Australian water markets report
2013–14

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Summary

The *Australian water markets report 2013–14* presents national statistics on water markets, including on water access entitlement and water allocation trade, market performance (trade processing times) and environmental water. This is the seventh edition of the water markets report, but the first produced by the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES). ABARES was commissioned by the National Water Commission (NWC) to produce the seventh edition prior to the closure of the NWC in June 2015.

**Water entitlement trade**

Around 35 150 gigalitres of water entitlements were issued across Australia at 30 June 2014. This included 28 023 gigalitres of surface water and 7 127 gigalitres of groundwater. In 2013–14, the Murray–Darling Basin accounted for 57 per cent of total volume of entitlements on issue.

In 2013–14, 2 421 gigalitres of water entitlements were traded across Australia. This was an increase of 1 078 gigalitres or 80 per cent on 2012–13 (Figure S1). Of this trade, 87 per cent was surface water and 13 per cent groundwater. The Murray–Darling Basin accounted for most (88 per cent) entitlement trade in Australia. Significant entitlement trade activity outside the Murray–Darling Basin occurred in the Sydney South Coast, Tasmania and the Western Australian Goldfields water systems.

The increase in entitlement trade nationally reflected a large increase in the volume of trade in the Murrumbidgee water system (Figure S2). This included one transaction where the Australian Government secured a 381-gigalitre Murrumbidgee supplementary entitlement (with a long-term average annual yield of 173 gigalitres) for the environment.
Water allocation trade

In 2013–14, 5,554 gigalitres of water allocations were traded across Australia, a decrease of 629 gigalitres (10 per cent) from 2012–13 (Figure S3). The Murray–Darling Basin accounted for most (96 per cent) allocation trade volume. Surface water allocation trade in the southern Murray–Darling Basin accounted for 84 per cent of total water allocation trade. Outside the Murray–Darling Basin, large volumes of water allocations were traded in the Barron, Burdekin, Burnett and Fitzroy water systems in Queensland.

In the southern Murray–Darling Basin, storage volumes and water allocation percentages were lower in 2013–14 than in 2012–13. As a result, water allocation prices were higher in 2013–14 (averaging around $67 a megalitre) than in 2012–13. However, prices remained well below the peaks observed during the millennium drought (Figure S4).
Total allocation trade volumes increased in recent years to 2013–14 in part because of transfers between environmental agencies. These transfers involved moving environmental water allocations held in one region (for example, the New South Wales and Victoria Murray water systems) to a related agency in another connected region (for example, the South Australian Murray). These transactions typically have no financial component (and no direct effect on market prices), but they are included in official trade statistics. In 2013–14 environmental water transfers accounted for around 46 per cent of total water allocation trade by volume in the southern Murray–Darling Basin.

Map S1 shows inter-regional allocation trade flows in the southern Murray–Darling Basin after environmental transfers were removed. In 2013–14, the Victoria Murray water system was a major importer of water allocations (144 gigalitres) while the New South Wales Murray water system was a major exporter (130 gigalitres).

Map S1 Net non-environmental allocation trade flows for southern Murray–Darling Basin, 2013–14

Source: Murray–Darling Basin Authority 2015, pers. comm., 26 June
Market performance

In 2013–14 most jurisdictions met their targets for processing times of water trades (Table S1 and Table S2). Most water allocation trades in the southern Murray–Darling Basin are processed within one to two days.

Table S1 Water entitlement trade processing times, by jurisdiction, 2013–14

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Unit</th>
<th>Approvals within 20 business days</th>
<th>Registration within 10 business days</th>
</tr>
</thead>
<tbody>
<tr>
<td>COAG service standard</td>
<td>%</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>New South Wales</td>
<td>%</td>
<td>95</td>
<td>96</td>
</tr>
<tr>
<td>Victoria</td>
<td>%</td>
<td>99</td>
<td>100</td>
</tr>
<tr>
<td>Queensland</td>
<td>%</td>
<td>na</td>
<td>96</td>
</tr>
<tr>
<td>South Australia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– River Murray</td>
<td>%</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>– Outside River Murray</td>
<td>ab</td>
<td>76</td>
<td>100</td>
</tr>
<tr>
<td>Western Australia</td>
<td>ab</td>
<td>35</td>
<td>100</td>
</tr>
<tr>
<td>Tasmania</td>
<td>ab</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Australian Capital Territory</td>
<td>b</td>
<td>%</td>
<td>100</td>
</tr>
</tbody>
</table>

* a COAG service standards do not apply, b No published figures were available so values were calculated from raw data.

Sources: DELWP (2015); NSW Office of Water (2015a, 2015b); Queensland Government Department of Natural Resources and Mining 2015, pers. comm., 2 September; South Australian Government Department of Environment, Water and Natural Resources 2015, pers. comm., 9 September; Sunwater 2015, pers. comm., 2 September

Table S2 Water allocation trade approval times, by jurisdiction, 2013–14

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Unit</th>
<th>Intrastate within 5 business days</th>
<th>Interstate within 10 business days</th>
</tr>
</thead>
<tbody>
<tr>
<td>COAG service standard</td>
<td>%</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>New South Wales</td>
<td>%</td>
<td>99</td>
<td>Vic. and Qld 98 SA 98</td>
</tr>
<tr>
<td>Victoria</td>
<td>%</td>
<td>97</td>
<td>NSW 98 SA 99</td>
</tr>
<tr>
<td>Queensland</td>
<td>%</td>
<td>Unsupplemented 77 Supplemented 96</td>
<td>NSW 100</td>
</tr>
<tr>
<td>South Australia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– River Murray</td>
<td>%</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>– Outside River Murray</td>
<td>ab</td>
<td>47</td>
<td>na</td>
</tr>
<tr>
<td>Western Australia</td>
<td>ab</td>
<td>100</td>
<td>na</td>
</tr>
<tr>
<td>Tasmania</td>
<td>ab</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Australian Capital Territory</td>
<td></td>
<td>na</td>
<td>na</td>
</tr>
</tbody>
</table>

* a COAG service standards do not apply, b No published figures were available so values were calculated from raw data.

c 10 business days for South Australia d 20 business days for South Australia. na not applicable.

Sources: DELWP (2015); NSW Office of Water (2015a, 2015b); Queensland Government Department of Natural Resources and Mining 2015, pers. comm., 2 September; South Australian Government Department of Environment, Water and Natural Resources 2015, pers. comm., 9 September; Sunwater 2015, pers. comm., 2 September
Environmental water

The Australian and state governments with responsibility for the Murray–Darling Basin have secured water entitlements to return over-allocated and overused water systems to environmentally sustainable extraction levels (Figure S5).

Figure S5 Environmental water managed, by key government agency, at 30 June 2014

As at 30 June 2014, the Commonwealth Environmental Water Holder managed 2 126 gigalitres (1 454 gigalitres long-term average annual yield) of water entitlements for environmental purposes—making it the largest manager of environmental water. The New South Wales Office of Environment and Heritage, the Victorian Environmental Water Holder, the Murray–Darling Basin Authority and the South Australian Government Department of Environment, Water and Natural Resources managed 743 gigalitres, 682 gigalitres, 50 gigalitres and 44 gigalitres of environmental water entitlements respectively.

The Australian Government secured the most environmental water. It switched the mechanism it used to secure entitlements from predominantly purchasing to acquiring through infrastructure efficiency improvements (Figure S6). In 2013–14 it secured around 456 gigalitres (87 per cent of total environmental water secured) through infrastructure projects. This compares with 37 per cent of environmental water secured in 2011–12.
Figure S6 Environmental water secured by the Australian Government, by source, 2007–08 to 2013–14

Note: Water secured volumes are received, estimated or agreed in signed contracts. Until contracts have been exchanged, these figures may be subject to change.
Source: Department of Agriculture and Water Resource 2015, pers. comm., 23 October

Map S2 shows the breakdown of environmental allocation transfers in the southern Murray–Darling Basin in 2013–14. Large volumes of environmental water allocations were transferred from the New South Wales and Victoria Murray water systems downstream to the South Australian Murray water system.

Map S2 Net environmental water allocation transfers, by water system, 2013–14

Source: Murray–Darling Basin Authority 2015, pers. comm. 26 June
1 Introduction

The *Australian water markets report 2013–14* presents national statistics on water markets, including on water access entitlement and water allocation trade, market performance (trade processing times) and environmental water.

This is the seventh edition of the water markets report, but the first produced by the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES). ABARES was commissioned by the National Water Commission (NWC) to produce the seventh edition prior to the closure of the NWC in June 2015.

ABARES used the same data sources and methods as previous editions to ensure that statistics were comparable with those of previous editions (and to maintain a consistent time series). Importantly, Appendix A outlines terminology used and reporting conventions underlying this report.

The report presents statistics in figures to improve readability. All statistics are available in table form in an accompanying spreadsheet. The underlying database of all water trades in Australia compiled for this report is also available for download. This database continues the NWC’s water trading data resource.

This report examines water trade across Australia (Map 1). Water is traded within relatively narrow geographical areas, except for the southern Murray–Darling Basin. The *Australian water market reports 2013–14* presents statistics for water markets across Australian surface water and groundwater systems.

*Map 1 Principal surface water systems where trading has occurred*

This report focuses on water access entitlement and allocation trade. The National Water Initiative (NWI) defines a water access entitlement as:

> a perpetual or ongoing entitlement to exclusive access to a share of water from a specified consumptive pool as defined in the relevant water plan.

It defines a water allocation as:

> the specific volume of water allocated to water access entitlements in a given season, defined according to rules established in the relevant water plan.
Jurisdictions have adopted various terms to describe water entitlement and allocation products (Table 1). This report uses the generic terms ‘entitlement’ and ‘allocation’.

Table 1 National Water Initiative equivalent entitlement terminology, 30 June 2014

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Water access entitlement</th>
<th>Water allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>New South Wales</td>
<td>Water access licence</td>
<td>Water allocation</td>
</tr>
<tr>
<td>Victoria</td>
<td>Water share</td>
<td>Water allocation</td>
</tr>
<tr>
<td>Queensland</td>
<td>Water allocation</td>
<td>Seasonal water assignment</td>
</tr>
<tr>
<td>South Australia</td>
<td>Water licence (bundled) and water access entitlement (unbundled)</td>
<td>Water allocation</td>
</tr>
<tr>
<td>Western Australia</td>
<td>Water licence</td>
<td>Water allocation a</td>
</tr>
<tr>
<td>Tasmania</td>
<td>Water licence</td>
<td>Water allocation</td>
</tr>
<tr>
<td>Northern Territory</td>
<td>Water licence</td>
<td>Water licence</td>
</tr>
<tr>
<td>Australian Capital Territory</td>
<td>Water access entitlement</td>
<td>Water allocation</td>
</tr>
</tbody>
</table>

*a* Applies only to Harvey Water. Note: This is not a complete list of entitlements on issue in each jurisdiction. Source: NWC (2013)

Many jurisdictions have more than one class of water access entitlement (see Appendix A). Typically, jurisdictions maintain at least two classes; available water is allocated first to higher reliability entitlements and then to lower reliability entitlements. As a result, higher reliability entitlements tend to receive higher allocation volumes on average (for a given nominal entitlement volume).

