Rest of Australia

Summary

- Water availability was below average in many key water systems outside the Murray–Darling Basin in 2015–16, including southern Victoria, south-east South Australia, eastern Queensland and parts of Western Australia.
- Water systems outside the Murray–Darling Basin accounted for around 4.3 per cent of total allocation trade volume in 2015–16. The largest volume of trade occurred in Queensland and southern Victorian systems.
- Average allocation prices in 2015–16 increased in those systems facing dry conditions. In southern Victoria, allocation prices increased by $95 to $135 per megalitre in Thomson–Macalister and by $53 to $356 per megalitre in Werribee. In Western Australia, allocation prices increased by $20 to $40 per megalitre in Harvey. Price data were not available for Queensland systems.
- Seasonal conditions were average in the Hunter system in eastern New South Wales. Average allocation and entitlement prices remained stable in 2015–16 at $33 per megalitre for allocations and $1,648 per megalitre for general security entitlements.
- The volume of trade in both allocation and entitlement markets in Tasmania nearly doubled from 2014–15 to 2015–16, hitting record highs. Increased irrigation activity—as existing irrigation districts matured and new schemes became operational—and relatively dry conditions contributed to the increase in trade.

Southern Victoria

Southern Victoria hosts a number of water systems that are hydrologically disconnected from the southern Murray–Darling Basin (MDB) and run from north to south towards the coast (Map 1).
Most of these systems have some irrigation activity but only two—the Thomson–Macalister and Werribee—are declared water systems with regulated surface water and active allocation markets. Both systems are managed by Southern Rural Water. Other systems in southern Victoria rely primarily on access to groundwater or unregulated water (Figure 1).

Figure 1 Entitlements on issue in Victoria outside the MDB, by resource type, 2015–16

Note: Excludes bulk entitlements. ‘Unincorporated’ includes all areas without declared groundwater management units.

Similar to other states, individual water systems outside the southern MDB are hydrologically disconnected, so market prices and trading activity can vary significantly between systems and resource types. However, similar climatic conditions across nearby systems can lead to similar trends across markets.
The majority of water use in Victoria is for irrigated agriculture. In southern Victoria, the largest volume of irrigated water use occurs in natural resource management (NRM) regions that include the Thomson–Macalister, Werribee, Glenelg and Hopkins systems (Figure 2). The main irrigation activity in these systems is pasture, the majority of which is for dairy. In 2014–15—the latest year of available ABS data—pasture accounted for 78 per cent of total irrigated water use across all Victorian systems outside the MDB.

Figure 2 Irrigated water use in Victoria outside the southern MDB, by activity and natural resource management region, 2014–15

Seasonal conditions

Seasonal conditions across much of Victoria were relatively dry during 2015–16. Many areas in southern and western Victoria received significantly lower rainfall than average (Map 2). Western Victoria started 2015–16 with the lowest rain percentile on record and dry conditions persisted through 2015 (BOM 2015). Similar to other regions in eastern Australia, the majority of the year’s rainfall occurred in mid 2016.

Conditions in the east were also more favourable, particularly in the Thomson–Macalister. This resulted in Southern Rural Water transferring 3,000 ML of water through other water operators from Thomson–Macalister to Werribee, which began the year with zero allocations (SRW 2017a).
The dry conditions were reflected in storage volumes for Werribee, which received below average inflows. This resulted in a continued drawdown in the system. In contrast, Thomson–Macalister storages began and ended the year at similar volumes (Figure 3).

**Figure 3 Water storage percentages in Victoria outside the southern MDB, 2007–08 to 2015–16**

Note: Represents the sum of water storage volumes for significant Victorian dams per system divided by the total capacity of those dams per system.
Source: Bureau of Meteorology

Overall market activity

**Allocation markets**

In 2015–16 the two regulated water systems in southern Victoria had 775 trades in the allocation market. This was a threefold increase from 2014–15. These trades totalled 28 GL, more than double the volume of trade in 2014–15 (Figure 4). The increase in both the number and volume of trades reflected the dry conditions and relatively lower water availability.
Average water allocation prices for 2015–16 are presented in Figure 5. These were around $135 per megalitre in the relatively wetter Thomson–Macalister system and almost $360 in the drier Werribee system. Both prices increased from 2014–15 due to the dry conditions. Beyond broader climatic conditions, prices for Thomson–Macalister and Werribee are not expected to align because trade between these systems cannot occur.

