

Water entitlement market prices

Murray–Darling Basin

(November 2016)

Prepared for Australian Government Department of Agriculture and Water Resources

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Introduction

This November 2016 monthly water entitlement market prices report has been prepared by Marsden Jacob Associates (Marsden Jacob) for the Australian Government Department of Agriculture and Water Resources.

A water access entitlement is 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.

The report includes:

- southern Murray–Darling Basin (MDB) market activity and price information, by region and entitlement type
- northern MDB market activity and price information, by region and entitlement type
- a list of catchments and water sources
- a list of data outliers removed from the trade data

Regions, entitlements and key statistics

The entitlement price report is broadly split into the southern and the northern MDB, as detailed in Table 1 and Table 2. Interactive maps showing the location of these trading regions are available on the Murray–Darling Basin Authority's website.

The water sources included in each of the regions are listed in Appendix A.

Table 1: Regions and entitlement types, southern MDB

Region	Entitlement type
SA Murray	Class 3a
Vic. Murray above Barmah Choke	High reliability
Vic. Murray above Barmah Choke	Low reliability
Vic. Murray below Barmah Choke	High reliability
Vic. Murray below Barmah Choke	Low reliability
Goulburn	High reliability
Goulburn	Low reliability
Campaspe	High reliability
Loddon	High reliability
NSW Murray	General security
NSW Murray	High security
NSW Murray Irrigation Limited	General security
Murrumbidgee	General security
Murrumbidgee	High security
Lower Darling	General security
Lower Darling	High security

Table 2: Regions and entitlement types, northern MDB

Region	Entitlement type
Macquarie	General security
Namoi	General security
Gwydir	General security
NSW Border Rivers	General security
Barwon–Darling	Unregulated
Lachlan	General security
Condamine–Balonne (St George)	Supplemented
Condamine–Balonne (Upper Condamine and Lower Balonne)	Unsupplemented
Central Condamine Alluvium Groundwater (1, 2, 3 and 4)	Groundwater (sub areas 1, 2, 3 and 4)
Upper Condamine Alluvium Groundwater (Dalrymple Creek)	Groundwater
Upper Condamine Alluvium Groundwater (Oakey Creek)	Groundwater
Qld Border Rivers	Supplemented
Qld Border Rivers	Unsupplemented
Lower Balonne	Overland flow

As requested by the department, for each of the regions and water entitlement categories Marsden Jacob reports a range of measures, subject to data availability and the number of trades:

- volume weighted average price (VWAP)
- median price
- mean price
- mode price
- 25th and 75th percentile prices
- price quintiles
- trade volume
- number of trades
- water trading exchange prices.

Data sources

The data sources for this report are:

- National Water Market Register data, up to 31 December 2013
- state government water registers and websites

- water exchange and broker noticeboard prices.

Notes

Entitlement prices in the state government water registers can lag the exchange date of contracts or water sale agreements by periods of days to several months. This means the entitlement prices shown in the monthly and quarterly VWAPs may not reflect all exchanges during the month.

Entitlement prices that do not appear to reflect arm's-length transactions have been excluded in the data cleaning process (see Appendix B).

Removing these values reduces price distortions in the reporting. This means prices in this report may differ from prices shown in registers where these transactions have not been removed.

Marsden Jacob uses a two-stage process to clean the data:

1. Removing prices that may not be genuine; for example, removing transactions where the price was reported to be null (\$0 per ML)
2. Reviewing and potentially removing transactions outside two standard deviations from the average price of water entitlements by region (or trading zone) and by water product.