Jurisdictions use various terms to describe their water entitlement classes. To allow easier comparisons of water access entitlements across jurisdictions (particularly in the Murray–Darling Basin), ABARES has classified water access entitlements as ‘higher reliability’ and ‘lower reliability’ to allow it to compare water access entitlements across jurisdictions, (particularly in the Murray–Darling Basin). Higher reliability entitlements primarily include New South Wales high security, Victoria high reliability, Queensland high priority and all South Australian water access entitlements. Lower reliability entitlements primarily include New South Wales general security, Victoria low reliability and Queensland medium priority water access entitlements.

Water access entitlements are not generally comparable across water systems and reliability types. Allocation of water for each entitlement is driven by the local hydrology and water sharing plan rules. Large differences are present in long-run average allocation levels or yields for water entitlements across Australia. Yields from water entitlements in different systems can differ significantly even if they belong to the same reliability class.

This report focuses on nominal water access entitlement volumes. These represent the maximum volume of water allocation the entitlements provide. Where possible, the report also presents the long-term average annual yield volume (accounting for differences in reliability) for water access entitlements.

Data for the report have been collated from various sources, including:
• Bureau of Meteorology—primary source of information on water trading (collects and manages water information for all jurisdictions under the Water Act 2007 and the Water Regulation 2008)
• Department of the Environment—information on Australian Government environmental water holdings and trading
• Murray–Darling Basin Authority—additional information on water trading and environmental water in the Murray–Darling Basin
• state and territory government water agencies—additional information on water trading.

This report has two chapters. The first chapter presents water market statistics and information at the national level and for jurisdictions. The second chapter presents water market statistics and information for the Murray–Darling Basin and its key water systems (information on key water systems outside the Murray–Darling Basin is highlighted in the first chapter). Appendix A outlines processes used to produce the water markets report.

ABARES has sought to ensure these statistics match those published by state and territory government water agencies. However, there may be small differences.
2 National water market activity

This chapter summarises Australia’s water market activity in 2013–14 by jurisdiction. It shows the importance of the Murray–Darling Basin and highlights major water systems outside it. The chapter presents information and statistics on key policy and institutional changes, entitlements on issue, water access entitlement and water allocation trade, seasonal conditions and market performance for 2013–14.

Policy and institutional changes

Table 2 summarises significant policy developments, reform initiatives, events and announcements of 2013–14. Some items have long-term implications for the water market, while others may have applied to the 2013–14 water year only.

Table 2 Chronology of key market events, 2013–14

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 July 2013</td>
<td>Victorian Carryover Review Committee reforms commenced. These included a new spill rule for Hume Dam, a 100 per cent limit on carryover, new water storage charges and changes to early reserves. The Northern Victoria Resource Manager also announced that the limit on trade, announced on 21 November 2012, would remain in effect.</td>
</tr>
<tr>
<td>1 July 2013</td>
<td>The New South Wales Water Commissioner announced high security access holders in the New South Wales Murray would commence the year with 97 per cent of entitlement. Victoria Murray high security access holders commenced the year with 42 per cent of entitlement.</td>
</tr>
<tr>
<td>3 July 2013</td>
<td>The Natural Resources Management (Review) Amendment Act 2013 (SA) came into effect. Amendments included establishment of 10-year reviews of regional natural resource management plans and water allocation plans, management of surface water and watercourse water as a single resource and carryover of unused water allocations into subsequent years.</td>
</tr>
<tr>
<td>24 July 2013</td>
<td>Victorian Environmental Water Holder announced plans to sell a small amount of available water in the northern Victorian water market.</td>
</tr>
<tr>
<td>14 August 2013</td>
<td>West Australian Department of Water released a draft allocation plan for the Gingin area for public consultation.</td>
</tr>
<tr>
<td>28 August 2013</td>
<td>Australian Government committed $25 million to Murray River communities in South Australia through the Murray–Darling Basin Regional Economic Diversification Programme. This is in addition to $265 million already committed to water recovery and industry regeneration projects.</td>
</tr>
<tr>
<td>20 September 2013</td>
<td>Western Australian Department of Water released the Securing Western Australia’s Water Future position paper for public consultation.</td>
</tr>
<tr>
<td>17 September 2013</td>
<td>Western Mount Lofty Ranges water allocation plan adopted in South Australia.</td>
</tr>
<tr>
<td>1 October 2013</td>
<td>Lower South Esk Irrigation Scheme in Tasmania opened.</td>
</tr>
</tbody>
</table>
Entitlements on issue

Total water entitlements on issue across Australia at 30 June 2014 were around 35 150 gigalitres (Figure 1). That comprised 28 023 gigalitres of surface water and 7127 gigalitres of groundwater. All states and territories (except Western Australia) had more surface water entitlements on issue than groundwater. The total volume of entitlements on issue in 2012–13 was 33 045 gigalitres (26 127 gigalitres of surface water and 6918 gigalitres of groundwater).

The Murray–Darling Basin had a large proportion of Australia’s entitlements on issue, as in previous years. In 2013–14 it accounted for 57 per cent of total volume of entitlements on issue;
it had 62 per cent of surface water entitlements and 36 per cent of groundwater entitlements. See chapter 3 for a more detailed discussion of the Murray–Darling Basin.

Figure 1 Entitlements on issue, by resource, as at 30 June 2014

![Graph showing entitlements by resource, by state and territory, as at 30 June 2014.](image)

<table>
<thead>
<tr>
<th>State/Territory</th>
<th>Surface</th>
<th>Ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW</td>
<td>10,000</td>
<td>2,000</td>
</tr>
<tr>
<td>Vic. a</td>
<td>5,000</td>
<td>2,000</td>
</tr>
<tr>
<td>Qld b</td>
<td>2,000</td>
<td>1,000</td>
</tr>
<tr>
<td>SA b</td>
<td>1,000</td>
<td>500</td>
</tr>
<tr>
<td>WA</td>
<td>1,000</td>
<td>500</td>
</tr>
<tr>
<td>Tas.</td>
<td>500</td>
<td>250</td>
</tr>
<tr>
<td>NT</td>
<td>250</td>
<td>125</td>
</tr>
<tr>
<td>ACT c</td>
<td>125</td>
<td>62.5</td>
</tr>
<tr>
<td>MDB</td>
<td>10,000</td>
<td>2,000</td>
</tr>
<tr>
<td>Aust.</td>
<td>30,000</td>
<td>6,000</td>
</tr>
</tbody>
</table>

Note: Excludes drainage diversion entitlements. a Excludes area-based licences. c ACT ‘surface and groundwater’ entitlements have been classified as surface water. MDB Murray–Darling Basin. Note: The Murray–Darling Basin total includes part of the New South Wales, Victoria, Queensland and Australian Capital Territory totals.

Figure 2 identifies the main regions outside the Murray–Darling Basin with significant volumes of entitlement on issue in 2013–14.

Figure 2 Entitlements on issue for selected water systems outside Murray–Darling Basin, by resource, 2013–14

![Graph showing entitlements by resource for selected water systems.](image)

<table>
<thead>
<tr>
<th>Region</th>
<th>Surface</th>
<th>Ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tasmania</td>
<td>2,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Sydney South Coast (NSW)</td>
<td>1,500</td>
<td>750</td>
</tr>
<tr>
<td>Burdekin (Qld)</td>
<td>1,000</td>
<td>500</td>
</tr>
<tr>
<td>Hunter (NSW)</td>
<td>750</td>
<td>375</td>
</tr>
<tr>
<td>Pilbara (WA)</td>
<td>500</td>
<td>250</td>
</tr>
<tr>
<td>Fitzroy (Qld)</td>
<td>250</td>
<td>125</td>
</tr>
<tr>
<td>Burnett (Qld)</td>
<td>125</td>
<td>62.5</td>
</tr>
<tr>
<td>South East (SA)</td>
<td>125</td>
<td>62.5</td>
</tr>
<tr>
<td>Moreton (Qld)</td>
<td>62.5</td>
<td>31.25</td>
</tr>
<tr>
<td>Ord (WA)</td>
<td>31.25</td>
<td>15.625</td>
</tr>
</tbody>
</table>

Note: Excludes drainage diversion entitlements and area-based licences.

**Water access entitlement trade**

In 2013–14, 2 421 gigalitres of water access entitlements were traded across Australia (Figure 3 and Figure 4). This is equivalent to 7 per cent of total volume of entitlements on issue. Entitlement trade increased by 1 078 gigalitres or 80 per cent from 2012–13.
In 2013–14, New South Wales had the most active entitlement market by volume, with 1,897 gigalitres traded (78 per cent of total volume traded), followed by Victoria with 206 gigalitres (8 per cent). However, Victoria had the highest number of trades in 2013–14, with 3,707 transactions (43 per cent of total transactions), compared with 2,594 transactions (30 per cent) in New South Wales. Average volume traded per transaction in Victoria was 55 megalitres, while in New South Wales it was 731 megalitres. Australian average was 281 megalitres. Volume of entitlement trades as a proportion of the volume of entitlements on issue was also higher in New South Wales, at 13 per cent, compared with 4 per cent and 3 per cent in South Australia and Victoria respectively.

Interstate water access entitlement trading is allowed in the southern connected Murray–Darling Basin. The interstate market consists of the connected areas in New South Wales, Victoria and South Australia. This trade involves tagging of entitlements and allows the...
entitlement to retain its state-of-origin characteristics (such as its nominal volume and allocations), while water is extracted in the state of destination. Take-up of tagging was slow in the survey period: one tag trade was reported in 2008–09, nine in 2009–10, two in 2010–11, none in 2011–12, one in 2012–13 and none in 2013–14.

The Murray–Darling Basin accounted for a large proportion of Australia’s trade in water access entitlements, as in previous years. In 2013–14, it accounted for 88 per cent of total volume of entitlement trade, with surface water and groundwater trade accounting for 93 per cent and 56 per cent respectively. See chapter 3 for a more detailed discussion of the Murray–Darling Basin.

Figure 5 shows the main water systems outside the Murray–Darling Basin that had significant volumes of water access entitlement trade in 2013–14.

Entitlement trade activity outside the Murray–Darling Basin included:

- **Goldfields, Western Australia** (incorporating the towns of Kalgoorlie, Leonora and Norseman and extending to the SA border)—33 gigalitres of groundwater entitlements traded across eight transactions, representing 10 per cent of volume of entitlements on issue.

- **Tasmania** (covering all water systems)—33 gigalitres of entitlements traded (over 99 per cent surface water), representing almost 2 per cent of volume of entitlements on issue.

- **Sydney South Coast, New South Wales** (incorporating the Nepean, Hawkesbury, Bega and Brogo rivers)—30 gigalitres of entitlements traded (97 per cent surface water), representing over 2 per cent of volume of entitlements on issue.

- **South East, South Australia** (incorporating the towns of Naracoorte and Mount Gambier)—23 gigalitres of groundwater traded, representing 5 per cent of volume of entitlements on issue.

- **Fitzroy, Queensland** (incorporating the Fitzroy River, Nogoa–Mackenzie irrigation area and the towns of Rockhampton and Emerald)—23 gigalitres of entitlements traded (78...
per cent surface water and 76 per cent within the Nogoa–Mackenzie irrigation area), representing 3 per cent of volume of entitlements on issue.

- Hunter, New South Wales (incorporating the Hunter River, city of Newcastle and town of Singleton)—around 20 gigalitres of entitlements traded (66 per cent surface water), representing almost 2 per cent of volume of entitlements on issue.