**Entitlement markets**

Entitlement trade occurred in eight Victorian water systems outside the southern MDB in 2015–16. The most active system was the Thomson–Macalister, accounting for 52 per cent of entitlement trade in Victoria outside the southern MDB (Figure 6). Trade in Thomson–Macalister was predominantly for regulated surface water licences, followed by groundwater trade.

Groundwater and unregulated surface water entitlements were traded in a number of systems but activity was generally split across a variety of trading zones and river locations, rather than concentrated in any one market.
Figure 6 Entitlement trade volume in southern Victoria, by water system and resource type, 2015–16

![Bar chart showing entitlement trade volume in southern Victoria by water system and resource type, 2015–16.](image)

Note: 'Unincorporated' refers to any groundwater resource in Victoria not covered by a groundwater management unit, and as such does not represent a distinct water system.

Source: Water Trade Database

**Water system profiles**

The Thomson–Macalister and Werribee are the major water markets in Victoria outside the Murray–Darling Basin. Entitlement trade occurs in other water systems but is split among a number of different water sources and does not represent a single cohesive market.

**Thomson–Macalister**

**Regional overview**

The Thomson–Macalister water system contains the Thomson, Macalister and La Trobe rivers in south-eastern Victoria in the West Gippsland natural resource management region (Map 1). The system contains relatively active water markets for water allocations and some entitlements. In 2015–16, 25.5 GL of allocation water was traded through 576 transactions and 19 GL of entitlements was traded through 222 transactions.

Water entitlements on issue in Thomson–Macalister are primarily for regulated surface water on the Thomson and Macalister rivers supplied by Lake Glenmaggie and the Thomson Reservoir. In 2015–16 the total volume of water entitlements on issue comprised 252 GL of regulated surface water, 70 GL of unregulated surface water and 94 GL of groundwater (Figure 7). Unlike many other systems, surface water entitlements were predominantly for high reliability water.

Figure 7 Thomson–Macalister water resources, 2015–16

![Bar chart showing Thomson–Macalister water resources, 2015–16.](image)

Source: Water Trade Database
Regulated surface water on the Thomson and Macalister rivers is managed by Southern Rural Water, which holds a bulk entitlement for the Thomson and Macalister systems and a right to 6 per cent of all inflows to the Thomson Reservoir. These inflows supply around 20 per cent of all allocations in the system; the remainder are sourced from Lake Glenmaggie (SRW 2016).

The system is home to the largest irrigation district in southern Victoria—the Macalister Irrigation District—which serves around 1,100 irrigators around the town of Maffra. About 85 per cent of entitlements in Thomson–Macalister are owned by irrigators in the Macalister Irrigation District.

Regulated surface water is also available under seasonal entitlements on the La Trobe River near the system’s western border. However, there is no active trade in this region. The water availability and allocation market discussion in this section is specific to the Thomson and Macalister rivers.

Water in the West Gippsland natural resource management region—which contains the Thomson and Macalister systems—is used almost entirely for irrigated agriculture. The bulk of water use is for pasture for dairy (Figure 8), with some minor vegetable and irrigated cropping activities (SRW 2017b).

Figure 8 Irrigated water use, West Gippsland (contains Thomson–Macalister), 2014–15

Source: Australian Bureau of Statistics 2016

**Water availability**

Water availability in Thomson–Macalister was slightly lower in 2015–16 than in previous years. In particular, the availability of spill water was the lowest since 2008–09. The system operates under annual accounting, with no provisions for carryover. As is common in Thomson–Macalister, allocation percentages for high reliability entitlements reached 100 per cent during the first month of the year. Similar to 2014–15, low reliability entitlements received allocations of 20 per cent (SRW 2016).

Under normal inflow patterns, Lake Glenmaggie regularly spills early in the year before allocations are granted to low reliability users. When spills occur, any allocations to high reliability entitlements used to that point are reclassified as spill entitlement and account balances are recredited for use. In 2015–16 water allocations equivalent to 3 per cent of the volume of high reliability entitlement volumes were classified as spill entitlement. This was significantly lower than previous years (Figure 9).
In 2015–16 the total volume of water allocations traded in Thomson–Macalister was 26 GL, more than double the volume traded in 2014–15 (Figure 10). This was likely driven by the lower availability of spill water at the start of the year. Similar to 2014–15 the majority of trade occurred in the Macalister Irrigation District in the trading zone below Cowwarr Weir. All allocation trade was for surface water—groundwater licences in Victoria have not been unbundled from land so allocations cannot be traded.

