin Plan Schedule 4 for that SDL resource unit. The baseline reflects the level of take at 30 June 2009 generally. It is a combination of limits established by state law (e.g. existing water resource plan limits) or limits established by the Cap arrangements, and defined levels of take where there are no established limits. The BDL establishes a baseline from which to determine required reductions in diversions to achieve the SDL.
Basin Plan, the	Legislation that sets out the BDL and SDL for each resource unit and the reporting requirements (see section A.1.2 for more information).
Basin states	The states and territories within the Murray–Darling Basin, namely, New South Wales, Victoria, Queensland, South Australia and the Australian Capital Territory.
Bulk entitlement	A perpetual entitlement of water granted to water authorities by the Crown of Victoria under the *Water Act 1989* (Vic).
Carryover	A way to manage water resources and allocations that allows entitlement holders to take a portion of unused water from one water year into a new water year.
Cap, The	A limit, implemented in 1997, on the volume of surface water that can be diverted for consumptive use.
CEWH	Commonwealth Environmental Water Holder
CEWO	Commonwealth Environmental Water Office

Class of entitlement	Water entitlements are divided into differing 'classes' of security, where 'security' refers to the frequency with which water allocated under that entitlement is able to be supplied in full. Higher security entitlements have higher average and less variable yields than lower security entitlements.
Consumptive use	Use of water for irrigation, industry, urban, stock and domestic use, or for other private consumptive purpose.
Diversion	The removal of water from a river system by means of pumping or gravity channels.
Diversion licence	Specified licences issued for a specified annual volume and diversion rate.
Water entitlement	The volume of water authorised to be taken and used by an irrigator or water authority. It includes bulk entitlements, environmental entitlements, water rights, sales water and surface-water and groundwater licences.
Environmentally sustainable level of take	Average level of take that allowing environmental needs to be met.
Environmental water	Held environmental water or planned environmental water.
Floodplain harvesting	The taking of water from a floodplain, including after it leaves a watercourse during a flood.
Gigalitre (GL)	One billion or 10^9 litres.
Groundwater	Water occurring naturally below ground level (in an aquifer or otherwise).
Held environmental water	Water available under: (a) a water access right, or (b) a water delivery right, or (c) an irrigation right, for the purposes of achieving environmental outcomes (including water that is specified in a water access right to be for environmental use).
Inflow	Source of the water that flows into a specific body of water — for a lake, inflow could be a stream or river, and inflow for a stream or river could be rain.
Interception	The interception of surface water or groundwater that would otherwise flow, directly or indirectly, into a watercourse, lake, wetland, aquifer, dam or reservoir that is a Basin water resource.
IQQM	Integrated quantity quality model

Irrigation	The application of water to land to grow crops, usually through supplying water by means of channels or pipes
Long-term diversion limit	Ratio used by water planners to represent the expected use of water in the various water access entitlements of a given river system.
Megalitre (ML)	One million or 10^6 litres
MSM	Murray Simulation Model
Ministerial Council, The	Murray–Darling Basin Ministerial Council.
Murray–Darling Basin Agreement	The Agreement between the governments of Agreement the four Basin states and the Commonwealth. The current Agreement is the 2008 Agreement.
On-farm storage	Privately-owned storage used to harvest surplus flow or to store unused allocation for use in the following season.
Overdraw	Water diverted in one season against a prospective allocation in the subsequent year.
Overland flow	A term used by Queensland for floodplain harvesting, see definition for floodplain harvesting
Permitted take	Total quantity of water permitted to be taken during a water accounting period in a water resource plan area, varying from year to year according to the interaction of climate, inflows and water resource plan rules (e.g. allocation rules, access rules).
Planned Environmental Water	Water used for environmental outcomes which is not associated with an entitlement but is managed through with rules set out in water management plans or laws.
REALM	Resource Allocation Model
Regulated system	A surface water system in which water in a watercourse can be stored or flow levels are controlled, through the use of structures such as large dams and large weirs.
Salinity	The concentration of dissolved salts in water usually expressed in EC units. Applies to both surface and groundwater
Surface water	Includes water in a watercourse, lake or wetland, and any water flowing over or lying on the land after having precipitated naturally or after having risen to the surface naturally from underground.
Sustainable diversion limit (SDL)	The maximum long-term annual average quantity of water that can be taken, on a sustainable basis, from the Basin water resources as a whole, and the water resources, or particular parts of the water resources, of each water resource plan area.

Take	Take is the removal of water, or the reduction in flow of water, from a water resource for consumptive purposes. See ‘Actual Take’ and ‘Permitted Take.’
Transitional diversion limit (TDL)	The TDL represents progress from current diversion limits (defined in the Basin Plan as the baseline diversion limit – BDL) to the SDL. It is a mechanism to assist with the development, testing and trialling of Basin Plan arrangements till June 2019.
Unregulated streams	Streams that are not controlled or regulated by releases from major storages.
Utilisation	The amount of water available for diversion that is actually diverted.
Water accounting	A systematic process of identifying, recognising, quantifying, reporting and assuring information about water, the rights or other claims to water, and the obligations against water. Water accounting applies Australian Water Accounting Standards
Water audit monitoring (WAM) Report	MDBA prepared annual reports providing a comprehensive overview of water use and management in the Basin. The Cap method precursor to Water Take Reporting.
Water quality	The condition of water and its related suitability for different purposes. It refers to a combination of physical, chemical and/or biological characteristics of water in the context of the proposed use of that water.
Water resource	Groundwater — water that occurs naturally beneath the ground level (whether in an aquifer or otherwise), or water that has been pumped, diverted or released to an aquifer for the purpose of being stored there. Murray–Darling Basin groundwater resources exclude groundwater in the Great Artesian Basin. Surface water — includes water in a watercourse, lake or wetland, and any water flowing over or lying on land after having precipitated naturally, or after having risen to the surface naturally from beneath the ground level.
Water resource plans (WRPs)	Statutory management plans developed for particular surface water and groundwater systems. Currently these plans known by different names throughout the Murray–Darling Basin (such as ‘water sharing plans’ in New South Wales and ‘water allocation plans’ in SA).
Water year	A continuous 12-month period, usually starting 1 July, or any other month as prescribed under the water regulation or a resource operations plan, but usually selected to begin and end during a relatively dry season. Used as a basis for processing streamflow and other hydrologic data.