Section 71 Report for South Australia 2014-15
Surface Water and Groundwater

1. PURPOSE

This report contributes to South Australia's requirements under section 71 of the *Water Act 2007* (Cth) for surface water and groundwater for 2014-15.

The water resource plan (WRP) areas under the Basin Plan are subdivided into Sustainable Diversion Limit (SDL) resource units for both surface water and groundwater. The information provided in this report is presented at the SDL resource unit level.

All information is current at 31 October 2015.

2. WATER RESOURCE MANAGEMENT OVERVIEW FOR THE STATE

Water resource management at a State level is governed by the *Natural Resources Management Act 2004* (SA) (NRM Act). Under the NRM Act, the State Natural Resources Management Plan (NRM Plan) is the overarching management plan that covers all geographical areas that are defined by the SDL resource units. Regional NRM Plans for the South Australian Murray-Darling Basin NRM Region, South Australian Arid Lands NRM Region and the South East NRM Region then cover one or more of the SDL resource unit areas. These plans provide general policies for managing the water resources within the areas they cover.

A number of the areas that represent the SDL resource units have been prescribed under the NRM Act and are managed under a Water Allocation Plan (WAP). Each SDL resource unit can therefore be categorised as being either prescribed or unprescribed. This description indicates the extent of water management (including monitoring and compliance) that is currently undertaken at a State level.

The SDL resource unit areas covered by this report are listed below.

Surface Water SDL Resource Units

- South Australian Non-Prescribed Areas (SS10)
- South Australian Murray (SS11)
- Marne-Saunders (SS12)
- Eastern Mount Lofty Ranges (SS13)

Groundwater SDL Resource Units (with aquifer sub-units denoted in italics)

- Angas Bremer (GS1) – *Quaternary Sediments, Murray Group Limestone*
- Eastern Mount Lofty Ranges (GS2)
- Mallee (GS3) – *Pliocene Sands, Murray Group Limestone, Renmark Group*
- Marne Saunders (GS4) – *Fractured Rock, Murray Group Limestone, Renmark Group*
- Peake, Roby and Sherlock (GS5) – *Unconfined, Confined*
- SA Murray (GS6)
- SA Murray Salt Interception Schemes (GS7)

Stock and Domestic

Stock and domestic take is generally unlicensed in South Australia and authorised under section 127 (1) of the NRM Act. All reported values for stock and domestic take (permitted or actual) in this report, other than the South Australian Murray (SS11), are represented by an estimated value. In the South Australian Murray (SS11), the reported values for stock and domestic take represent the licenced use.

Conjunctive Use

There is some potential for the double accounting of take due to the conjunctive use of water for licensed and non-licensed purposes and the conjunctive use of surface water and groundwater resources in SDL resource

units that contain prescribed areas. The magnitude of these issues are being investigated as part of the development of the South Australian water resource plans. In particular:

- Extraction of groundwater into a surface water dam from where it is used for consumptive purposes. It is possible that part or all of a volume recorded against a groundwater allocation may also be subsequently recorded against a surface water allocation.
- Non-licensed use, particularly for stock and domestic purposes, may be taken though the same meters used to record licensed use.

State wide Authorisations for Prescribed Areas

A number of state wide authorisations under section 128 of the NRM Act authorise the take of water without a licence in prescribed water resource areas for the following purposes:

- underground water in the course of any operation or activity reasonably necessary for, or incidental to the drilling, construction or testing of a hydrocarbon exploration well pursuant to section 11 of the Petroleum Act 2000
- fire-fighting
- road making
- for the purpose of the application of chemicals to non-irrigated crops and non-irrigation pasture and for the control of pest plants and animals
- up to or equal to 500 KL per annum of surface water from a connected roof area
- native title purposes.

In addition, within the South Australian Murray SDL resource unit there is an s 128 authorisation to create or enlarge an artificial water body with a surface area equal to or less than 190 m^2 or maintaining the water level of an artificial water body with a surface are equal to or less than 190m^2 (including to compensate for water lost from the artificial water body through evaporation).