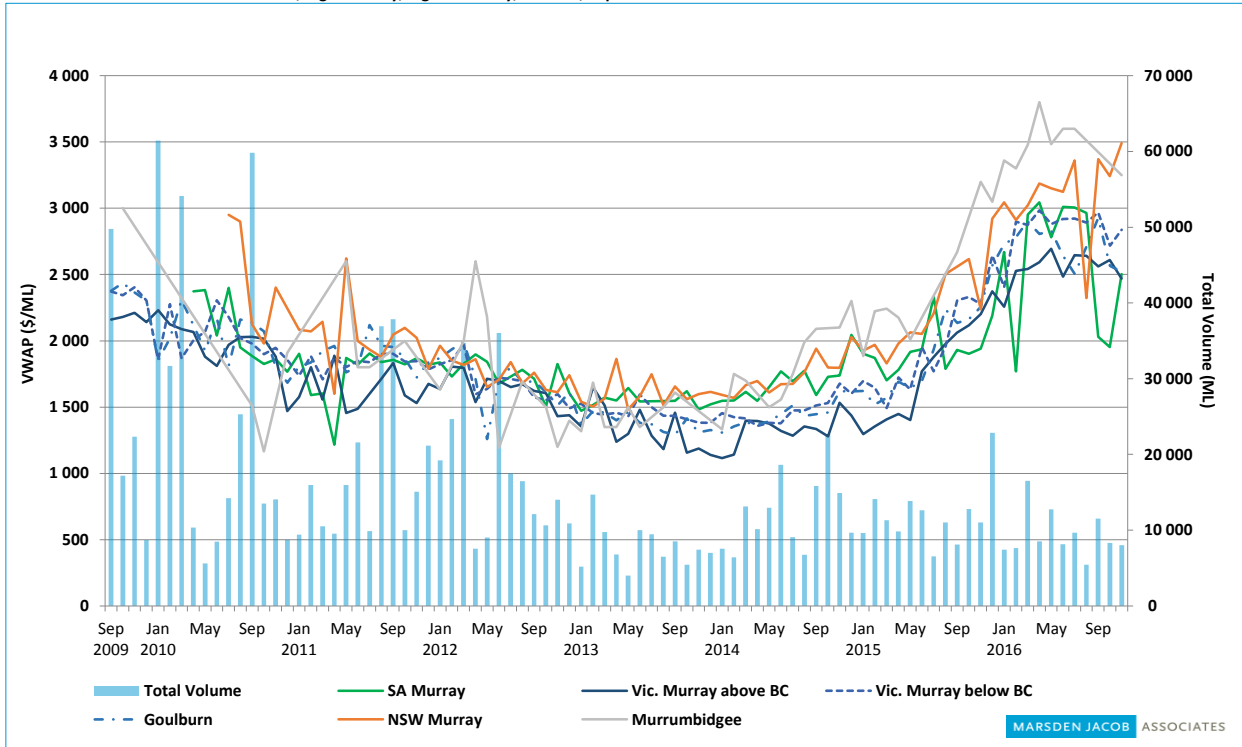
Marsden Jacob does not necessarily remove all trades that fall outside two standard deviations, as some of them reflect arm's-length trades. If trades that fall outside two standard deviations are retained in the regional dataset, this is noted in the region and entitlement-specific reports. Also, trades that fall within two standard deviations but are removed because they are not considered representative on the basis of recent data trends are also noted in the region and entitlement-specific reports as well as Appendix B.

Water entitlement market prices Murray–Darling Basin (November 2016)

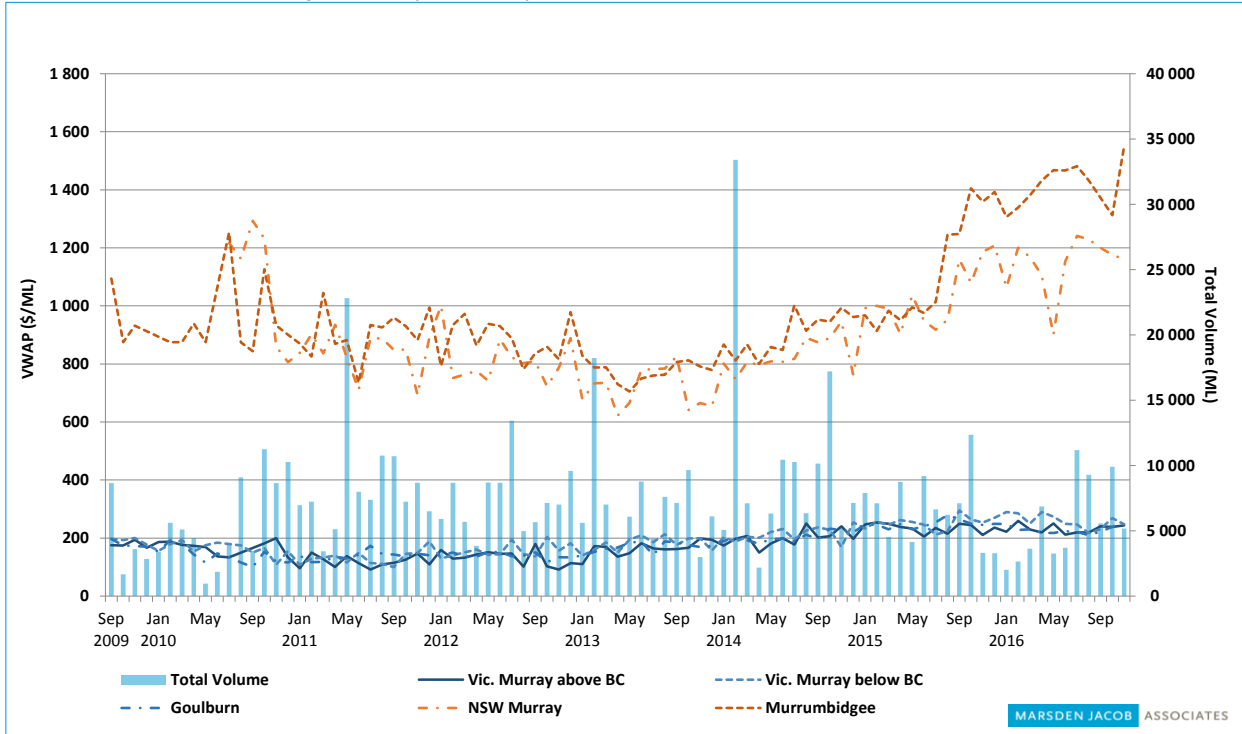
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Southern Murray–Darling Basin