- Pilbara (incorporating towns of Tom Price, Port Hedland, Karratha and Exmouth)—16 gigalitres of groundwater entitlements traded across three transactions, representing 2 per cent of volume of entitlements on issue.

- Thomson–Macalister, Victoria (incorporating the Thomson and Macalister rivers and town of Sale)—12 gigalitres of surface water entitlements traded, representing 5 per cent of volume of entitlements on issue.

Robust trading price data are only available for a limited number of water systems. Figure 6 presents entitlement price data by reliability for selected water systems. See Appendix A for outline of processes used to calculate entitlement prices.

For water systems where prices were calculated: highest average price paid for entitlements in 2013–14 was $1.939 a megalitre for higher reliability water in the Thomson–Macalister water system in Victoria; average price paid for lower reliability water in the same system was $108 a megalitre. The highest average price for lower reliability water was $1.630 a megalitre in the Hunter water system of New South Wales. In the Murray–Darling Basin, higher reliability entitlements in the Goulburn, Victoria Murray and Lachlan water systems averaged $1.357, $1.362 and $969 a megalitre; lower reliability entitlements averaged $182, $187 and $432 a megalitre.

**Seasonal conditions**

Seasonal conditions are a major influence on supply and demand for water used by irrigators and other users. Use of water allocation markets is also closely linked to changes in water supply and demand. This section provides a brief overview of seasonal conditions across areas with active water markets—focusing on rainfall, temperature and storage levels of key dams.
Areas across Australia with active water markets received below long-term average rainfall and recorded above long-term average temperatures in 2013–14 (Map 2 and Map 3). Large parts of Queensland were drought declared (McVeigh 2014). They received below average rainfall and recorded some of the highest temperatures on record. Northern New South Wales also received below average rainfall, while southern New South Wales and Victoria broadly received average rainfall. While Tasmania received above average rainfall and well above average temperatures. Parts of south-west Western Australia received below average rainfall and recorded well above average temperatures.

Map 2 Australian annual rainfall quartiles, 2013–14

Source: Bureau of Meteorology (2015a)

Map 3 Australian annual mean temperature quartiles, 2013–14

Source: Bureau of Meteorology (2015b)

Changes in volume of water in key storages associated with areas of active water markets also varied in 2013–14 (Figure 7).

Water storage levels in key water storages in 2013–13 varied:
• Dartmouth (flowing into Hume Dam and Murray River)—started at 95 per cent before increasing to a high of 99 per cent in October and then decreasing to 88 per cent in April; ended year at 90 per cent.

• Hume (flowing into Murray River)—started at 69 per cent before increasing to a high of 98 per cent in September and then decreasing to a low of 37 per cent in May; ended year at 47 per cent.

Figure 7 Water levels in selected storages, 2007–08 to 2013–14

Source: Bureau of Meteorology 2015, pers. comm., 11 June

• Lake Dalrymple (major storage in Burdekin water system in Queensland)—started year at 98 per cent before decreasing to 65 per cent in January and then increasing to 104 per cent in April; ended year at 99 per cent.

• Lake Maraboon (major storage in Fitzroy system in Queensland)—started at 75 per cent before decreasing consistently across the year and ending at 50 per cent.

• Thomson Reservoir (major storage in Thomson–Macalister system in Victoria)—started at 74 per cent before increasing to 84 per cent in December and decreasing to end year at 75 per cent.

**Water allocation trade**

Water allocation announcements by water agencies define how much water is available for water access entitlement holders in a given year. The announcements reflect the scarcity (or otherwise) of water in a given year and affect water markets significantly. Water allocation announcements in 2013–14 varied across Australia (as did water storage levels) (Figure 8).
Allocations in the southern Murray–Darling Basin started the year at 52 per cent, increased rapidly between August and September and finished at 81 per cent. Allocations to high reliability entitlements in the Macalister system increased from 60 per cent at the start of the year to full allocations in April, with major increases in early August. Allocations in the Harvey system started the year at 0 per cent, before increasing to 70 per cent in September. Higher reliability entitlements in the Fitzroy and Hunter systems received a 100 per cent allocation from the start of the year.

In 2013–14, 5 554 gigalitres of water allocations were traded across Australia. This was 629 gigalitres (10 per cent) less than in 2012–13 (Figure 9). At time of publication, allocation trade data were unavailable for Tasmania.

New South Wales had the most active allocation market by volume and number of trades (Figure 10), with 3 116 gigalitres traded (56 per cent of the total volume traded) and...
12,467 transactions (48 per cent of transactions). Victoria followed, with 1,832 gigalitres traded (33 per cent of total volume traded) and 11,145 transactions (43 per cent of transactions).

Figure 10 Allocation trade volumes, by jurisdiction and Murray–Darling Basin, 2013–14

The market for interstate water allocations was strong but volume traded was lower. In 2013–14, 962 gigalitres of allocation water was traded interstate (Figure 11), representing 17 per cent of total water allocation trade. Compared with 2012–13, interstate water allocation trade fell by 357 gigalitres or 27 per cent. New South Wales was the largest net exporter of water allocations, followed by Victoria. South Australia was the largest net importer of water allocations. A large proportion of this was environmental water. See environmental trade section of chapter 3 for discussion.

Figure 11 Allocation traded internally and interstate, by jurisdiction, 2013–14

The Murray–Darling Basin accounted for a significant proportion of Australia’s allocation trade (Figure 10). In 2013–14 it accounted for 96 per cent of total water allocation trade, 97 per cent of surface water allocation trade and 88 per cent of groundwater allocation trade. Within the Murray–Darling Basin, 86 per cent of allocation trade occurred in the southern connected system (Figure 12). See chapter 3 for a more detailed discussion.
Figure 12 Allocation trade volumes in Murray–Darling Basin, by water system, 2013–14

Note: Southern Murray–Darling Basin includes surface water trade in New South Wales Murray, Murrumbidgee, Lower Darling, Campaspe, Loddon, Goulburn, Ovens, Bullarook, Broken, Victoria Murray and South Australia Murray water systems. NSW Murray, Murrumbidgee and SA Murray have additional bars in this figure because these are for groundwater trade and are not part of the southern Murray–Darling Basin.

Figure 13 identifies the main water systems outside the Murray–Darling Basin that had significant volumes of water allocation traded in 2013–14. Allocation trade in these water systems included:

- **Fitzroy, Queensland (incorporating Fitzroy River, Nogoa–Mackenzie irrigation area and towns of Emerald and Rockhampton)**—65 gigalitres of allocations traded (97 per cent surface water), with 58 gigalitres (or 88 per cent) traded in the Nogoa–Mackenzie irrigation area.
- **Burnett, Queensland (incorporating Burnett River and towns of Bundaberg, Childers, Gin Gin and Kingaroy)**—38 gigalitres of allocations traded (87 per cent surface water).
- **Barron, Queensland (incorporating Barron and Walsh River and towns of Atherton and Mareeba)**—24 gigalitres of allocations traded (98 per cent surface water).
- **Burdekin, Queensland (incorporating Burdekin River and towns of Ayr and Charters Towers)**—19 gigalitres of allocations traded (79 per cent surface water).
- **Thomson/Macalister, Victoria (incorporating Thomson and Macalister rivers and town of Sale)**—14 gigalitres of surface water allocations traded.
- **Hunter, New South Wales (incorporating Hunter River and towns of Newcastle and Singleton)**—10 gigalitres of surface water allocations traded.
- **Harvey, Western Australia (incorporating Harvey irrigation area)**—6 gigalitres of surface water allocations traded.
Robust trading price data are available for some water systems only. Figure 14 presents allocation price data for selected water systems. See Appendix A for an outline of the processes used to calculate allocation prices.

Allocation prices in the southern connected Murray–Darling Basin averaged $67 a megalitre over 2013–14. This was higher than 2012–13, when prices averaged around $44 a megalitre, but much lower than during the millennium drought.

Outside the Murray–Darling Basin, the highest price for allocation water was in the Werribee system, where it traded at an average $282 a megalitre. Allocation prices were also high in the Thomson–Macalister water system, where they averaged $140 a megalitre. In contrast, allocation prices averaged $23 a megalitre and $15 a megalitre in the Harvey and Hunter water systems. Allocation price for the Hunter water system was one of lowest, but its general security entitlement price was one of the highest.

Note: Southern MDB includes New South Wales Murray, Murrumbidgee, Lower Darling, Campaspe, Loddon, Goulburn, Victoria Murray and South Australia Murray water systems. These are average prices weighted by the volume traded.
Market performance

Since 2007–08, COAG and the Natural Resource Management Ministerial Council have adopted agreed service standards for processing times by state approval authorities for approvals and rejections of entitlement and water allocation trades. The Murray–Darling Basin jurisdictions must report publicly on trade processing times.

Table 3 and Table 4 summarise the performance of jurisdictions against service standards for entitlement trades and allocation trades. ABARES has included published figures from jurisdictions on performance against service standards where possible. If published figures were not available, service standards were calculated using raw trade data. These calculated values do not allow for the use of ‘stop the clock’ provisions when additional information is being sought from applicants (Box 1).

New South Wales, Victoria, Queensland, South Australia and the Australian Capital Territory reported meeting the standards for both approval and registration stages of entitlement trades. Victoria, Queensland and South Australia all improved their performance compared to 2012–13. Tasmania’s performance was significantly below these service standards, at just 9 per cent. This was a marked deterioration from 2012–13, when 41 per cent of entitlement trades were processed within agreed standards.

New South Wales, Victoria, Queensland (supplemented allocation trades only) and South Australia met the standard for both intrastate and interstate allocation trades. Western Australia met the standard for intrastate trade (does not trade interstate). The performance of New South Wales against the standards declined marginally for intrastate trades compared with 2012–13 (99 per cent compared with 100 per cent). However, its interstate allocation trades improved (98 per cent compared with 96 per cent in 2012–13). Victoria’s performance also declined marginally for intrastate trades (97 per cent and 99 per cent); results for interstate trade were steady. Queensland’s performance for unsupplemented intrastate allocation improved from 57 per cent in 2012–13. Data for allocation trades in Tasmania were not available at time of publishing.

Table 3 Water entitlement trade processing times, by jurisdiction, 2013–14

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Unit</th>
<th>Approvals within 20 business days</th>
<th>Registration within 10 business days</th>
</tr>
</thead>
<tbody>
<tr>
<td>COAG service standard</td>
<td>%</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>New South Wales</td>
<td>%</td>
<td>95</td>
<td>96</td>
</tr>
<tr>
<td>Victoria</td>
<td>%</td>
<td>99</td>
<td>100</td>
</tr>
<tr>
<td>Queensland</td>
<td>%</td>
<td>na</td>
<td>96</td>
</tr>
<tr>
<td>South Australia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– River Murray</td>
<td>%</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>– Outside River Murray</td>
<td>ab</td>
<td>%</td>
<td>76</td>
</tr>
<tr>
<td>Western Australia</td>
<td>ab</td>
<td>%</td>
<td>35</td>
</tr>
<tr>
<td>Tasmania</td>
<td>ab</td>
<td>%</td>
<td>9</td>
</tr>
<tr>
<td>Australian Capital Territory</td>
<td>b</td>
<td>%</td>
<td>100</td>
</tr>
</tbody>
</table>

a COAG service standards do not apply. b No published figures available so values calculated from raw data. na Not available.