The actual take for these uses has not formally been quantified for each SDL resource unit. The volumes of water used for these purposes are variable from year to year and are extremely small compared to the licensed and stock and domestic use in these areas.

3. SURFACE WATER OVERVIEW

Unprescribed Areas

The water resources within these areas are generally considered to be at a low risk from current or future development. Development is generally low due to a number of factors including low water availability, high evaporation and high groundwater salinity.

South Australian Non-Prescribed Areas (SS10)

The South Australian Non-Prescribed Areas (SS10) is unprescribed and no licences have been issued, allocations made or trade allowed. No metering or estimation of water use is currently undertaken. There are no environmental entitlements held in this SDL resource unit.

A method for calculating the annual permitted take and for determining the actual annual take is being progressed as part of the development of the water resource plan for the SA Murray Region.

Prescribed Areas with a Water Allocation Plan

The water resources within these areas are under development pressure and require more active management. Water licences are issued and Water Allocation Plans (WAPs) developed to sustainably manage and monitor the available resources. Licensed purposes generally include irrigation, industrial, intensive animal keeping, recreation and town water supply.

The South Australian Murray (SS11) SDL resource unit is managed under the River Murray Prescribed Watercourse WAP, the Marne-Saunders (SS12) SDL resource unit is managed under the Marne-Saunders WAP and the Eastern Mount Lofty Ranges (SS13) SDL resource unit is managed under the Eastern Mount Lofty Ranges WAP.

Carryover is permitted under the Marne-Saunders WAP and the Eastern Mount Lofty Ranges WAP. Within the South Australian Murray SDL resource unit, the South Australian Government has a policy for the allocation of private carryover to entitlement holders, which will ultimately be incorporated into the next revision of the WAP for the River Murray Prescribed Watercourse.

The Eastern Mount Lofty Ranges WAP is in the early stages of implementation, in particular, the initial issuing of licences and installation of meters. As such, there was limited information available for 2014-15 regarding allocations and actual water use.

Permitted take [s 71(1)(b)]

South Australian Murray (SS11)

Permitted take for the South Australian Murray SDL resource unit is defined as the sum of the annual diversion targets that are calculated based on the existing Cap on Diversions under clause 7 of Schedule E of the *Murray-Darling Basin Agreement 2008*. These long-term Caps are summarised in the table below, and the annual diversion targets are calculated using agreed methods and models.

Consumptive Purpose	**Maximum Volume**
Water supply purposes delivered to Metropolitan Adelaide and associated country areas through the Swan Reach – Stockwell, Mannum-Adelaide and Murray Bridge-Onkaparinga pipelines	650 GL over any five year period
Lower Murray Swamps irrigation	94.2 GL per year consisting of: 72 GL for irrigation, stock and domestic 22.2 GL for environmental land management
Country Towns water supply	50 GL per year
All other purposes	449.9 GL (long-term average annual diversion)

Once calculated, the annual diversion targets are adjusted for permanent and temporary trade (as permitted), allocation levels, private carryover and to account for those entitlements where the purpose of use has changed from consumptive to environmental (since the relevant Cap was set). The latter adjustment for Held Environmental Water (HEW) is undertaken using a scaling approach agreed with the MDBA. No private carryover was allocated in 2014-15.

A value of 860.390 GL has been determined as the permitted take for the SA Murray SDL resource unit, which consists of:

1. Metropolitan Adelaide = 410.763 GL
2. Lower Murray Swamps = 31.376 GL
3. Country Towns = 37.000 GL
4. All other purposes = 381.251 GL

Marne-Saunders (SS12)

The permitted take of 3.227 GL has been calculated as the allocated volumes (entitlement, carryover) plus the BDL estimated take values (stock and domestic, commercial plantations, farm dam losses):

1. Take from a watercourse = 0.211 GL, including 0.028 GL for carryover
2. Dam extractions = 1.419 GL, including 0.142 GL for carryover
3. Stock and domestic = 0.496 GL (BDL estimate)
4. Estimate for farm dam losses = 1.1 GL (BDL estimate - long-term average over period 1895 to 2009).
5. Net take by commercial plantations = 0.0 GL (BDL estimate - forestry is negligible)