Price correlations in the southern MDB, high security, high reliability, Class 3a, September 2009 to November 2016



Price correlations in the southern MDB, general security, low reliability, October 2009 to November 2016

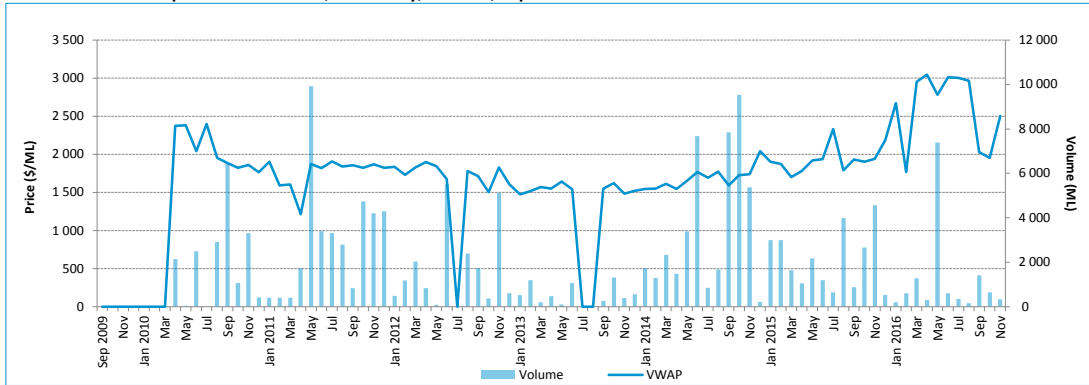


Source: Marsden Jacob analysis, 2016.

Water entitlement market prices Murray–Darling Basin (November 2016)

Southern Australian Murray: Class 3a

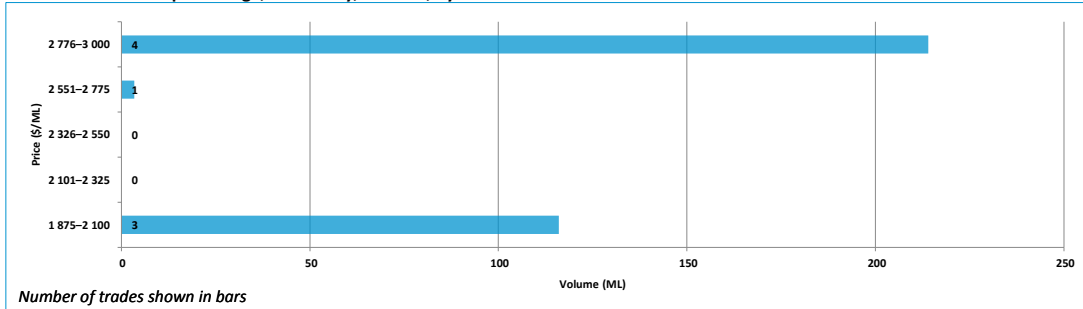
Entitlement market prices and volumes, SA Murray, Class 3a, September 2009 to November 2016



Entitlement market prices and volumes, SA Murray, Class 3a

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)	
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean				Mode
2 502	2 074	2 629	1 875	2 875	2 775	2 497	1 875	333	8	2 500 - 3 000

Entitlement market price range, SA Murray, Class 3a, by volume month November 2016