The average price for 2015–16 was just under $135 per megalitre. This was an increase of around $40 per megalitre from 2014–15, reflecting reduced water availability. The average price
was similar to that in 2013–14, when more spill water but less low reliability water was available (Figure 10).

**Entitlement market activity**

The total volume of water entitlements traded in Thomson–Macalister in 2015–16 was 18 GL. This was 17 per cent higher than in 2014–15 (Figure 11). By volume, trade was primarily for high reliability surface water entitlements (55 per cent).

![Figure 11 Volume of entitlement trade by reliability class, Thomson–Macalister, 2007–08 to 2015–16](source: Water Trade Database)

Average entitlement prices in 2015–16 were $1,944 per megalitre for high reliability entitlements and $145 per megalitre for low reliability entitlements (Figure 12). Prices for low reliability entitlements decreased slightly in 2015–16, but remained consistent with long-term averages. High reliability entitlement prices have remained fairly constant since 2012–13. Entitlement prices changed most significantly between 2008–09 and 2009–10. The entitlement market in Thomson–Macalister began in 2008–09, when it became a declared water system and water rights were unbundled. These large price changes can likely be attributed to initial immaturity of trade and subsequent maturing of the market.
Figure 12 Surface water entitlements trade for selected reliability classes, Thomson–Macalister 2007–08 to 2015–16

Note: Price data are presented only for years with at least five reported transactions with non-zero prices.
Source: Water Trade Database

Werribee
Regional overview

The Werribee water system consists of the area around the Werribee River in western Melbourne (Map 1). In 2015–16, 2 GL of water allocations were traded through 199 transactions and 1 GL of entitlements were traded through 51 transactions.

Water entitlements on issue in Werribee are primarily for regulated surface water supplied by Pykes Creek, Merrimu Reservoir and Melton Reservoir. In 2015–16 the total volume of water entitlements on issue comprised 23 GL of regulated surface water, 8 GL of unregulated surface water and 6 GL of groundwater (Figure 13). Regulated surface water was primarily high reliability water.

Figure 13 Werribee water resources, 2015–16

Source: Water Trade Database

Regulated surface water in Werribee comprises five trading zones across two irrigation districts—the upstream Bacchus Marsh Irrigation District and more-coastal Werribee Irrigation District. Generally trade is freely allowed between these zones except in some select parts and at the top of the system.

Water in Werribee is used primarily for irrigated agriculture. Although the Port Phillip and Western Port NRM region, which includes Werribee, hosted a relatively wide range of irrigation activities in 2014–15 (Figure 14), Werribee is primarily known for vegetable production.
Water availability

Water availability in Werribee was very low in 2015–16 due to very low rainfall. High reliability water entitlement allocation opened the season at 10 per cent and ended at 15 per cent, the lowest closing allocation since 2009–10. Similarly, low reliability entitlements received no allocations. Because of the dry conditions, Southern Rural Water transferred water from the Thomson–Macalister through other water operators including Melbourne Water to support water availability in Werribee (SRW 2016).

Although allocations were low in 2015–16, this was the second year in which carryover was available. Carryover from 2014–15 made up a significant portion of available water in the region, equivalent to around 38 per cent of the total volume of high reliability entitlements on issue (Figure 15).

Allocation market activity

In 2015–16 the total volume of water allocations traded in Werribee was 2 GL, a 28 per cent decrease from 2014–15 (Figure 16). In contrast, the total number of transactions increased almost 57 per cent to 199. Trade was solely for surface water, and was primarily within the Bacchus March Irrigation District and Werribee Irrigation District.

The increase in the number of trades and the decrease in volumes of allocation traded are consistent with the very limited water availability. Limited water availability also contributed to a noticeable increase in the average allocation price, from $303 per megalitre in 2014–15 to $356 in 2015–16 (Figure 16).
Entitlement market activity

The total volume of water entitlements traded in Werribee in 2015–16 was 1 GL, around 32 per cent lower than in 2014–15 (Figure 17). In contrast, the number of transactions was 55 per cent higher, at 51.

Despite the increase in number, trade was spread thinly across a number of different trading zones and reliable prices could not be estimated.

Eastern New South Wales

New South Wales hosts a small number of water systems outside the Murray–Darling Basin along its east coast. These include the Hunter, NSW North Coast and Sydney South Coast systems (Map 3).
Entitlements in the Sydney South Coast and NSW North Coast are primarily for unregulated surface water (Figure 18). Only the Hunter system contains significant volumes of regulated surface water with an active allocation market.