Eastern Mount Lofty Ranges (SS13)

The permitted take of 19.936 GL has been calculated using a combination of modelled outputs (using the BDL model with 2014-15 climate data) and BDL estimates as follows:

1. Take from watercourses = 7.843 GL (BDL model)
2. Take from farm dams = 8.893 GL
    a. Dam extractions = 5.593 GL (BDL model)
    b. Dam losses = 3.3 GL (BDL estimate – long-term average over period 1895 to 2009)
3. Net take by commercial forestry = 3.2 GL (BDL estimate – long-term average over period 1895 to 2009).

Not all licences in this SDL resource unit have been issued and no carryover was allocated in 2014-15.

Actual take [s 71(1)(c)]

South Australian Murray (SS11)

Water taken in accordance with Schedule E of the Agreement is licensed and metered. The actual take of 500.874 GL is the metered use for 2014-15, consisting of:

1. Metropolitan Adelaide = 73.190 GL
2. Lower Murray Swamps = 15.672 GL
3. Country Towns = 35.808 GL
4. All other purposes = 376.205 GL

Marne-Saunders (SS12)

All licensed use is metered and actual take is reported as a combination of this metered use and estimates for non-licensed take (same values as for permitted take).

Water use of 2.343 GL comprises:

1. Take from a watercourse = 0.097 GL
2. Dam extractions = 0.650 GL
3. Stock and domestic = 0.496 GL (BDL estimate)
4. Farm dam losses = 1.1 GL (BDL estimate)
5. Commercial plantations = 0 GL (BDL estimate)

Eastern Mount Lofty Ranges (SS13)

The implementation of the EMLR WAP is continuing but the majority of water users did not have water meters installed prior to the start of 2014-15. As such, the actual take for consumptive purposes from watercourses and farm dams is a combination of modelled and non-modelled demands. The modelled estimates were determined by applying 2014-15 climate data to the model used to estimate the BDL.

Water use of 19.936 GL comprises:

1. Take from watercourse = 7.843 GL (stock, domestic and irrigation via watercourse extractions including some modelled floodplain diversions in the lower Bremer)
2. Take from runoff dams = 8.893 GL
    a. Dam extractions = 5.593 GL (stock, domestic and irrigation from commercial farm dams)
    b. Dam losses = 3.3 GL (BDL estimate)
3. Net take by commercial forestry = 3.2 GL (BDL estimate)

Water allocations [s 71(1)(d)]

South Australian Murray (SS11)

For the 2014-15 water year, there was a 100% allocation against water access rights under the *Water Allocation Plan for the River Murray Prescribed Water Course*.

Critical Human Water Needs Carryover

Allocation to SA Water of preserved carryover for Critical Human Water Needs – 172GL. This annual allocation has been made since 2011-12.

Marne-Saunders (SS12)

For the 2014-15 water year, there was a 100% allocation against water access rights.

Eastern Mount Lofty Ranges (SS13)

For the 2014-15 water year, there was a 100% allocation against water access rights.

Other decisions that permit water to be taken [s 71(1)(e)]

Allocation decisions are not normally made outside of a WAP, unless specific circumstances occur (such as drought) and / or additional authorisations are made under section 128 of the NRM Act.

In 2014-15, no other decisions that permit water to be taken were made within surface water SDL resource units.

Trade details [s 71(1)(f)]

South Australian Murray (SS11)

All water access entitlements and allocations can be traded within the SDL resource unit and interstate within the Murray-Darling Basin as enabled by Schedule D of the *Murray-Darling Basin Agreement 2008* with the exception of entitlements issued for:

- water supply purposes delivered to Metropolitan Adelaide and associated country areas through the Swan Reach – Stockwell, Mannum-Adelaide and Murray Bridge-Onkaparinga pipelines
- environmental land management in the Lower Murray Swamps.

Marne-Saunders (SS12) and Eastern Mount Lofty Ranges (SS13)

Trade is permitted under the Marne-Saunders WAP and the Eastern Mount Lofty Ranges WAP, but within the SDL resource units only.