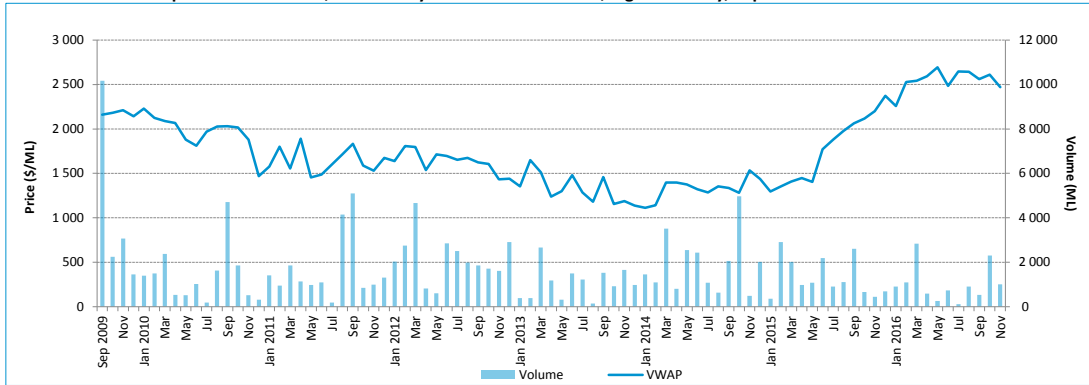
Number of trades shown in bars

Note: One trade which is outside two standard deviations of the average price of water entitlements has been included for this region.

Water entitlement market prices Murray–Darling Basin (November 2016)

Victorian Murray above Barmah Choke: high reliability

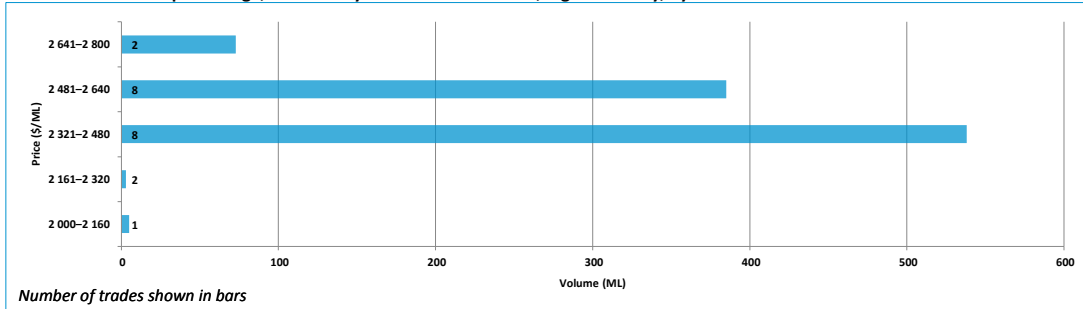
Entitlement market prices and volumes, Vic. Murray above Barmah Choke, high reliability, September 2009 to November 2016



Entitlement market prices and volumes, Vic. Murray above Barmah Choke, high reliability

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)	
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean				Mode
2 471	2 567	2 528	2 355	2 600	2 400	2 454	2 500	1 004	21	2 300 - 2 650

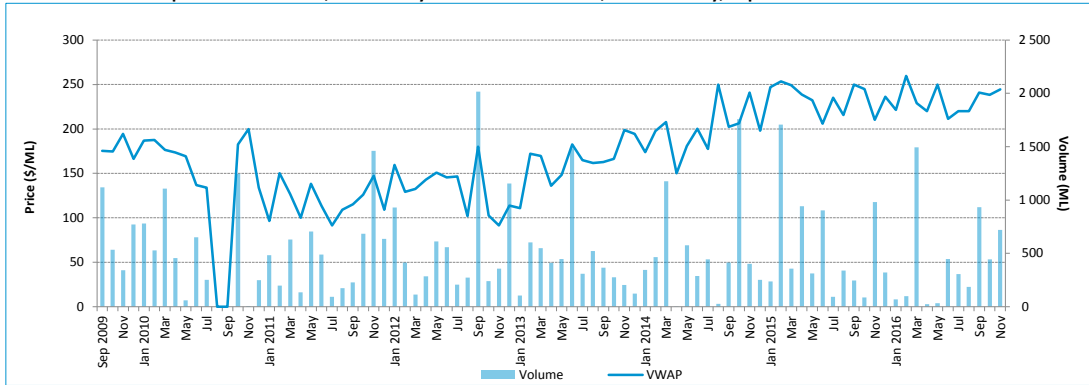
Entitlement market price range, Vic. Murray above Barmah Choke, high reliability, by volume month November 2016



Water entitlement market prices Murray–Darling Basin (November 2016)