Sources: DELWP (2015); NSW Office of Water (2015a, 2015b); Queensland Government Department of Natural Resources and Mining 2015, pers. comm., 2 September; South Australian Government Department of Environment, Water and Natural Resources 2015, pers. comm., 9 September; SunWater 2015, pers. comm., 2 September
Table 4 Water allocation trade approval times, by jurisdiction, 2013–14

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Unit</th>
<th>Intrastate within 5 business days&lt;sup&gt;c&lt;/sup&gt;</th>
<th>Interstate within 10 business days&lt;sup&gt;d&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>COAG service standard</td>
<td>%</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>New South Wales</td>
<td>%</td>
<td>99</td>
<td>Vic. and Qld 98</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>SA 98</td>
</tr>
<tr>
<td>Victoria</td>
<td>%</td>
<td>97</td>
<td>NSW 98</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SA 99</td>
</tr>
<tr>
<td>Queensland</td>
<td>%</td>
<td>Unsupplemented 77</td>
<td>NSW 100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Supplemented 96</td>
<td></td>
</tr>
<tr>
<td>South Australia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– River Murray</td>
<td>%</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>– Outside River Murray</td>
<td>%</td>
<td>47</td>
<td>na</td>
</tr>
<tr>
<td>Western Australia</td>
<td>%</td>
<td>100</td>
<td>na</td>
</tr>
<tr>
<td>Tasmania</td>
<td>%</td>
<td>na</td>
<td>na</td>
</tr>
</tbody>
</table>

<sup>a</sup> COAG service standards do not apply.  
<sup>b</sup> No published figures were available so values were calculated from raw data.  
<sup>c</sup> 10 business days for South Australia.  
<sup>d</sup> 20 business days for South Australia.  
na Not available.

Sources: DELWP (2015); NSW Office of Water (2015a, 2015b); Queensland Government Department of Natural Resources and Mining 2015, pers. comm., 2 September; South Australia Government Department of Environment, Water and Natural Resources 2015, pers. comm., 9 September; Sunwater 2015, pers. comm., 2 September

Box 1 ‘Stop-the-clock’ provisions

Under the trade service standards, each Basin state is allowed to ‘stop the clock’ (that is, not count processing time) when a state approval authority requests further information from an applicant. This provision aims to ensure that the service standards focus on what is within the control of approval authorities.

When the stop-the-clock provision is used, it is possible for a Basin state to comply with the service even if the time between the approval authority receiving an application and approving or denying the application is longer than that required by the standard.

The clock can be stopped from time of the request until the information is received by the authority. Within this general rule, Basin states have some discretion whether they apply the stop-the-clock provision, how they apply it and how long they stop the clock.

Under the monitoring and reporting framework agreed by the Council of Australian Governments (COAG), Basin states are not required to keep or provide information on whether they have applied the stop-the-clock provision or the length of time they have stopped it. However, in October 2010, COAG released Water management partnerships: report on performance 2009. The report included a recommendation that the monitoring and reporting requirements include reporting on:

- frequency with which the stop-the-clock provision has been applied and the duration for which it was applied
- policies governing use of the provision and any efforts by Basin states to identify systemic issues that are causing problems in completion of trade applications.
3 Murray–Darling Basin water market activity

The Murray–Darling Basin is the major water trade region in Australia. In 2013–14, it accounted for 65 per cent of the volume of entitlements on issue, 89 per cent of the volume of entitlement trade and 96 per cent of the volume of allocation trade. This chapter examines water entitlement and allocation trade in the Murray–Darling Basin.

Policy and institutional changes

Table 5 summarises significant policy developments, reform initiatives, events and announcements in the Murray–Darling Basin jurisdictions of 2013–14. Some items have implications for catchments outside the Murray–Darling Basin, particularly in those jurisdictions that have water systems both inside and outside the Basin.

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1 July 2013| Victorian Carryover Review Committee reforms commenced. These included a new spill rule for Hume Dam, a 100 per cent limit on carryover, new water storage charges and changes to early reserves.  
The Northern Victoria Resource Manager also announced that the limit on trade, announced on 21 November 2012, would remain in effect. |
| 1 July 2013| South Australia Murray water users began the 2013–14 water year with 100 per cent allocations. This was the third year in a row that full allocations were announced.                                                                                                           |
| 1 July 2013| Opening seasonal determinations for northern Victoria regulated river systems announced. The Murray system high reliability water shares opened at 42 per cent, the Goulburn and Loddon system high reliability water shares at 51 per cent and the Campaspe system at 100 per cent.  
Goulburn–Murray Water announced maximum annual allocations of 100 per cent for Lower Campaspe Valley water supply protection area. |
<p>| 3 July 2013| New South Wales Water Commissioner announced an extension to 30 September 2013 for landholders to register interest in a floodplain harvesting licence in the Namoi and Border rivers regions.                                                                                           |
| 3 July 2013| The Natural Resources Management (Review) Amendment Act 2013 (SA) came into effect. Amendments included establishment of 10-year reviews of regional natural resource management plans and water allocation plans, management of surface water and watercourse water as a single resource and carryover of unused water allocations into a subsequent year. |
| 4 July 2013| Australian and New South Wales governments announced that an agreement had been reached to fund the Nimmie–Caira project; Australian Government provided $180 million to New South Wales to purchase land and water entitlements in the Nimmie–Caira in the Lower Murrumbidgee. |</p>
<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 July 2013</td>
<td>Australian and New South Wales governments commenced delivery of 60 gigalitres of environmental water to the Macquarie Marshes.</td>
</tr>
<tr>
<td>24 July 2013</td>
<td>Victorian Environmental Water Holder announced plans to sell a small amount of available water in the northern Victorian water market.</td>
</tr>
<tr>
<td>25 July 2013</td>
<td>Goulburn–Murray Water announced an annual allocation of 70 per cent for the Kutunga water supply protection area.</td>
</tr>
<tr>
<td>1 August 2013</td>
<td>Australian Government announced delivery of up to 300 gigalitres of environmental water to the River Murray across New South Wales, Victoria</td>
</tr>
<tr>
<td></td>
<td>and South Australia.</td>
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<tr>
<td>September 2013</td>
<td>Australian and Victorian governments delivered almost 48 gigalitres of environmental water to the Loddon, Campaspe and Lower Broken systems.</td>
</tr>
<tr>
<td>6 September 2013</td>
<td>New South Wales Water Commissioner confirmed that allocation trades into the Murrumbidgee Valley had reached their limit and that further</td>
</tr>
<tr>
<td></td>
<td>trades would only be approved against trades of an equivalent or greater volume out of the Murrumbidgee Valley.</td>
</tr>
<tr>
<td>18 September 2013</td>
<td>Goulburn–Murray Water announced maximum annual allocations of 100 per cent in the Loddon Highlands Water Supply Protection Area—except</td>
</tr>
<tr>
<td></td>
<td>the Newlyn Zone, which had an initial allocation of 75 per cent, as well as for the Mid Loddon Groundwater Management Area.</td>
</tr>
<tr>
<td>16 October 2013</td>
<td>Goulburn–Murray Water announced that groundwater allocations in the Newlyn Zone of the Loddon Highlands Water Supply Protection Area would</td>
</tr>
<tr>
<td></td>
<td>reach 100 per cent.</td>
</tr>
<tr>
<td>28 October 2013</td>
<td>Commonwealth Environmental Water Holder approved the delivery of up to 20 gigalitres of environmental water to the Gwydir catchment, with</td>
</tr>
<tr>
<td></td>
<td>15 gigalitres designated for Mehi River and 5 gigalitres for Carole Creek.</td>
</tr>
<tr>
<td>15 November 2013</td>
<td>Goulburn–Murray Water commenced automated online processing of allocation trades and reduced cost of an application for trade submitted</td>
</tr>
<tr>
<td></td>
<td>online from $77.60 to $41.15.</td>
</tr>
<tr>
<td>5 November 2013</td>
<td>New South Wales Water Commissioner announced a further extension to 30 November 2013 for landholders to register interest in a floodplain</td>
</tr>
<tr>
<td></td>
<td>harvesting licence in the Namoi and Border rivers regions.</td>
</tr>
<tr>
<td>22 November 2013</td>
<td>Amendments made to water sharing plan for Murrumbidgee Regulated River Water Source to extend closing dates for general security intra-valley</td>
</tr>
<tr>
<td></td>
<td>trade, inter-valley trade and interstate trade to 31 May.</td>
</tr>
<tr>
<td>2 December 2013</td>
<td>Goulburn–Murray Water called for submissions on proposed changes to management of shallow groundwater resources in Shepparton Irrigation</td>
</tr>
<tr>
<td></td>
<td>Region that would replace water supply protection area with a groundwater management area.</td>
</tr>
<tr>
<td>10 December 2013</td>
<td>Northern Victoria Resource Manager declared risk of spill in Campaspe system was low. Water held in spillable water made was available for use</td>
</tr>
<tr>
<td></td>
<td>or trade.</td>
</tr>
<tr>
<td>Date</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>20 January 2014</td>
<td>Commonwealth Environmental Water Holder announced its first sale of water allocations—10 gigalitres in Gwydir catchment.</td>
</tr>
<tr>
<td>28 January 2014</td>
<td>New South Wales Water Commissioner announced that trade imbalance in the Murrumbidgee Valley had cleared and that trade of allocated water into the Murrumbidgee Valley would recommence through a ballot.</td>
</tr>
<tr>
<td>14 February 2014</td>
<td>South Australian Government advised that, as a result of works at Lake Victoria, flow and river levels between lock 6 and lock 7 on the River Murray would be affected from 21 February.</td>
</tr>
<tr>
<td>11 March 2014</td>
<td>Commonwealth Environmental Water Holder announced that up to 400 megalitres of water allocations were available for sale in the Peel Valley.</td>
</tr>
<tr>
<td>8 April 2014</td>
<td>Irrigators along the Condamine–Balonne water system able to access low-level water harvest resulting from heavy rainfall.</td>
</tr>
<tr>
<td>29 April 2014</td>
<td>Allocation trades out of the Murrumbidgee Valley reached limit and further trade out of the valley suspended.</td>
</tr>
<tr>
<td>1 May 2014</td>
<td>New South Wales Water Commissioner announced that allocation trade from Lake Cawndilla into the Lower Darling would close on 15 May 2014 as a result of the fall in water levels in Menindee Lakes system. Allocation trades would continue to be accepted until then, to a maximum of 10 gigalitres, shared proportionately if applications for trade exceeded this amount.</td>
</tr>
<tr>
<td>8 May 2014</td>
<td>New South Wales water sharing plans, due to expire on 30 June 2014, were extended for 12 months to allow sufficient time to implement changes flagged by the New South Wales Government.</td>
</tr>
<tr>
<td>16 May 2014</td>
<td>Victorian Essential Services Commission released its <em>Coliban water rural price review final decision</em>.</td>
</tr>
<tr>
<td>21 May 2014</td>
<td>Goulburn–Murray Water announced changes to trade and carryover rules for Broken system. Allocation trade out of the system allowed in 2014–15, limited to an undelivered trade-out volume of 1.5 gigalitres, with no trade to occur after 31 March or before 1 July. Customers allowed to carry over a maximum volume equal to 50 per cent of high reliability water shares only.</td>
</tr>
<tr>
<td>29 May 2014</td>
<td>Water Management Amendment Bill 2014 introduced into New South Wales Parliament, to provide security for holders of supplementary water and floodplain harvesting licences.</td>
</tr>
</tbody>
</table>
### Date

- **3 June 2014**: Victorian Government announced dates requests for allocation trades and water share trades must be submitted to guarantee processing by 30 June.
- **30 June 2014**: Australian and New South Wales governments announce that over 250 gigalitres of environmental water was delivered to the lower Murrumbidgee catchment in 2013–14.
- **30 June 2014**: Around 20 gigalitres of entitlement flow available in storage for private carryover in South Australia into 2014–15.