**Figure 18 Entitlements on issue in New South Wales outside the MDB, by resource type, 2015–16**

Entitlement trade occurs in all systems but is spread among a range of water sources with no clear active markets. As such, only the Hunter system is examined in detail.

**Hunter**

The Hunter water system is a collection of tributaries leading into the Hunter River, which flows out to sea at Newcastle. Regulated surface water is governed by two water sharing plans for the Hunter regulated river and a regulated tributary, the Paterson River.

The Hunter water sharing plan contains three main trade zones, roughly corresponding with the management areas governing each section of water course within the system. These are the water course below Glennies Creek Dam (zone 3), the water course below Glenbawn Dam...
(zone 1), and the water course from their confluence to the ocean (zone 2). Zone 1 contains the largest portions of regulated entitlement (58 per cent) and unregulated entitlement (92 per cent). Trade is allowed between these zones as long as diversions in any one zone never exceed individually defined maximum volumes (NSW DPI 2017a).

Irrigation in the Hunter water system primarily supports irrigated pastures and some fruits and vegetables (Figure 19).

**Figure 19 Irrigated water use, NSW Hunter–Central Rivers natural resource management region, 2014–15**

By volume, water entitlements on issue in the Hunter in 2015–16 were predominantly for unregulated surface water (Figure 20). Regulated surface water was comprised primarily of general security entitlements.

**Figure 20 Hunter water resources, 2015–16**

Source: Water Trade Database

**Water availability**

In 2015–16 the Hunter catchment had relatively consistent water availability. Regulated surface water in Hunter is primarily fed from Glennies Creek Dam and Glenbawn Dam, both of which held high volumes of water throughout 2015–16 (Figure 21). High security and general security licence holders received full allocations in 2015–16. Additionally, the Hunter allows 25 per cent of both high security and general security entitlement volumes as carryover (NSW DPI 2016).

Supplementary licences received water several times throughout 2015–16. Supplementary licences were allocated 39 GL and used an estimated 30 GL (77 per cent) of this (NSW DPI 2017b). This generally reflects climactic conditions in the region, with the Hunter receiving average to slightly above average rainfall for most of 2015–16. The Hunter also had some of its driest months on record in the latter part of 2015–16.
Allocation market activity
In comparison with other NSW water systems, the volume of allocation trade in the Hunter region is relatively small. In 2015–16, 5 GL of allocations were traded, all of which was surface water (Figure 22). This was higher than in 2014–15 but lower than peak trade volumes of 2012–13 and 2013–14. Trade volumes have continued to trend upwards since 2007–08.

Allocation prices in the Hunter system region were relatively stable from 2008–09 to 2015–16, and reached $33 per megalitre in 2015–16. These prices are consistently lower than allocation prices in other NSW systems. Divergence in prices is to be expected because the Hunter is hydrologically disconnected and no trade occurs between the Hunter and other catchments. Prices are solely driven by the local climate, trading and irrigation activities within the region.

Source: Water Trade Database
Entitlement market activity

In 2015–16, the volume of entitlement trade in the Hunter was 20 GL, significantly lower than the 124 GL traded in 2014–15 but in-line with the long-term trend (Figure 23). Trade volumes in 2014–15 were significantly boosted by trade in local water utility and supplementary entitlements.

The large amount of local water utility trade in 2014–15 reflects the AGL Macquarie Barnard Scheme being fully incorporated into the water licencing framework for the Hunter. This involved creating a special entitlement type—major utility (Barnard)—to replace previous rules-based allowances. This was a one-time transfer and is not related to normal market activity (NSW DPI 2017a).

Entitlement trade in Hunter is split among a number of distinct water sources and reliability classes. Reliable prices could only be estimated for general security regulated surface water entitlements.

The average price for general security entitlements in 2015–16 was $1,648 per megalitre, similar to the previous year (Figure 24). Prices have generally declined since highs in 2007–08 and 2008–09, which may reflect increasing levels of water availability in the Hunter from the start of 2006–07 until recently.
Western Australia

Western Australia has two main active allocation water markets. These are located in irrigation cooperatives in the Harvey and Gascoyne water systems (Map 4). A large range of water resources exist and entitlement trade is generally permitted within any physically connected system but the majority of these systems experience no trade. Many systems in Western Australia have a greater supply of water than is currently allocated, leading to low competing demand among users. Entitlement market activity for those regions that do trade is relatively low, generally fewer than 20 trades per year.
Western Australian water entitlements remain bundled. Water allocations cannot be freely traded except within irrigation cooperatives that hold bulk entitlements and manage share trading between their members. The two cooperatives with active allocation markets are Harvey Water, which manages surface water trading in irrigation districts south of Perth, and Gascoyne Water, which supplies groundwater along the Gascoyne River near Carnarvon.