Victorian Murray above Barmah Choke: low reliability

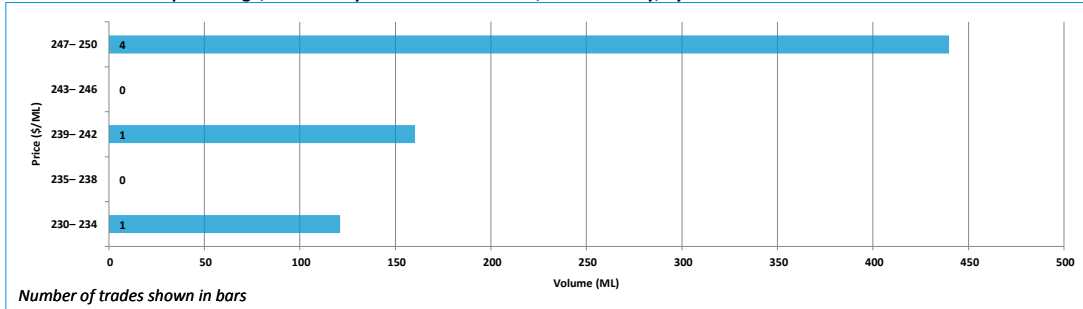
Entitlement market prices and volumes, Vic. Murray above Barmah Choke, low reliability, September 2009 to November 2016



Entitlement market prices and volumes, Vic. Murray above Barmah Choke, low reliability

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)	
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean				Mode
244	241	233	243	250	250	245	250	721	6	225 - 275

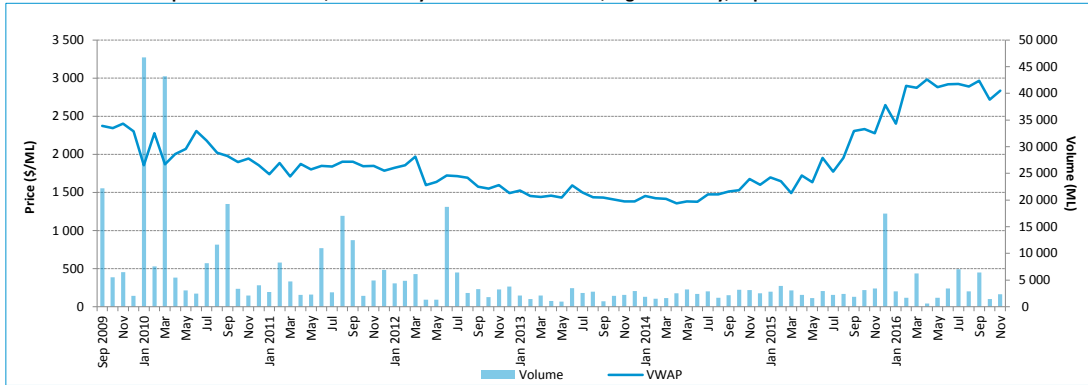
Entitlement market price range, Vic. Murray above Barmah Choke, low reliability, by volume month November 2016



Water entitlement market prices Murray-Darling Basin (November 2016)

Victorian Murray below Barmah Choke: high reliability

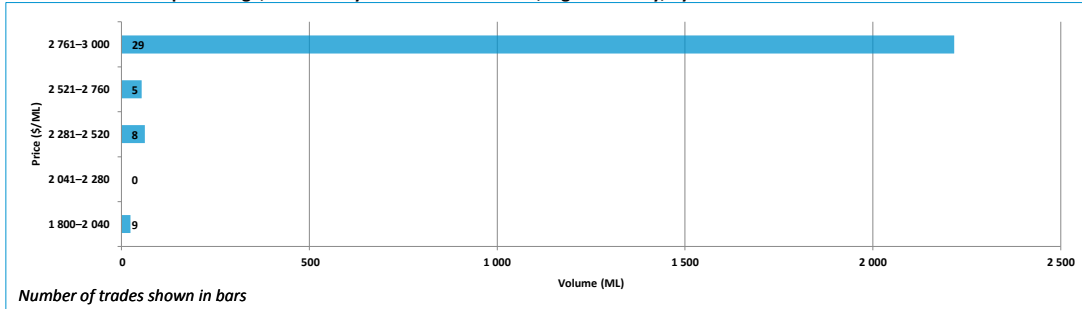
Entitlement market prices and volumes, Vic. Murray below Barmah Choke, high reliability, September 2009 to November 2016



Entitlement market prices and volumes, Vic. Murray below Barmah Choke, high reliability

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)	
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean	Mode			
2 837	2 903	2 793	2 500	2 838	2 800	2 631	2 800	2 356	51	2 500 - 3 000

Entitlement market price range, Vic. Murray below Barmah Choke, high reliability, by volume month November 2016