### Entitlements on issue

Total volume of entitlements on issue across the Murray–Darling Basin as at 30 June 2014 was 19,949 gigalitres (Figure 15), comprising 17,379 gigalitres (87 per cent) of surface water and 2,570 gigalitres (13 per cent) of groundwater.

The Murrumbidgee had the highest volume of entitlements on issue at 30 June 2014 of any water system, accounting for 21 per cent of total volume of entitlements on issue. The Murrumbidgee was followed by the New South Wales Murray (14 per cent) and the Goulburn (11 per cent) water systems.

![Figure 15 Entitlements on issue in Murray–Darling Basin, by water system and resource, as at 30 June 2014](image)

Note: Excludes drainage diversion entitlements and area-based licences.

### Water access entitlement trade

Entitlement trade in the Murray–Darling Basin was variable between 2007–08 and 2013–14 (Figure 16). In 2013–14 total volume of trade in entitlements in the Murray–Darling Basin was 2,136 gigalitres, which was 1,095 gigalitres (105 per cent) more than in 2012–13. Around 92 per cent of this trade was in surface water, compared with 77 per cent in 2012–13. Groundwater...
entitlement trade is a small proportion of total trade, but it remains an important water resource.

Figure 16 Entitlement trade volumes in Murray–Darling Basin, by jurisdiction, 2007–08 to 2013–14

Note: Includes water access entitlements (or their jurisdictional equivalents) and non-National Water Initiative entitlements and excludes trade of area-based licences.

Box 2 highlights key features of groundwater entitlement and allocation trade in the Murray–Darling Basin.

Almost half of all trade by volume in the Murray–Darling Basin in 2013–14 was in the Murrumbidgee, which accounted for 1 047 gigalitres (49 per cent) (Figure 17). The Australian Government secured more than one-third of this volume (381 gigalitres) in one transaction of supplementary water. Entitlement trade in the Macquarie water system accounted for a further 19 per cent of total volume of trade in 2013–14.

Figure 17 Entitlement trade volumes for selected water systems in Murray–Darling Basin, by resource, 2013–14

Note: Includes water access entitlements (or their jurisdictional equivalents) and non-National Water Initiative entitlements and excludes trade of area-based licences.
Robust entitlement trading prices by reliability in the Murray–Darling Basin are available for only a select number of water systems (Figure 20). See Appendix A for outline of processes used to calculate prices.

Box 2 Groundwater trade in Murray–Darling Basin

Groundwater in the Murray–Darling Basin (excluding the Great Artesian Basin) is managed under the Murray–Darling Basin Plan. From 2019, it will be subject to sustainable diversion limits, which will strengthen controls on groundwater use and establish a consistent management arrangement across all Murray–Darling Basin groundwater resources (MDBA n.d.). Groundwater trade is prohibited under the Basin Plan unless certain conditions are met.

Across the Murray–Darling Basin, annual average extraction of groundwater is 1 795 gigalitres, of which three-quarters is sourced from a small number of large alluvial aquifers in New South Wales, Queensland and Victoria (MDBA n.d.). This volume represents less than 20 per cent of total water used in the Basin. However, during drier periods, groundwater use increases to average up to one third of total water use (MDBA n.d.).

Groundwater entitlements accounted for almost 13 per cent of volume of entitlements on issue in the Murray–Darling Basin in 2013–14. Two-thirds of those entitlements by volume were located in New South Wales, with 17 per cent in Victoria, 9 per cent in Queensland, almost 7 per cent in South Australia and less than 1 per cent in the Australian Capital Territory.

Trade in groundwater entitlements and allocations has been limited, averaging 5 per cent and 1 per cent of total trade between 2007–08 and 2013–14. Most entitlement and allocation trade in 2013–14 occurred in New South Wales, which accounted for 44 per cent and 85 per cent (Figure 18). This may result from the relatively larger size of groundwater resources in New South Wales and the full unbundling of entitlements. Over half of all groundwater entitlement trades in the Murray–Darling Basin occurred in Murrumbidgee (23 per cent of the volume of Murray–Darling Basin groundwater entitlement trade), Lachlan (18 per cent) and New South Wales Barwon (14 per cent) water systems. These catchments also accounted for three-quarters of groundwater allocation trade in 2013–14 (24 per cent, 29 per cent and 23 per cent respectively).

In 2013–14 prices for groundwater allocations were below those of surface water in the Basin (Figure 19). For example, in the New South Wales Murray water system, the volume weighted average price of groundwater allocations was $13 a megalitre, compared with $67 a megalitre for surface water allocations. The greatest price differential between groundwater and surface water allocations was in NSW Barwon, where groundwater traded on average at $132 a megalitre below surface water. A possible explanation for the price differential between groundwater and surface water is that costs associated with pumping groundwater are incorporated into the price. Pumping costs are estimated to be around $50 a megalitre (Waterfind 2014, pers. comm., 13 August).

continued …
Box 2 Groundwater trade in Murray–Darling Basin continued

The National Water Commission identified several factors limiting groundwater trade. These were:

- limited hydro-geological connectivity of aquifers and limited physical infrastructure linking groundwater areas limit trade to within individual aquifers
- groundwater entitlements in some jurisdictions are yet to be fully unbundled
- provisions relating to groundwater trade are relatively new and markets have not fully developed in response
- uncertainty about definition of individual groundwater management units
- groundwater entitlements continue to be available on application in some areas
- demand is limited in some areas, particularly where surface water is plentiful (NWC 2011).

Physical limitations restricting groundwater trade may be difficult to overcome, but progress towards removing or reducing institutional barriers is ongoing. For example, the Murray–Darling Basin Authority is drafting groundwater trade technical guidelines to assist jurisdictions in developing water resource plans. The guidelines will aim to facilitate groundwater trade where possible, while managing any associated risks and considering potential for third party and environmental impacts.

Note: Lower includes New South Wales general security and Victoria low reliability and higher includes New South Wales higher security and Victoria high reliability.
Water users in the Lower Darling water system paid the most for higher reliability entitlements, at average $1,663 a megalitre, while lower reliability entitlements in the same system traded for $799 a megalitre on average. Highest average price paid for lower reliability entitlements was $1,261 a megalitre, in the New South Wales Barwon water system.

Several factors influenced differences in entitlement prices by reliability across water systems. One was the difference in long-term average volume of water allocated to each entitlement type. However, water flow constraints can also cause price differences. Box 3 examines the effect of the Barmah Choke on Victorian entitlement prices.

**Box 3 Entitlement prices above and below Barmah Choke**

Several constraints affect the flow of water throughout the Murray–Darling Basin catchment (MDBA 2013). A major constraint is the Barmah Choke (on the Murray River between Yarrawonga Weir and Echuca), which has a maximum channel capacity of 10,000 megalitres a day (Map 2).

If the Barmah Choke is at capacity, it can prevent water allocations from being traded downstream though the choke. Water allocation prices in the Murray trading zones below the choke could be higher than those above the choke.

In recent years, the Barmah Choke has not been a binding constraint on trade and water allocation prices have been identical in the trading zones above and below the choke. However, the constraint could be binding in the future so may affect the market value of water entitlements.

Murray water entitlement prices (such as for Victoria Murray high reliability water shares) can be used to test market expectations on the effect of the choke. Reliability of entitlements above and below the choke is identical, so they should be traded at identical prices if the constraint is not expected to be binding in the future. However, if the choke is expected to bind—which would lead to higher allocation prices below the choke at least some of the time—then entitlements below the choke would be more valuable than those above.

Average entitlement prices for Victorian high reliability water shares (above and below the choke) are shown in Table 6. Average premium for entitlements below the choke was around $100 a megalitre in 2013–14. This indicates an expectation that the choke may be a binding constraint on trade in the future.

**Table 6 Summary statistics for Victorian high reliability entitlement trade prices, above and below Barmah Choke, 2013–14**

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Unit</th>
<th>Above choke</th>
<th>Below choke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>$ a ML</td>
<td>1320</td>
<td>1420</td>
</tr>
<tr>
<td>Observations</td>
<td>no.</td>
<td>201</td>
<td>557</td>
</tr>
<tr>
<td>Variance</td>
<td>$ a ML</td>
<td>42 999</td>
<td>20 437</td>
</tr>
</tbody>
</table>
Seasonal conditions


Irrigation farms in the southern and northern Murray–Darling Basin received on average 450 millimetres and 481 millimetres of rainfall in 2013–14 respectively (Figure 21). For the southern Murray–Darling Basin, this was 7 per cent above the long-term average, while for the northern Murray Darling Basin it was 21 per cent below the long-term average.

Volume of water held in key water storages in the Murray–Darling Basin declined in 2013–14 (Figure 22). Total storage volume in 2013–14 was below that of 2012–13. However, it was much higher than the total volumes held during the millennium drought. Volume of water held in storage in July 2013 averaged 16 378 gigalitres or 73 per cent of capacity. From July to September storage levels increased to a high of 18 776 gigalitres (or 83 per cent of capacity) but decreased from October to April to a low of 11 853 gigalitres (or 53 per cent). Water storage had not been this low since early 2010–11. The year ended with water storage in the Murray–Darling Basin at 55 per cent.
Figure 22 Water storage levels in southern and northern Murray–Darling Basin, 2007–08 to 2013–14

Source: ABARES (2013, 2014)

Figure 23 presents the water storage levels for the five major storage dams in the Murray–Darling Basin since 2007–08.

Figure 23 Water storage levels for major storage dams in southern Murray–Darling Basin, 2007–08 to 2013–14

Source: Bureau of Meteorology 2015, pers. comm., 11 June.

Water storage levels in key water storages in 2013–14 varied:

- Dartmouth (flows into Hume Dam and Murray River)—started at 95 per cent before increasing to a high of 99 per cent in October and then decreasing to 88 per cent in April; ended year at 90 per cent.
- Eldon (flows into Goulburn River)—started at 71 per cent before increasing to a high of 95 per cent in October and then decreasing to a low of 68 per cent in May; ended year at 69 per cent.
• Hume (flows into Murray River)—started at 69 per cent before increasing to a high of 98 per cent in September and then decreasing to a low of 37 per cent in May; ended at 47 per cent.

• Blowering (flows into Tumut River and then Murrumbidgee River)—started at 75 per cent before increasing to a high of 91 per cent in October and then decreasing to a low of 48 per cent in April; ended year at 57 per cent.

• Burrinjuck (flows into Murrumbidgee River)—started at 43 per cent before increasing to a high of 66 per cent in October and then decreasing to a low of 45 per cent in February; ended year at 58 per cent.

**Water allocation trade**

Water allocation announcements over 2013–14 varied across the Murray–Darling Basin. Figure 24 illustrates allocation announcements for major water systems by reliability.