Harvey Water operates a network of channels and pipes around the Harvey River, which are fed by seven dams along the Darling Scarp escarpment. Major water storages include Wellington Dam and Harvey Dam. This irrigation network feeds three adjacent irrigation districts, the Harvey Irrigation District, Waroona Irrigation District and Collie Irrigation District (Harvey Water 2017). Trade data from 2007–08 to 2015–16 indicate that trade is allowed between districts.

Gascoyne Water pumps groundwater from bore fields surrounding the Gascoyne River and delivers the water through a network of irrigation pipelines. Both allocations and entitlements can be traded between irrigators.
**Water availability**

The Harvey and Gascoyne water systems received average to below average rainfall in 2015–16 (Map 5). Harvey, in particular, had a period of prolonged rainfall deficiency.

Map 5 Rain deciles, Western Australia, 2015–16

Water availability in Harvey declined during the 2015–16 water year, decreasing by more than 15 per cent for the period ending in June 2016 (Figure 25). This was contrary to the trend of increasing water availability in the five previous years.
The Carnarvon Irrigation District within the Gascoyne scheme is fed from groundwater extracted from bore fields north-east of the town. In 2015–16 the volume of groundwater entitlements held by the cooperative was larger than the capacity to extract water, meaning water availability is limited by physical constraints rather than groundwater availability. The cooperative is seeking to expand allocations and physical capacity (GWC 2016).

**Water market activity**

Although Western Australia has two allocation markets, Gascoyne has historically not collected trade data or traded prices so the focus in this report is on the Harvey water system. Both systems have some entitlement trade activity but the majority of trade occurs in the allocation market. In 2015–16 Western Australian allocation trade made up 0.1 per cent of national allocation trade volume.

**Allocation markets**

Surface water allocation trade volume in Harvey increased in 2015–16 compared with the previous year, from 5 GL in 2014–15 to 10 GL in 2015–16. The average allocation price also increased considerably, from $20 per megalitre in 2014–15 to over $40 in 2015–16 (Figure 26). This aligns with low levels of rainfall and declining water storage volumes. In 2015–16, 0.6 GL of groundwater allocation was also traded in Gascoyne.
Entitlement markets

Western Australian entitlement markets have had consistently low levels of market activity. Activity that does occur is primarily for transfers of ownership associated with land sales rather than for sole trades of entitlement.

In 2015–16 around 0.3 GL of surface water and 0.4 GL of ground water entitlements were traded in the Harvey water system (Figure 27). Large volumes of trade in 2012–13 reflect resignations and partial buy-backs of shares from the Harvey Water irrigation scheme. This was in part due to a combination of years of poor water quality, high fixed costs and low agricultural profitability (Harvey Water 2013).

In Gascoyne 0.4 GL of groundwater entitlements were traded in 2015–16.
Tasmania

Tasmania has a number of irrigation districts across the south-east, central and northern parts of the state. Trade was predominantly confined to a few districts in 2015–16 (Map 6). Historically—except for cooperatives on the River Clyde and Macquarie River—most surface water entitlements have been unregulated and have had minimal trade. Tasmanian Irrigation has been constructing and operating a number of new regulated water schemes in the north and east since 2008.

Each irrigation area has separate storages and waterways, and effectively operate as separate water markets. Within a scheme, water can only be traded to outlets at or above the seller along a pipeline, which further limits trade. For this report water markets have been analysed collectively across the state, with some additional information provided for Tasmanian Irrigation districts. No trade data are available for the River Clyde or Elizabeth–Macquarie irrigation cooperatives.

Map 6 Tasmania irrigation schemes and irrigation areas

In 2015–16, the majority of Tasmanian Irrigation schemes had been fully-established and were operating normally. Several more commenced operation in the 2015–16 irrigation season. Tasmanian Irrigation is currently planning a second tranche of irrigation schemes—including the Duck, Scottsdale and North Esk schemes in the north, and the Southern Highlands and Swan Valley schemes in the east—along with improvements in interconnectivity and enhancements of
existing schemes through central and northern Tasmania (Tasmanian Irrigation 2016). Most Tasmanian Irrigation schemes are near or at full capacity.