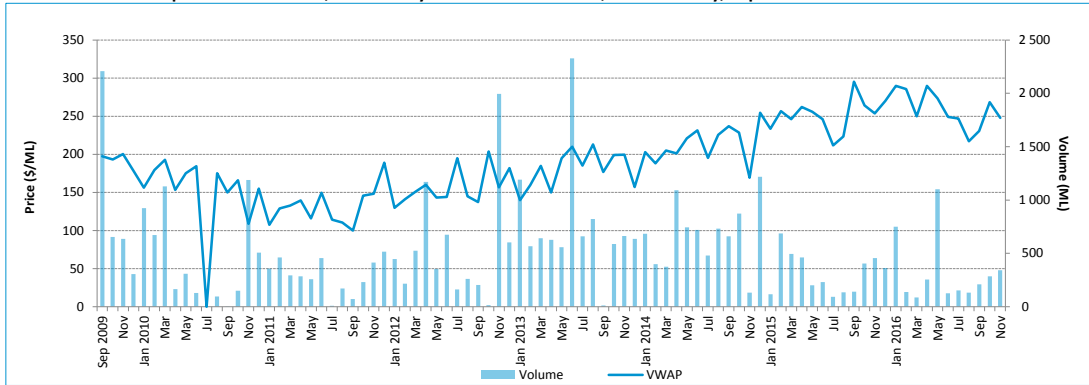
Number of trades shown in bars

Note: One trade which is inside two standard deviations of the average price of water entitlements has been excluded for this region.

Water entitlement market prices Murray–Darling Basin (November 2016)

Victorian Murray below Barmah Choke: low reliability

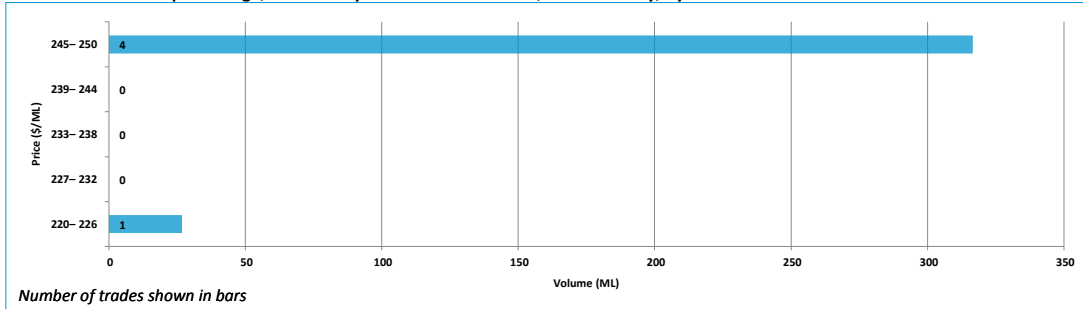
Entitlement market prices and volumes, Vic. Murray below Barmah Choke, low reliability, September 2009 to November 2016



Entitlement market prices and volumes, Vic. Murray below Barmah Choke, low reliability

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)	
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean	Mode			
248	250	269	250	250	250	244	250	343	5	240 - 275

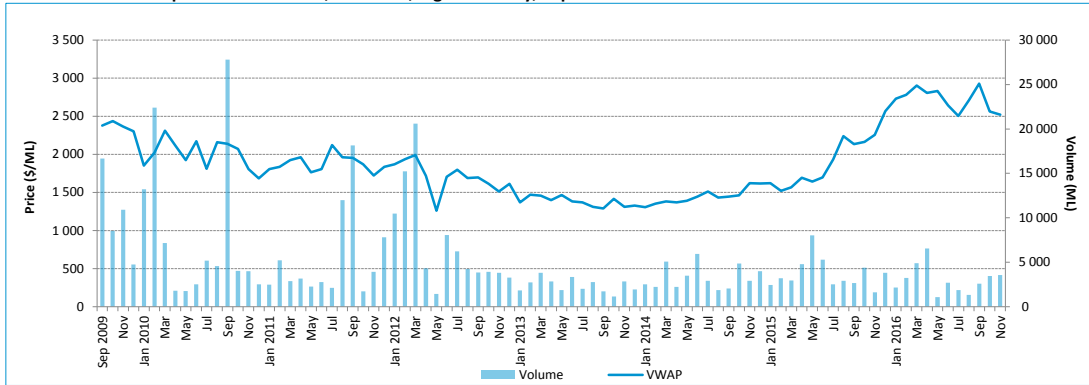
Entitlement market price range, Vic. Murray below Barmah Choke, low reliability, by volume month November 2016



Water entitlement market prices Murray-Darling Basin (November 2016)