**Figure 24 Allocation announcements for selected water systems in Murray–Darling Basin, by reliability, 2013–14**

High security entitlements in the New South Wales Murray water system started the year with 97 per cent allocations and increased to full allocations in October. Allocations for high reliability entitlements in the Goulburn water system started the year with 51 per cent. However, above average rainfall saw allocations increase rapidly, to reach full allocations by early September. The Victoria Murray water system was similar, with high reliability allocations increasing from 42 per cent at the start of the year to 100 per cent by early September. Allocations for general security entitlements in the Murrumbidgee water system started the year at less than 20 per cent, slowly increasing to 63 per cent in April. This compared to an ending allocation of 100 per cent in 2012–13. Allocation for medium priority entitlements in the Condamine water systems started and ended the year at 60 per cent.

In 2013–14, 5 357 gigalitres of water allocations were traded in the Murray–Darling Basin—700 gigalitres or 12 per cent less than in to 2012–13 (Figure 25). New South Wales had most of the volume of allocation trade in the Murray–Darling Basin, with 3 106 gigalitres (or 58 per cent), followed by Victoria (1 815 gigalitres or 34 per cent), South Australia (354 gigalitres or 7 per cent) and Queensland (82 gigalitres or 2 per cent). The Australian Capital Territory had no allocation trades in 2013–14.
Figure 25 Allocation trade volumes in the Murray–Darling Basin, by jurisdiction, 2007–08 to 2013–14

Figure 26 illustrates the volume of allocation trades in the Murray–Darling Basin by origin water system and resource in 2013–14. Figure 27 illustrates the volume of allocation trades and the volume of allocations traded into and out of selected water systems.

Figure 26 Allocation trade volumes for selected water systems, Murray–Darling Basin, by resource, 2013–14
Figure 27 Allocation traded internally and in and out of selected water systems, Murray–Darling Basin, 2013–14

Water systems with the largest allocation trade in 2013–14 were:

- New South Wales Murray—with 901 gigalitres traded internally, 424 gigalitres traded out and 131 gigalitres traded in.
- Murrumbidgee—with 848 gigalitres traded internally, 182 gigalitres traded out and 63 gigalitres traded in.
- Victoria Murray—with 515 gigalitres traded internally, 519 gigalitres traded out and 360 gigalitres traded in.
- Goulburn—with 569 gigalitres traded internally, 161 gigalitres traded out and 221 gigalitres traded in.
- South Australian Murray—with 250 gigalitres traded internally; 104 gigalitres traded out and 642 gigalitres traded in (most allocation traded in was environmental water originating from the New South Wales Murray and Victoria Murray water systems).

In 2013–14, most inter-system allocation trade in the Murray–Darling Basin occurred among the New South Wales Murray, Victoria Murray and South Australia Murray water systems (Map 6). In total, 646 gigalitres of water allocation was traded among these water systems, accounting for 69 per cent of total trade among water systems. Most allocations were traded into the South Australia Murray water system. Box 4 examines net importing and exporting water systems in the southern Murray–Darling Basin for non-environmental water.
Box 4 Non-environmental water allocation trade in southern Murray–Darling Basin

Water allocation trade in the southern Murray–Darling Basin consists of environmental transfers and non-environment trade. Figure 28 shows the volume of non-environmental allocation water trade in and out of water systems, and Map 5 shows which water systems are net importers/exporters. The Victoria Murray water system was the largest net importer, trading 620 gigalitres in and 476 gigalitres out. The Lower Darling water system was also a net importer, trading 75 gigalitres in and 9 gigalitres out. The New South Wales Murray water system was the largest net exporter, trading 251 gigalitres in and 381 gigalitres out.

**Figure 28 Non-environmental allocation trade in and out of water systems, 2013–14**

Note: These statistics are sourced from the Murray–Darling Basin Authority as part of their river flow management responsibility, resulting in some discrepancies in the statistics for trade between water systems compared with data from the Bureau of Meteorology.

Source: Murray–Darling Basin Authority, pers. comm. 26 June

**Map 5 Non-environmental water allocation trade flows, by water system, 2013–14**

Note: These statistics come from the Murray–Darling Basin Authority as part of their river flow management responsibility, resulting in some discrepancies compared with data from the Bureau of Meteorology.

Source: Murray–Darling Basin Authority, pers. comm. 26 June

Total water allocation trade among water systems shows that the SA Murray water system was a net exporter and the Victoria Murray a net importer.
These trades included all environmental transfers (including under the Living Murray Initiative) and non-environmental trades but excluded allocation trades in irrigation areas (like Murrumbidgee Irrigation). The South Australian Murray and Lower Darling were the main net importers of water allocations, with 538 gigalitres and 96 gigalitres respectively. The New South Wales Murray, Victoria Murray and Murrumbidgee were the main net exporters of water allocation, with 379 gigalitres, 188 gigalitres and 121 gigalitres respectively. See the environmental section for discussion of net environmental water allocation transfers by water systems. See Box 4 for discussion of net non-environmental trades by water systems.

Allocation trading prices in the Murray–Darling Basin are available for only a select number of water systems (Figure 29). See Appendix A for processes used to calculate allocation prices.

Allocation prices in the Macquarie and New South Wales Barwon water systems were significantly higher than elsewhere in the Murray–Darling Basin, trading at an average price of
$191 a megalitre and $179 a megalitre respectively. Allocation prices increased markedly in both systems during the summer months of 2013–14, which may have been a result of drier than average conditions and limited trade with other regions.

Box 5 explores water allocation trade in the southern Murray–Darling Basin since 2007–08. Allocation prices across water systems in the southern Murray–Darling Basin averaged $67 a megalitre. Over 2013–14 allocation prices in the southern Murray–Darling Basin increased from $38 a megalitre in July to $86 a megalitre in January 2014, declining to $50 a megalitre in May and ending the year at $51 a megalitre in June (Figure 30).

Figure 30 Price and volume of allocation traded, southern Murray–Darling Basin, 2013–14

Note: These statistics exclude zero dollar transaction and outliers, so volume presented is less than actual volume traded over 2013–14.
Box 5 Southern Murray–Darling Basin water allocation market, 2007–08 to 2014–15

Water allocation prices are subject to significant measurement error (including non-reported prices and other outliers), but it is possible to calculate relatively accurate estimates of market prices for allocations in the southern Murray–Darling Basin.

Figure 31 shows reported prices for allocation trades in the southern Murray–Darling Basin between 2007–08 and 2013–14 and a fitted regression line. Price differences between regions in the southern Murray–Darling Basin can emerge as a result of trade constraints, but prices were similar across the major southern Murray–Darling Basin water systems between 2007–08 and 2013–14.

Figure 31 Water allocation prices, 2007–08 to 2013–14

Changes in water allocation prices are primarily driven by changes in water supply. Figure 32 shows total water allocations and storage volumes. The presented water allocations are for the regulated surface water entitlements in the Broken, Campaspe, Loddon, Lower Darling, Murrumbidgee, New South Wales Murray, South Australia Murray and Victoria Murray water systems. Storage levels are total volumes held in Blowering, Burrinjuck, Dartmouth, Eildon, Hume, Lake Victoria, Menindee Lakes, Waranga Basin and Yarrawonga and Goulburn Weirs.

Figure 32 Total water allocations and storage volumes, southern Murray–Darling Basin, 2007–08 to 2013–14

Source: Bureau of Meteorology 2015, pers. comm., 11 June
Box 5 Southern Murray–Darling Basin water allocation market, 2007–08 to 2014–15
continued

Allocation prices rose to unprecedented highs during the peak of the millennium drought (from 2006–07 to 2008–09), before decreasing during the subsequent flood years of 2010–11 and 2011–12. Lower allocation levels led to slightly higher allocation prices during 2013–14.

Figure 33 plots water allocations against market prices in December, from 2007 to 2014. It shows the clear negative correlation between annual allocation levels and market prices in the southern Murray–Darling Basin.

Figure 33 Water allocation rates and allocation prices, southern Murray–Darling Basin, December, 2007 to 2014

Annual supply of water in the southern Murray–Darling Basin is the sum of current allocations and carryover volumes from previous years. Figure 34 shows annual carryover volumes (volumes carried over from the previous year) in the southern Murray–Darling Basin by jurisdiction. Statistics include carryover volumes in the Murrumbidgee, New South Wales Murray, Goulburn, Victoria Murray and the South Australia Murray.

Figure 34 Southern Murray–Darling Basin annual carry-over volumes, by region, 2007–08 to 2014–15

Note: Total carryover includes spillable water account volumes in the Goulburn and VIC Murray net of deductions due to spills. CEWO Commonwealth Environmental Water Office.
continued...
Box 5 Southern Murray–Darling Basin water allocation market, 2007–08 to 2014–15 continued

Carryover volumes increased significantly, driven by increases in water supply and relaxation of restrictions on carryover—in particular in northern Victoria. New carryover rules introduced in northern Victoria in 2010–11 were associated with large increases in irrigator carryover volumes (Figure 341). See Hughes et al. (2013) for more on carryover rule changes.

Carryover volumes held in the southern Murray–Darling Basin by the Commonwealth Environmental Water Office remained a small proportion of the 2013–14 total, at 169 gigalitres or 14 per cent.

Figure 35 shows annual carryover volumes against total allocations for the southern Murray–Darling Basin. It also shows annual carryover as a proportion of the previous year’s total availability (final season allocation plus previous year’s carryover). Around a third of all water allocations available during 2010–11 and 2011–12 were carried over by entitlement holders.

Figure 35 Southern Murray–Darling Basin annual carry-over volumes and allocations, 2007–08 to 2014–15


Environmental water

COAG approved the Intergovernmental Agreement on Addressing Water Overallocation and Achieving Environmental Objectives in the Murray–Darling Basin in June 2004. The agreement included a budget of $500 million to return 500 gigalitres of water to the Murray River by 2009 under the Living Murray Initiative.

Since then, the Australian, New South Wales, Victorian and South Australian governments have secured water for the environment through various programmes. The five key government agencies managing environmental water in the Murray–Darling Basin are:

- Commonwealth Environmental Water Office
- Murray–Darling Basin Authority
- New South Wales Office of Environment and Heritage
- Victorian Environmental Water Holder
- South Australian Department of Environment, Water and Natural Resources.
This section examines environmental water held, changes in volume of environmental water and volume of environmental water transferred within and among water systems in the Murray–Darling Basin. Long-term average annual yield of environmental water entitlements has been included where possible.

**Water managed**

Figure 36 shows total volume of environmental water entitlements managed by key government agencies at 30 June 2014. This represents most but not all water entitlements held for the environment. Full details of water entitlements for the environment can be found in the Murray–Darling Basin Authority’s forthcoming Water Audit Monitoring Report.

![Figure 36 Environmental water managed, by key government agency, as at 30 June 2014](image)


The Commonwealth Environmental Water Office managed 2 126 gigalitres of entitlements of varying reliability (1 454 gigalitres long-term average annual yield) across all Murray–Darling Basin states as at 30 June 2014 (Figure 37). Most environmental water was held in New South Wales (64 per cent of volume of entitlements), followed by Victoria (26 per cent), South Australia (6 per cent) and Queensland (5 per cent).
Figure 37 Commonwealth Environmental Water Office managed entitlement holdings, by jurisdiction and reliability, as at 30 June 2014

Supp. Supplementary. Note: Unregulated includes Queensland unsupplemented entitlements.
Source: Department of the Environment (2014)

Around 888 gigalitres (540 gigalitres long-term average annual yield) or 42 per cent of entitlements managed were lower reliability; 327 gigalitres and 208 gigalitres were held in the New South Wales Murray and Murrumbidgee water systems. Higher reliability entitlements accounted for 639 gigalitres (601 gigalitres long-term average annual yield) or 30 per cent of entitlements held; 265 gigalitres (252 gigalitres long-term average annual yield) were held in the Victorian Murray and 222 gigalitres (211 gigalitres long-term average annual yield) in the Goulburn water systems. Supplementary entitlements accounted for 427 gigalitres (181 gigalitres long-term average annual yield) or 20 per cent of entitlements; 381 gigalitres (173 gigalitres long-term average annual yield) were held in the Murrumbidgee.