Entitlements in Tasmania are predominately for surface water, with some limited groundwater entitlements. In 2015–16, 2,052 GL of surface water entitlements and 20 GL of groundwater entitlements were on issue (Figure 28). At least 1,817 GL of this surface water was unregulated and not within irrigation schemes.

Figure 28 Entitlements on issue by type, Tasmania, 2015–16

Unregulated surface water
Regulated surface water
Groundwater

Note: Tasmanian regulated surface water was estimated by classifying all entitlements on issue belonging to Tasmanian Irrigation, Elizabeth–Macquarie Irrigation Trust and River Clyde Trust as regulated. All other surface water entitlements are unregulated.

Source: Water Trade Database

**Water availability**

2015–16 was an average water year for much of Tasmania. Storages were already below average at the start of the season due to a very dry 2014–15. The second half of 2015 remained dry before wetter conditions returned in the first half of 2016.

Map 7 Rain deciles, Tasmania, 2015–16
Tasmanian water storage is largely decentralised, with the Bureau of Meteorology collecting information on 46 dams across the state with capacity of at least 1 GL each. Each irrigation scheme has access to its own single or multiple storages.

Given the combination of average to below average rainfall and full allocations across irrigation districts, storage levels continued to decline to below trend levels across the state (Figure 29). 2015–16 storages ended the season at their lowest levels in recent years.

Figure 29 Water storage percentages, Tasmania total, 2009–10 to 2015–16

The primary irrigation activity in Tasmania is growing pastures for grazing. Water is also used for growing vegetables in the North and North West NRM regions. The amount of water consumed for irrigated activities in the North NRM region is more than double that of other regions in Tasmania (Figure 30). In recent years irrigated agriculture has expanded. The area to the east of Launceston has increasingly featured irrigated dairy and vegetables. In the past this land has been largely used for dryland agriculture.

Figure 30 Irrigated water use by activity and NRM region, Tasmania, 2014–15

Source: Bureau of Meteorology

Source: Australian Bureau of Statistics 2016
**Water market activity**

**Allocation markets**

The volume of trade in allocation markets in Tasmania doubled from 2014–15 to 2015–16 and the volume and number of trades hit record highs for the second year in a row. The increase in trade resulted from increased irrigation activity—as existing irrigation districts matured and new schemes became operational—and the relatively dry conditions across Tasmania.

Within Tasmanian Irrigation districts, the maximum price of allocation water declined from the high prices in 2014–15. Additionally the volume traded doubled and the number of trades quadrupled between 2014–15 and 2015–16 (Table 1).

<table>
<thead>
<tr>
<th>Year</th>
<th>Volume traded (ML)</th>
<th>Number of Trades</th>
<th>Maximum price ($ per ML)</th>
<th>Median price ($ per ML)</th>
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<td>-</td>
</tr>
<tr>
<td>2013–14</td>
<td>181</td>
<td>7</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2014–15</td>
<td>6,907</td>
<td>78</td>
<td>583</td>
<td>-</td>
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<tr>
<td>2015–16</td>
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<td>313</td>
<td>215</td>
<td>108</td>
</tr>
</tbody>
</table>

Source: Tasmanian Irrigation

**Entitlement markets**

Within Tasmanian Irrigation districts, 2015–16 was the third year in a row in which entitlement trade increased. Both the number of trades and the volume traded increased, with nearly a doubling in the number of trades from 2014–15. The highest value trade was $2,700, slightly down from 2014–15, which may reflect the slightly improved rainfall conditions (Table 2).

<table>
<thead>
<tr>
<th>Year</th>
<th>Volume traded (ML)</th>
<th>Number of Trades</th>
<th>Maximum price ($ per ML)</th>
<th>Median Price ($ per ML)</th>
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<td>62</td>
<td>2,700</td>
<td>1,372</td>
</tr>
</tbody>
</table>

Source: Tasmanian Irrigation

As well as permanent trade, Tasmanian Irrigation districts have a reasonable amount of entitlement leasing—that is, limited-term transfer of entitlement. In 2015–16, 38 limited-term transfers were made, totalling 2,436 ML. Interpreting the price of these limited-term trades is difficult because the duration of each transfer contract can vary.
Rest of South Australia

Water markets are active in three water systems in South Australia outside the Murray–Darling Basin—Adelaide–Mt Lofty, SA South East and SA Arid Lands (Map 8). Although Adelaide–Mt Lofty adjoins the southern MDB through the eastern Mt Lofty system, the area is considered separate based on NRM spatial boundaries. Despite recent increases in surface water trade in the Adelaide–Mt Lofty system, these systems continue to be dominated by groundwater trade.