Goulburn: high reliability

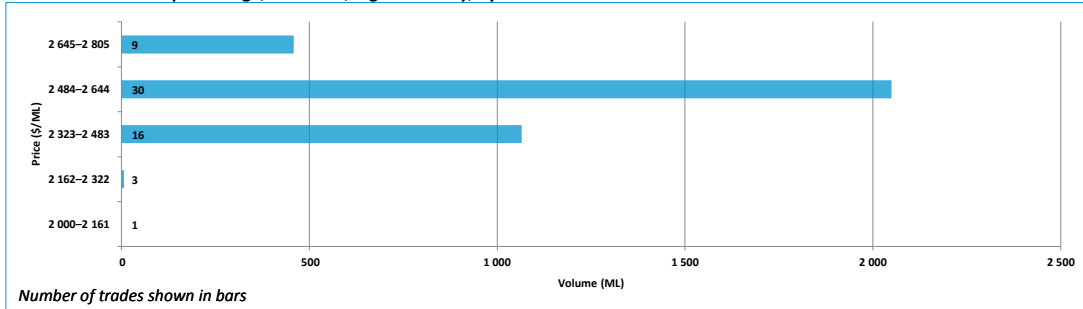
Entitlement market prices and volumes, Goulburn, high reliability, September 2009 to November 2016



Entitlement market prices and volumes, Goulburn, high reliability

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)	
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean				Mode
2 521	2 645	2 716	2 364	2 600	2 500	2 499	2 500	3 580	59	2 400 - 2 700

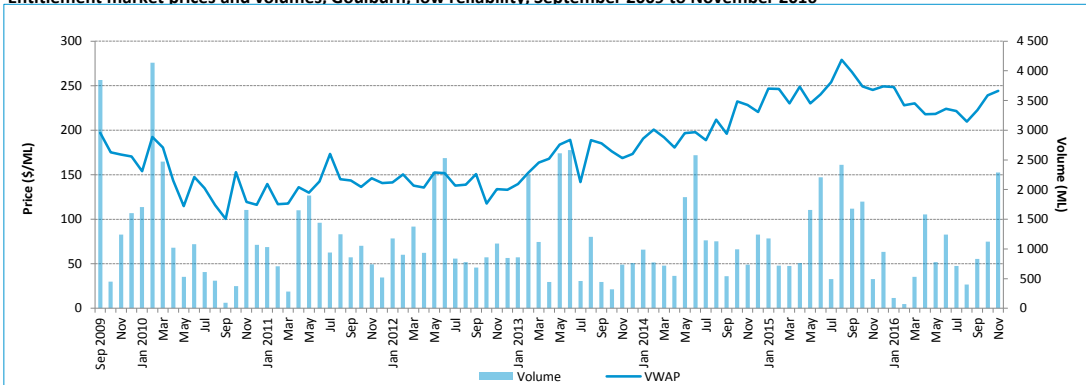
Entitlement market price range, Goulburn, high reliability, by volume month November 2016



Water entitlement market prices Murray-Darling Basin (November 2016)

Goulburn: low reliability

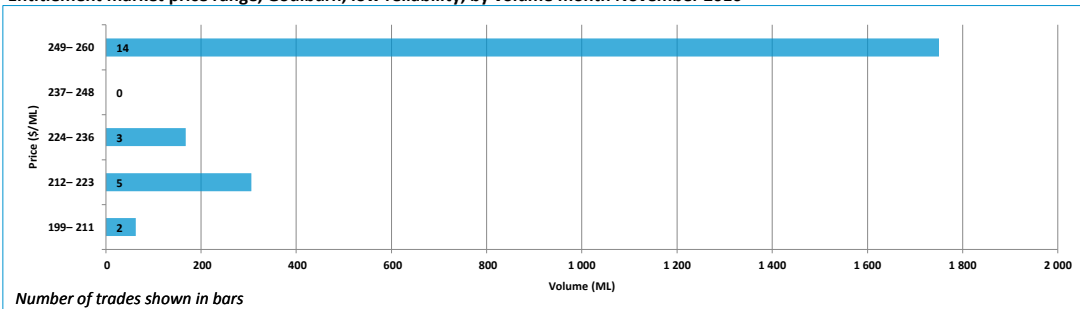
Entitlement market prices and volumes, Goulburn, low reliability, September 2009 to November 2016



Entitlement market prices and volumes, Goulburn, low reliability

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)	
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean				Mode
244	238	231	220	250	250	238	250	2 286	24	230 - 275

Entitlement market price range, Goulburn, low reliability, by volume month November 2016