New South Wales Office of Environment and Heritage managed 743 gigalitres of entitlements as at 30 June 2014 (Figure 38). Around 557 gigalitres or 75 per cent of these entitlements were part of the Living Murray Initiative. Supplementary entitlements accounted for 511 gigalitres or 69 per cent of the total volume of entitlements held. Most of these supplementary entitlements were held in the Lower Darling (250 gigalitres or 49 per cent) and New South Wales Murray (130 gigalitres or 27 per cent) water systems. High security entitlements accounted for 193 gigalitres or 26 per cent of the total volume of entitlements held. The Murrumbidgee, New South Wales Murray and Lower Darling water systems accounted for 77 gigalitres, 65 gigalitres and 48 gigalitres of high security entitlements respectively.
The Victorian Environmental Water Holder managed 682 gigalitres of entitlements as at 30 June 2014 (Figure 39). Around 348 gigalitres or 51 per cent of these were part of the Living Murray Initiative. Low reliability entitlements accounted for 326 gigalitres or 48 per cent of the total volume of entitlements held, with 183 gigalitres and 133 gigalitres held in the Goulburn and Victoria Murray water systems. High reliability entitlements accounted for 232 gigalitres or 34 per cent of the total volume of entitlement held, with 130 gigalitres and 78 gigalitres held in the Victoria Murray and Goulburn water systems.

The Murray–Darling Basin Authority managed 50 gigalitres of entitlements as at 30 June 2014; all were part of the Living Murray Initiative. Water systems in New South Wales accounted for 25 gigalitres (all general security), while water systems in Victoria and South Australia accounted for 18 gigalitres (all high reliability) and 7 gigalitres (all high reliability) respectively.

Note: Other entitlements gained through infrastructure projects, such as the Northern Victorian Irrigation Renewal Project. Source: VEWH (2014)
The South Australian Department of Environment, Water and Natural Resources managed 45 gigalitres of entitlements as at 30 June 2014; all were in the South Australia Murray water system, with 38 gigalitres part of the Living Murray Initiative.

**Entitlements secured**

In 2013–14, the Australian and New South Wales governments secured additional water entitlements for the environment.

The Australian Government secured 523 gigalitres of water entitlements (Figure 40), of which 456 gigalitres (or 87 per cent of the volume secured) was generated from water savings recovered from infrastructure projects. Water purchases accounted for 26 gigalitres or 5 per cent of the volume secured.

**Figure 40 Environmental water secured by the Australian Government, by source, 2007–08 to 2013–14**

Note: Water secured volumes are received, estimated or agreed in signed contracts. Until contracts have been exchanged, these figures may be subject to change.

Source: Department of Agriculture and Water Resource 2015, pers. comm., 23 October

Since 2007–08 the Australian Government has shifted its main method of securing water entitlements for the environment from purchase to infrastructure. Supplementary entitlements accounted for the highest volume of water entitlements secured, at 381 gigalitres or 73 per cent of secured entitlements (Figure 41). These were exclusively acquired through infrastructure investments.
Water entitlements were mostly purchased in the Murrumbidgee (12 gigalitres general security), Queensland Lower Balonne (10 gigalitres overland flow), Australian Capital Territory Murrumbidgee (9 gigalitres) and New South Wales Murray (3 gigalitres high security and 0.6 gigalitres general security) (Figure 42).

In 2013–14, the New South Wales Office of Environment and Heritage secured an additional 18 gigalitres for the environment (Figure 43). Most of these entitlements were secured in the Lachlan water system, with 12 gigalitres of general security and almost 1 gigalitre of high security entitlements secured. Water entitlements were also secured in the Gwydir (4 gigalitres) and Murrumbidgee (1 gigalitre) water systems.
Environmental water allocation transfers

Government agencies managing water entitlements transfer water allocated to their entitlements within and among water systems to achieve environmental objectives. These transfers of environmental water account for a significant proportion of total water moved throughout the southern connected Murray–Darling Basin.

In 2013–14, 1 623 gigalitres of water allocations were transferred for the environment in the southern connected Murray–Darling Basin. This represented 47 per cent of total water allocation trade (Figure 46). The share of environmental transfers varies among water systems. For larger water systems the Victoria Murray, New South Wales Murray and Murrumbidgee, environmental transfers accounted for 51 per cent, 55 per cent and 36 per cent respectively. For smaller water systems the Lower Darling and Loddon, they accounted for 74 per cent and 4 per cent respectively. These include transfers under the Living Murray Initiative (by New South Wales Office of Environment and Heritage, Victorian Environmental Water Holder and others) and by the Commonwealth Environmental Water Holder. Box 6 summarises Commonwealth Environmental Water Holder environmental water allocation transfers.
Box 6 Commonwealth Environmental Water Holder transfers

In 2013–14 the Commonwealth Environmental Water Holder (CEWH) transferred environmental water allocation to achieve its environmental objectives. The CEWH transferred a total of 947 gigalitres in the Murray–Darling Basin. These included allocation transfers to and from delivery partners, between Australian Government accounts and sales to users in the Gwydir (10 gigalitres) and Peel (340 megalitres) water systems, and excluded water allocation transfers from users to the Australian Government. Around 770 gigalitres or 81 per cent of the volume of these allocation transfers were made within water systems (Figure 44). Major systems that had internal environmental water allocation transfers were the Goulburn (218 gigalitres), Murrumbidgee (152 gigalitres), New South Wales Murray (123 gigalitres), Victoria Murray (114 gigalitres) and South Australia Murray (107 gigalitres).

Figure 44 Environmental water allocation transfers by the Commonwealth Environmental Water Holder, by water system, 2013–14

Source: Department of the Environment 2015, pers. comm., 20 May

The CEWH transferred almost 177 gigalitres of environmental water allocations between water systems. The water system that had the highest volume of allocation water transferred out was the New South Wales Murray, with 136 gigalitres or 77 per cent of the total. Other water systems that had allocation water transferred out were the Victoria Murray (37 gigalitres) and Murrumbidgee (4 gigalitres). The South Australia Murray water system had the highest volume of allocation water transferred in, with 98 gigalitres or 55 per cent of the total. Other major water systems that had transfers in were the Lower Darling (47 gigalitres), Victoria Murray (21 gigalitres), Goulburn (6 gigalitres) and New South Wales Murray (4 gigalitres).

Map 7 summarises the net environmental water allocation transfers by the CEWH by water system. The two main net importing water systems of environmental water allocation transfers by the CEWH were South Australia Murray (with 98 gigalitres) and Lower Darling (47 gigalitres). This was a result of CEWH decisions made to achieve environmental watering objectives in these water systems. The main net exporting water systems of environmental water allocations by the CEWH were New South Wales Murray (132 gigalitres) and Victoria Murray (16 gigalitres).

Volume of environmental water allocations transferred by the CEWH and its share of total allocation varied throughout the year (Figure 43). In 2013–14, these environmental water allocation transfers accounted for 19 per cent of total allocation trades in the southern Murray–Darling Basin. This varied monthly between 0 gigalitres of water allocations in February to 291 gigalitres, or 44 per cent of total allocation trade, in October. continued ...
Box 6 Commonwealth Environmental Water Holder transfers continued

Map 7 Net environmental water transfers by the Commonwealth Environmental Water Holder, 2013–14

Source: Department of the Environment 2015, pers. comm., 20 May

Figure 45 Commonwealth Environmental Water Holder transfers in Murray–Darling Basin, by month, 2013–14

Note: Months are taken as the month allocation transfers were registered with relevant state authorities, which is different from the date indicated by the CEWH in the relevant table to the spreadsheet.

Source: Department of the Environment 2015, pers. comm., 20 May
The water system with the highest volume of environmental water allocations transferred in was South Australia Murray, with 755 gigalitres (Figure 47); however, a large volume of water was also transferred out (152 gigalitres). The water system with the largest volume of environmental water allocations transferred out was Victoria Murray (506 gigalitres); however, 175 gigalitres was transferred in. Other major systems that had large volumes of environmental water allocations transferred were the Goulburn and New South Wales Murray water systems.
Environmental Water Holder and Victorian Environmental Water Holder, New South Wales Office of Environment and Heritage and South Australian Department of Environment, Water and Natural Resources (as part and outside of the Living Murray Initiative). It also includes in-stream credits between the Goulburn and Victorian Murray systems. It shows the South Australian Murray water system was the main net importer of water allocations, with 603 gigalitres. The Goulburn, New South Wales Murray and Murrumbidgee water systems were the main net exporters with 329 gigalitres, 249 gigalitres and 56 gigalitres respectively.

Map 8 Net environmental water allocation transfers, by water system, 2013–14

Note: Includes Victorian in-stream credits between the Victoria Murray and Goulburn water systems. These statistics are sourced from the Murray–Darling Basin Authority as part of their river flow management responsibility, resulting in some discrepancies compared with data from the Bureau of Meteorology.

Source: Murray–Darling Basin Authority 2015, pers. comm., 26 June
Appendix A: Explanatory notes

The National Water Commission produced the Australian water markets report 2007–08 (NWC 2008), the first water markets report. ABARES has used the NWC’s reporting conventions wherever possible to produce the Australian water markets report 2013–14. It retained the minor changes introduced in the 2011–12 report to better reflect trade data. The 2007–08 explanatory notes are repeated to provide clarity, with amendments where necessary.

The Australian water markets report series seeks to inform market participants and others about activity in Australia’s water markets by documenting trading products, trading activity, prices and any relevant changes in governance arrangements.

Reporting period and scope

This report provides data for the 2013–14 water year (from 1 July 2013 to 30 June 2014). It also provides historical information from 2007–08 to 2013–14 and information on events that influenced markets up until the end of June 2014.

The report is not intended to be a contemporary guide to inform market participants on their day-to-day water trading decisions. It highlights trends and market activity over the year. This information is intended to inform direct market participants, regulators, policymakers and other indirect market participants.

The Australian water market consists of several separate markets of varying size, activity and connectivity, and each state and territory has water resources with tradable products. The report is structured as a review of the major water markets, particularly in the Murray–Darling Basin.

The report focuses on the market institution so it does not contain statistics on volumes of water used by various sectors, efficiency of water use or economic value of different water uses.

Surface water is the main water source for trading activity in Australia, and is the main focus of this series. Groundwater trading occurs in certain areas of Australia and is reported where data are available. Other human-made water sources (such as desalination and recycling) may be included in Australia’s water markets in future years.

Water market terminology

Australian jurisdictions have adopted various terms to describe statutory water rights and dealings. Different terms may be used for the same market product or dealing. This report uses these National Water Initiative definitions:

- water access entitlement—‘a perpetual or ongoing entitlement to exclusive access to a share of water from a specified consumptive pool as defined in the relevant water plan’
- water allocation—‘the specific volume of water allocated to water access entitlements in a given season, defined according to rules established in the relevant water plan’ (NWC 2004).