Map 8 Water systems in South Australia outside the southern MDB

Historically, entitlements on issue in many areas of South Australia were granted by land area (haIE, or hectare Irrigation Equivalents) rather than by volume. In the past decade many of these licences have been converted into volumetric (ML) entitlements, such as during the implementation of the Lower Limestone Water Allocation Plan in SA South East in November 2013.

In 2015–16 volumetric entitlements on issue comprised 1,260 GL of groundwater in SA South East, 95 GL of groundwater and 303 GL of unregulated surface water in Adelaide–Mt Lofty and 49 GL of groundwater in SA Arid Lands (Figure 31). The SA Arid Lands are excluded from the discussion in this report due to the insignificant number and volume of trades.
Figure 31 Volumetric entitlements on issue by resource type, selected systems in South Australia, 2015–16

Source: Water Trade Database

**Water availability**

Like much of Australia, rainfall across South Australia was variable in 2015–16. Despite areas to the north-west of the Adelaide–Mt Lofty system experiencing above average rainfall, the water systems generally experienced unfavourable conditions. The Adelaide–Mt Lofty and SA South East systems had below average to very much below average rainfall (Map 9).

Map 9 Rainfall deciles, South Australia, 2015–16

Source: Bureau of Meteorology

The primary irrigated activities in South Australia outside the southern MDB are horticulture and grapevines. The majority of irrigated agriculture in South Australia outside of the SA Murray occurs in the SA South East system. This system also includes irrigation for pasture (Figure 32).
Water market activity

South Australian water markets outside the MDB continue to be dominated by trade in groundwater. In 2015–16, 3 GL of groundwater allocations and 89 GL of groundwater entitlements were traded. The majority of this trade occurred in the SA South East system. Activity in surface water entitlement markets has increased in recent years, with 1.4 GL of trade in unregulated surface water in 2015–16. All surface water trade occurred in the Adelaide–Mt Lofty system.

Allocation markets

The total volume of water trade within South Australia outside the southern MDB is small compared with most of Australia’s other water markets. In 2015–16, allocation trade occurred entirely in groundwater markets, totalling 3 GL through 17 trades. This is an 85 per cent increase in volume traded from the previous year, but a 60 per cent decrease in number of trades (Figure 33).

Entitlement markets

South Australian water systems outside the MDB have experienced significant growth in volumetric entitlement trade in recent years, likely driven by the gradual conversion of hectare equivalent licences to volumetric licences. In 2015–16 the volume of entitlement trade increased
by 145 per cent from 37 GL in 2014–15 to 90 GL (Figure 34). The number of trades increased by 57 per cent, from 387 trades in 2014–15 to 606 trades in 2015–16. Of the 90 GL traded in non-MDB South Australian regions, less than 2 per cent or 1 GL occurred in surface water markets. Water entitlement markets were most active in the SA South East system.

Figure 34 Total volume of groundwater entitlement trade, selected water systems in South Australia, 2007–08 to 2015–16

Source: Water Trade Database

**Eastern Queensland**

A number of water systems in Queensland contain active water markets. Several occur in the northern Murray–Darling Basin and several more follow the coast to the north. This section details the systems outside the Murray–Darling Basin, focusing on Burdekin, Burnett and Fitzroy (Map 10). The non-MDB Queensland water systems produce sugar cane, as well as cotton, some pasture and other fruits and vegetables.
The water systems—like most other states and unlike the southern Murray–Darling Basin—are largely hydrologically disconnected. This means that each collection of connected trading zones within each system operates as an individual market and that water prices and trade activity can vary significantly across systems and water resource types.

The majority of surface water rights in eastern Queensland systems are regulated entitlements (Figure 35). The exception is the Queensland Gulf area, which has significantly more unregulated water (69 per cent unregulated). Groundwater is also important in some areas, most notably in the Great Artesian Basin. This is not a separate system but a larger groundwater basin that spans multiple systems across Queensland, New South Wales, South Australia and the Northern Territory.