4. GROUNDWATER OVERVIEW

Unprescribed areas

The water resources within these areas are generally considered to be at a low risk from current or future development. Development across these areas is generally low due to a number of factors including low water availability, high evaporation and high groundwater salinity.

SA Murray (GS6)

The area is not prescribed so no licences have been issued, allocations made or trade allowed. No metering or estimation of water use is currently undertaken. There are no environmental entitlements in this SDL resource unit.

A method for calculating the annual permitted take and for determining the actual annual take is being progressed as part of the development of the water resource plan for the SA Murray Region.

Partially Prescribed Areas and Prescribed Areas with a Water Allocation Plan

The water resources within these areas are under development pressure and require more active management. Water licences are issued and WAPs developed to sustainably manage and monitor the available resources. Licensed purposes generally include irrigation, industrial, intensive animal keeping, recreation and town water supply.

The South Australian groundwater SDL resource units are managed under the following WAPs:

- Angas Bremer (GS1) and Eastern Mount Lofty Ranges (GS2) – Eastern Mount Lofty Ranges WAP
- Mallee (GS3) – Mallee and Noora WAPs
- Marne-Saunders (GS4) – Marne-Saunders WAP
- Peake-Roby-Sherlock (GS5) – Peake, Roby and Sherlock WAP
- SA Murray Salt Interception Schemes (GS7) – partially managed under the Noora WAP

Carryover is permitted under the Angas Bremer (GS1), Eastern Mount Lofty Ranges (GS2) and Marne-Saunders (GS4) WAPs only.

The Eastern Mount Lofty Ranges WAP is in the early stages of implementation, in particular, the initial issuing of licences and installation of meters. As such, there was limited information available for 2014-15 regarding allocations and actual water use.

Aquifer Recharge

Managed aquifer recharge is currently only undertaken within the Angas Bremer (GS1) SDL resource unit.

Recharge occurs using allocations from two surface water SDL resource units (SS11 and SS13) but it is currently not possible to identify the source unit of the water used. The allocations are generally against irrigation licences and are not allocations specifically provided for aquifer recharge.

Aquifer recharged volumes are available for up to five years from the time of injection and this is reflected in annual allocations in subsequent years for this purpose. The allocations are accounted for as part of the annual permitted take and use is accounted for under actual annual take

Permitted take [s 71(1)(b)]

Angas Bremer (GS1)

The permitted take for the Angas Bremer (Quaternary Sediments) aquifer has been reported as a fixed annual limit equal to the SDL of 1.09 GL.

The permitted take for the Angas Bremer (Murray Group Limestone) aquifer of 16.52 GL has been calculated as the allocated volumes (entitlement, carryover, aquifer recharge) plus the BDL estimated value for stock and domestic take:

1. Water Access Right = 6.525 GL
2. Stock and domestic = 0.068 GL (BDL estimate)
3. Carryover = 1.638 GL
4. Aquifer recharge allocation = 8.289 GL

Eastern Mount Lofty Ranges (GS2)

The permitted take of 33.43 GL has been calculated as the allocated volumes (entitlement issued to end of 2014-15, carryover) plus the BDL estimated take values (stock and domestic, commercial plantations):

1. Water Access Right = 31.293 GL
2. Stock and domestic = 0.653 GL (BDL estimate)
3. Net take by commercial plantations = 1.483 GL (BDL estimate)

Mallee (GS3)

The permitted take for the Mallee (Pliocene Sands) aquifer has been reported as a fixed annual limit that is equal to the SDL of 41.4 GL.

The permitted take for the Mallee (Renmark Group) aquifer has been reported as a fixed annual limit that is equal to the SDL of 2.0 GL.