Many jurisdictions have more than one type of water access entitlement (Table A1). The main difference between entitlement types is frequency of water being supplied in full (known as its reliability). Typically, water is allocated to higher reliability water access entitlements before lower reliability entitlements during periods of scarcity.
Table A1 Types of water access entitlements, by jurisdiction

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Types of water access entitlement</th>
</tr>
</thead>
<tbody>
<tr>
<td>New South Wales</td>
<td>Conveyance, general security, high security, local water utility, major utility, stock and domestic, supplementary and supplementary water (Lowbidgee)</td>
</tr>
<tr>
<td>Victoria</td>
<td>High reliability, low reliability, spill and Wimmera–Mallee pipeline</td>
</tr>
<tr>
<td>Queensland</td>
<td>High-A priority, high-A1 priority, high-A2 priority, high class A, high class B, high class C, high priority, medium-A priority, medium-A1 priority, medium-A2 priority, medium-A3 priority, medium priority, risk-A priority, risk-B priority and risk priority</td>
</tr>
<tr>
<td>South Australia</td>
<td>Class 1 (stock, domestic and stock and domestic purposes), class 2 (urban water use), class 3a (irrigation excluding Qualco Sunlands Groundwater Control area), class 3b (irrigation in Qualco Sunlands Groundwater Control area), class 4 (recreation), class 5 (industrial and industrial dairy), class 7 (environment) and class 9 (wetlands)</td>
</tr>
<tr>
<td>Tasmania</td>
<td>Surety 1, surety 3, surety 5, surety 6, surety 7 and surety 8</td>
</tr>
<tr>
<td>Northern Territory</td>
<td>High, low and medium</td>
</tr>
</tbody>
</table>

**Reporting conventions**

ABARES has used several conventions to capture and set out market information in this report.

**Definitions of water trades**

A water trade is defined as one of these transactions:

- a transfer of an entitlement from one legal entity to another, with or without a change in location
  - transfers made as part of land sales are included in the report as water trades
  - transfers of ownership between related parties, often involving zero consideration, are included in the trade data and not reported separately because existing water registers cannot single out such trades
  - transfers accompanied by a change in location from one water source, delivery system or trading zone to another are included in the report and, where possible, identified separately from ‘internal transfers’ made within a trading zone or water source
  - dealings that vary the location of an entitlement without an accompanying transfer of ownership are not included in the report

- an assignment (or trade) of water allocation from one authorised water user to another, or between water accounts held by the same water user, with or without a change in location
  - movement of water between accounts held by the same legal entity arguably should not be counted as a water trade, but registers and information systems maintained by states and territories typically do not identify such dealings separately from transactions between two independent parties
  - water allocation assignments within a trading zone or water source are reported separately from assignments out of and into a zone or water source.

**Trading volume, activity and net change**

Three measures of market activity are defined and reported. First, total volume of entitlement transfers or water allocation trades for a particular jurisdiction, zone or water source is calculated to equal the total volume (in megalitres) of trades within the jurisdiction, zone or water source plus the volume of outbound trades. The volume of trade is overestimated if both
inbound and outbound trades were counted because an outbound trade from one jurisdiction, zone or water source is an inbound trade to another.

Second, the trading intensity experienced in a particular trading zone or water source is measured in relative terms and is defined as the total volume of trades in, out and within a zone, divided by the total nominal volume of entitlement in that zone for water access entitlement trades (or the allocation volume at 30 June 2014 in that zone for water allocation trades).

A relative measure is used to ensure that trading activity in different zones can be compared equally and that differences in activity resulting from differing volumes of issued entitlement in each zone are controlled for. Trading activity is measured and mapped separately for entitlement transfers and water allocation trades.

Third, the net change in entitlement volume or water allocation holdings for a particular trading zone, water source or jurisdiction is calculated as the difference between inbound trades and outbound trades (in megalitres). This statistic is mapped for each major water system.

**Price information**

Availability and quality of price information for trades of entitlements and water allocations varies depending on depth of the particular market and reliability of available data. Prices for entitlements are generally more variable because the volume of trades in entitlements compared to trades in water allocation is small. In 2013–14 most jurisdictions did not have a statutory requirement for buyers and sellers to disclose prices, and no jurisdiction had a mechanism to verify the price data provided. However, from 1 July 2014, the Murray–Darling Basin Plan 2012 water trading rules requires that prices be disclosed.

Allocation transfers within the one entity, either by irrigators or by environmental water holders or users, occur as a zero dollar trade. For example, an irrigator operates two geographically separated properties, each with its own water access entitlement and water allocation. The irrigator may wish to transfer a water allocation from one property to another. In such cases, the irrigator would not charge for the transfers and the transfer would be registered with the government water agency as a zero dollar trade.

Where ABARES acquired price data from state and territory water registers, it cleansed the data to remove zero prices and outliers that were unlikely to be genuine. Price data for 2013–14 were cleansed by:

1. removing transactions involving water entitlements where the price was reported to be below $10 a megalitre or above $10 000 a megalitre
2. removing transactions involving water allocations where the price was reported to be zero or above $10 000 a megalitre
3. removing transactions with prices outside two standard deviations from the average price over the year.

Where private water brokers provided data, ABARES assumed the data were correct and did not do additional cleansing. If ABARES took a different approach to any price datasets, it made this clear in the relevant jurisdictional summary. It has reported a standard deviation to indicate the amount of price variation around the mean (or average) price.

This process is different from that used before 2010–11, when water allocation transactions at prices below $10 a megalitre were removed. In many areas prices below $10 a megalitre were common in 2010–11, 2011–12 and 2012–13.
Information sources

Water markets differ in each jurisdiction. Each state or territory has at least one department or agency that facilitates operation of its water market. Each jurisdiction also has a statutory register to record entitlement transfers and other dealings.

For the 2007–08 report, jurisdictions provided data to the National Water Commission on a voluntary basis. However, the Bureau of Meteorology assisted in collecting data for the 2008–09 to 2013–14 reports. The Bureau of Meteorology collects and manages Australia’s water information under the Water Act 2007.

Section 126 of the Act provides for the making of regulations to support those functions. The Water Regulations 2008 (Cwlth) include schedules for the delivery of various categories of water data to the Bureau of Meteorology. Category 6 of the Regulations covers entitlements, water allocations and trading data and specifies the delivery schedule for the data in that category.

Schedule 2 to the Water Regulations lists those who are compelled to provide category 6 data to the Bureau of Meteorology. ABARES is grateful to the Bureau of Meteorology for collecting and making these data available.

ABARES collected data from various other sources not covered by the Regulations. It made every effort to use data collected by the Bureau of Meteorology effectively to avoid any unnecessary reporting burden on government agencies and other water organisations.
## Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bundled right</td>
<td>Aggregation of individual rights into a single right. May include land property title, water access entitlement, water allocations, water use rights, delivery rights, irrigation rights and works approvals.</td>
</tr>
<tr>
<td>Carryover</td>
<td>Option to hold in storage a portion of unused seasonal allocation for use at a later date.</td>
</tr>
<tr>
<td>Entitlements on issue</td>
<td>Represents the total quantity of water access entitlements granted by state and territory government agencies which are in effect at a given point of time.</td>
</tr>
<tr>
<td>Gigalitres (GL)</td>
<td>One billion litres.</td>
</tr>
<tr>
<td>Groundwater</td>
<td>Water occurring naturally below ground level (whether in an aquifer or otherwise) or water occurring at a place below ground that has been pumped, diverted or released to that place for the purpose of being stored there but does not include water held in underground tanks, pipes or other works.</td>
</tr>
<tr>
<td>Internal trade</td>
<td>Transaction to transfer a water right from one legal entity to another within a specified area. Area can be a trading zone, an irrigation district or a water resource plan area as defined in respective state and territory legislation.</td>
</tr>
<tr>
<td>Interstate trade</td>
<td>Transaction to transfer a water right from one legal entity to another between different states or territories.</td>
</tr>
<tr>
<td>Intrastate trade</td>
<td>Transaction to transfer a water right from one legal entity to another within the same state or territory.</td>
</tr>
<tr>
<td>Irrigation infrastructure operator</td>
<td>An entity that operates water service infrastructure delivering water for the primary purpose of being used for irrigation. For example, Murrumbidgee Irrigation Limited in New South Wales and Goulburn-Murray Water in Victoria.</td>
</tr>
<tr>
<td>Megalitres (ML)</td>
<td>One million litres.</td>
</tr>
<tr>
<td>Millennium drought</td>
<td>Major drought between 2002-03 and 2009-10 affecting south-eastern Australia.</td>
</tr>
<tr>
<td>National Water Initiative (NWI)</td>
<td>Intergovernmental Agreement on a National Water Initiative between the Commonwealth of Australia and the Governments of New South Wales, Victoria, Queensland, South Australia, Western Australia, Tasmania, the Australian Capital Territory and the Northern Territory (as amended from time to time).</td>
</tr>
<tr>
<td>Regulated water resource</td>
<td>A water resource for which flows are controlled through use of infrastructure to store and release water.</td>
</tr>
<tr>
<td>Reliability</td>
<td>The frequency with which water allocated under a water access entitlement is supplied in full. Some jurisdictions use terms ‘high security’ and ‘general security’.</td>
</tr>
<tr>
<td>Southern Murray-Darling Basin</td>
<td>Comprising the New South Wales Murray, Murrumbidgee, Lower Darling, Campaspe, Loddon, Goulburn, Ovens, Bullarook, Broken, Victoria Murray and South Australia Murray water systems where water allocation trade among these water systems is allowed.</td>
</tr>
<tr>
<td>Supplementary water</td>
<td>New South Wales water access entitlement allowing holders to extract water during announced periods when flows exceed those required to meet other obligations or environmental needs.</td>
</tr>
<tr>
<td>Surface water</td>
<td>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 under ground.</td>
</tr>
<tr>
<td>Unregulated water resource</td>
<td>Water resource not controlled through use of infrastructure to store and release water.</td>
</tr>
<tr>
<td>Water access entitlement</td>
<td>Perpetual or ongoing entitlement to exclusive access to a share of water from a specified consumptive pool as defined in the relevant water plan.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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</tr>
<tr>
<td>Water allocation</td>
<td>Specific volume of water allocated to water access entitlements in a given season, defined according to rules established in relevant water plan.</td>
</tr>
<tr>
<td>Water allocation trade</td>
<td>Transaction to transfer a water allocation from one legal entity to another, with or without a change in location, for the remaining water year (by default) or for a specified term that may be less than the end of the water year or carried over to subsequent years.</td>
</tr>
<tr>
<td>Water resource type</td>
<td>Describes the attributes of a water resource—for example, surface or groundwater; regulated or unregulated water.</td>
</tr>
<tr>
<td>Water system</td>
<td>System that is hydrologically connected and described at the level desired for management purposes—for example, a subcatchment, catchment, basin or drainage division and/or groundwater management unit, sub-aquifer, aquifer or groundwater basin.</td>
</tr>
<tr>
<td>Water tagging</td>
<td>An accounting approach that allows a traded water access entitlement to retain its original characteristics when traded to a new jurisdiction and/or trading zone rather than be converted into a form issued in the new jurisdiction and/or trading zone.</td>
</tr>
</tbody>
</table>
References

Unless otherwise indicated, ABARES publications listed here are available at agriculture.gov.au/abares/publications.