In total, all water systems in non-MDB Queensland have 3,001 GL of regulated surface water entitlements, 934 GL of unregulated surface water entitlements and 644 GL of groundwater entitlements. The majority of regulated surface water entitlements—about 64 per cent (2,251 GL)—are medium reliability.
The Burdekin natural resource management (NRM) region uses the largest volume of water for irrigation in Queensland (Figure 36). Across non-MDB Queensland, most irrigation water is used for sugar production, which is the major irrigation activity in the coastal NRM regions of Burdekin, Burnett–Mary, Mackay–Whitsunday and Northern Gulf. Cotton remains the primary use of irrigation water in Fitzroy.

Water in Burdekin is managed predominantly by Sun Water, but two districts around the Burdekin River delta are managed by Lower Burdekin Water, which was formed by the amalgamation of the North Burdekin Water Board and the South Burdekin Water Board in February 2015. Lower Burdekin Water actively manages take and recharge of the alluvial aquifer that is the water source for most of the area's sugar cane (LBW 2017). The Queensland Government has introduced the Water (Local Management Arrangements) Amendment Bill 2016 to consider turning over Sun Water irrigation assets in Burdekin to local irrigator-owned entities (LMAI 2017).
Water availability

Seasonal conditions improved throughout much of Queensland in 2015–16. This followed an extended dry period in central Queensland which created significant rainfall deficits and low water storages (Map 11).

Map 11 Three-year Queensland rainfall deficit to January 2016

Much of Queensland was in an extended drought until early 2016, especially central Queensland (Map 11). This contributed to a rundown in water storages. However, widespread rainfall in early 2016 saw agricultural conditions and water storages improve. Overall, the dry conditions in the first half of the year and wetter conditions in the second half resulted in roughly average rainfall for most of Queensland (Map 12).
The trend until the beginning of 2015 was for a long-term decline in storage levels. However, improved rainfall in the first half of 2015 and 2016 saw some replenishment in storage systems. The Burdekin returned to full capacity in April 2016 from an eight-year low in January 2016 and storage levels in the Burnett were relatively high. Fitzroy storages remained relatively low (Figure 37).
Given the low volume of water available in Burdekin in the first half of the year, 2015–16 was only the second year since 2002–03 in which medium security entitlements were below full allocation mid-season (Sun Water 2017).

**Water market activity**

Coverage of Queensland water markets is limited due to data constraints. Currently price data for allocation trade is unavailable, and entitlement prices are generally only reported for land sales. The Burdekin, Burnett and Fitzroy water systems contain the largest volumes of trade in non-MDB Queensland.

**Allocation trade**

The volume of surface water allocation trade in the Burdekin, Burnett and Queensland Fitzroy systems remained at similar levels in 2015–16 to 2014–15. The Fitzroy water system remained the most active by volume.

Figure 38 Volume of surface water allocation trade, selected non-MDB Queensland water systems, 2007–08 to 2015–16
Although the majority of permanent trade in Queensland is for surface water, some trade in groundwater does occur. The volumes of groundwater allocation trade in 2015–16 were similar to 2014–15 in all three systems (Figure 39).

Figure 39 Volume of groundwater allocation trade, selected water systems in Queensland, 2007–08 to 2015–16

Entitlement trade

Entitlement trade in the Burdekin, Burnett and Fitzroy systems was lower in 2015–16 than 2014–15 (Figure 40).

Figure 40 Volume of surface water entitlement trade, selected non-MDB Queensland water systems, 2007–08 to 2015–16

Trade of medium reliability entitlements remained low compared with previous years. This may indicate a change in regional definitions or data collection and reporting methods in 2013–14. In the Burnett system this trade remained just over 1 GL per year in 2015–16 (Figure 41). The majority of this trade occurred in the Barker Barambah scheme. Prices for medium reliability entitlements were too variable to report meaningful market prices.
To date, the Northern Territory has had almost no water trade due to an abundance of water resources and limited scarcity.

Water resources that have been deemed sufficiently developed to warrant improved management to prevent overusing groundwater reserves, river flows or wetlands are declared as water control districts (NT Government 2017).

Legislative frameworks are in place to enable water entitlement trade in declared water allocation plan areas (Map 13) within these districts. However, to date only one trade has occurred, in Western Davenport in 2013–14.
In 2015–16 two water allocation plans were in force (Western Davenport and Tindall Katherine). More water allocation plans are currently being developed by the NT Government and three were implemented in 2016. Although this suggests the potential for emerging markets, the current limited number of licences (334 across all Northern Territory in 2015–16) and users in these areas limits the potential market size and depth.
References