The permitted take for the Mallee (Murray Group Limestone) aquifer has been reported as a fixed annual limit that is equal to the proposed revised SDL of 65.578 GL. This has the following components:

1. Water Access Right = 60.451 GL
2. Stock and domestic = 2.278 GL (BDL estimate)
3. Unallocated water = 0.849 GL (Unallocated consumptive water under the WAP / SDL limit)

Marne-Saunders (GS4)

The permitted take for the Marne-Saunders (Fractured Rock) aquifer of 2.245 GL has been calculated as the allocated volume plus the BDL estimated take values (stock and domestic, commercial plantations):

1. Water Access Right = 1.819 GL
2. Carryover = 0.332 GL
3. Stock and domestic = 0.094 GL (BDL estimate)
4. Net take by commercial plantations = 0.0 GL (BDL estimate)

The permitted take for the Marne-Saunders (Murray Group Limestone) aquifer of 2.436 GL has been calculated as the allocated volume plus the BDL estimated take values (stock and domestic, commercial plantations):

1. Water Access Right = 2.071 GL
2. Carryover = 0.188 GL
3. Stock and domestic = 0.176 GL (BDL estimate)
4. Net take by commercial plantations = 0.0 GL (BDL estimate)

The permitted take from the Marne-Saunders (Renmark Group) aquifer has been reported as a fixed annual limit that is equal to the SDL of 0.5 GL.

Peake-Roby-Sherlock (GS5)

The permitted take for the Peake-Roby-Sherlock (unconfined) aquifer is a fixed annual limit that is equal to the SDL of 3.41 GL. This has the following components:

1. Water Access Right = 0.291 GL
2. Stock and domestic = 0.19 GL (BDL estimate)
3. Unallocated water = 2.928 GL (Unallocated consumptive water under the WAP / SDL limit)

The permitted take for the Peake-Roby-Sherlock (confined) aquifer is a fixed annual limit that is equal to the SDL of 2.58 GL. This has the following components:

1. Water Access Right = 1.92 GL
2. Stock and domestic = 0.41 GL (BDL estimate)
3. Unallocated = 0.250 GL (Unallocated consumptive water under the WAP / SDL limit)

SA Murray Salt Interception Schemes (GS7)

The SA Murray Salt Interception Schemes SDL resource unit incorporates the River Murray floodplain and adjacent areas, extending west from the South Australian – Victorian border to the east of Morgan. Parts of this SDL resource unit are contained in the Noora Prescribed Wells Area and the Designated Area defined under the *Groundwater (Border Agreement) Act 1985* (SA). The remainder is not prescribed.

There is a single water access right within the Noora Prescribed Wells Area that was made in 2009 and is for extraction from the Pliocene Sands aquifer for the Murtho salt interception scheme.

The annual permitted take for the SA Murray Salt Interception Schemes is a fixed annual limit that is equal to the SDL of 28.6 GL.

Actual take [s 71(1)(c)]

Angas Bremer (GS1)

There was no take from the Angas Bremer (Quaternary Sediments) aquifer.

All licensed use is metered and actual take for the Angas Bremer (Murray Group Limestone) aquifer is reported as a combination of this metered use and estimates for non-licensed take.

In order to explicitly determine use for the various purposes, the order of use from the EMLR WAP has been applied at a licence level:

i. Base Allocation (Water Access Right)
ii. Carryover
iii. Aquifer Recharge

Water use from the Angas Bremer (Murray Group Limestone) aquifer of 2.043 GL comprises:

1. Water Access Right = 1.229 GL
2. Carryover = 0.108 GL
3. Aquifer Recharge = 0.638 GL
4. Stock and domestic = 0.068 GL (BDL estimate)

Eastern Mount Lofty Ranges (GS2)

Due to the limited number of meters installed by the end of 2014-15 and an even smaller number with a full year of meter data, actual take under water access rights was not determined. Water use is reported for stock and domestic purposes and for commercial forestry only.

Water use of 2.136 GL comprises:

1. Water Access Right – not determined (N/D)
2. Stock and domestic = 0.653 GL (BDL estimate)
3. Net take by commercial plantations = 1.483 GL (BDL estimate)

Mallee (GS3)

All licensed use is metered and actual take is reported as a combination of this metered use and estimates for non-licensed take (same values as for permitted take).

Water use from the Mallee (Murray Group Limestone) aquifer of 37.730 GL comprises:

1. Water Access Right = 34.303 GL
2. Stock and domestic = 2.278 (BDL estimate)
3. s 128 authorised use = 1.149 GL

There was no take from the Mallee (Pliocene Sands) and Mallee (Renmark Group) aquifers.

Marne-Saunders (GS4)

All licensed use from the Marne-Saunders (Fractured Rock) and (Murray Group Limestone) aquifers is metered and actual take is reported as a combination of this metered use and estimates for non-licensed take (same values as for permitted take).

In order to explicitly determine use for the various purposes, the order of use from the Marne-Saunders WAP has been applied at a licence level:

i. Aquifer Recharge (although none currently in this area)
ii. Base Allocation (Water Access Right)
iii. Carryover

Water use from the Marne-Saunders (Fractured Rock) aquifer of 0.4372 GL comprises:

1. Water Access Right = 0.3427 GL
2. Carryover = 0.001 GL
3. Stock and domestic = 0.094 GL (BDL estimate)
4. Net take by commercial plantations = 0.0 GL (BDL estimate)

Water use from the Marne–Saunders (Murray Group Limestone) aquifer of 1.400 GL comprises:

1. Water Access Right = 1.2175 GL
2. Carryover = 0.0065 GL
3. Stock and domestic = 0.176 GL (BDL estimate)
4. Net take by commercial plantations = 0.0 GL (BDL estimate)

There is no licensed take for the Marne-Saunders (Renmark Group) aquifer. Any stock and domestic take is very small and has been included in the estimate for the Mallee (Murray Group Limestone) aquifer, as per the BDL determination.

Peake-Roby-Sherlock (GS5)

All licensed use from the Peake-Roby-Sherlock (unconfined) and Peake-Roby-Sherlock (confined) aquifers is metered and actual take is reported as a combination of this metered use and estimates for non-licensed take.

Water use from the Peak-Roby Sherlock (Unconfined) aquifer comprises:

1. Water Access Right = 0.0 GL
2. Stock and domestic = 0.19 GL (BDL estimate)

Water use from the Peake-Roby Sherlock (Confined) aquifer comprises:

1. Water Access Right = 0.2046 GL
2. Stock and domestic = 0.47 GL (BDL estimate)

SA Murray Salt Interception Schemes (GS7)

All take from salt interceptions schemes is metered. The total use for 2014-15 was 9.547 GL.

Water allocations [s 71(1)(d)]

For the 2014-15 water year there was a 100% allocation against water access rights.

Other decisions that permit water to be taken [s 71(1)(e)]

Allocation decisions are not normally made outside of a WAP, unless specific circumstances occur (such as drought) and / or additional authorisations are made under Section 128 of the NRM Act. Aside from the Mallee SDL resource unit, no other decisions outside of any WAPs permitted water to be taken in 2014-15.

Mallee (GS3)

In addition to the state wide authorisations issued pursuant to section 128 of the NRM Act there is an authorisation for no more than 42,920 ML over ten years and a maximum of 6,000 ML per annum to be taken from the Mallee (Murray Group Limestone) aquifer for mineral sands operations in the Hundreds of Mindarie, Chesson, McPherson and Allen.

Trade details [s 71(1)(f)]

Trade is only permitted within the individual SDL resource units.

4. ENVIRONMENTAL WATER

There are now large volumes of South Australian entitlements held for environmental purposes, as well as environmental allocations issued in New South Wales and Victoria that are delivered and used in South Australia.

At the start of 2014-15, there was 164.879 GL of entitlements held in South Australia for environmental purposes.

During 2014-15, a total of 600.472 GL of environmental allocations from interstate were traded to South Australia. Additionally, 1.087 GL of consumptive allocations were traded from interstate for environmental purposes and 0.146 GL of South Australian consumptive allocations provided for environmental purposes.

The total volume of allocations used for environmental purposes in South Australia during 2014-15 was 809.086 GL.

There was also 157.543 GL of planned environmental water available in South Australia.

5. PROGRESS ON WATER REFORM

Please refer to South Australia's 2014-15 submission to the National Water Commission against the milestones set out in Schedule A of the *National Partnership Agreement on Implementing Water Reform in the Murray-Darling Basin*.