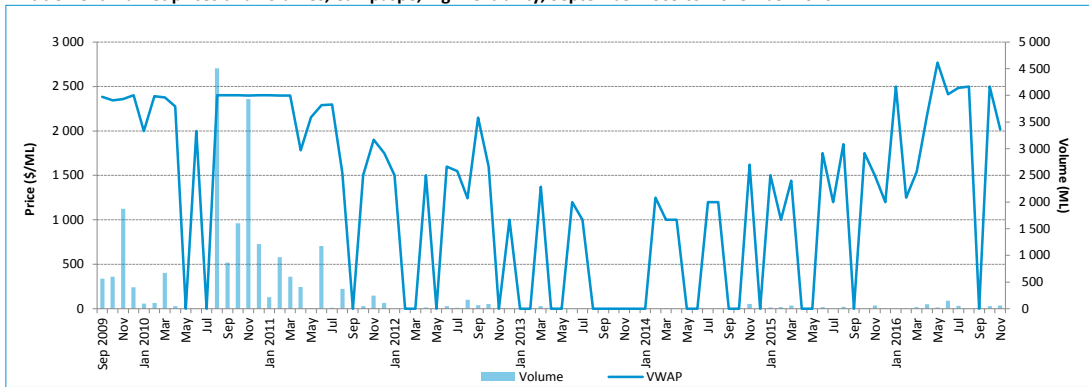
Number of trades shown in bars

Note: One trade which is outside two standard deviations of the average price of water entitlements has been included for this region.

Water entitlement market prices Murray–Darling Basin (November 2016)

Campaspe: high reliability

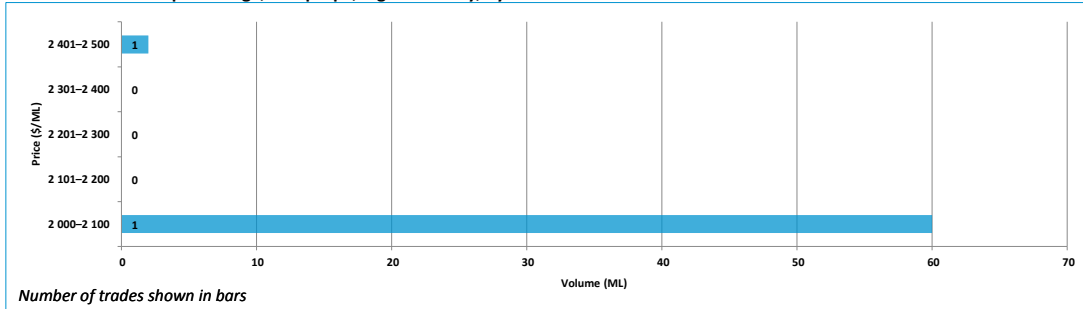
Entitlement market prices and volumes, Campaspe, high reliability, September 2009 to November 2016



Entitlement market prices and volumes, Campaspe, high reliability

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean			
2 016	2 232	2 282	2 125	2 375	2 250	2 250	0	62	2 2 400 - 2 800

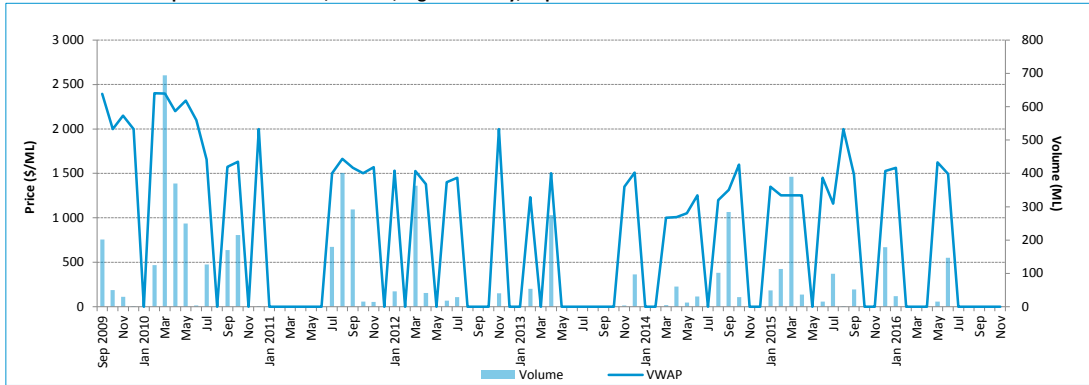
Entitlement market price range, Campaspe, high reliability, by volume month November 2016



Water entitlement market prices Murray-Darling Basin (November 2016)

Loddon: high reliability

Entitlement market prices and volumes, Loddon, high reliability, September 2009 to November 2016



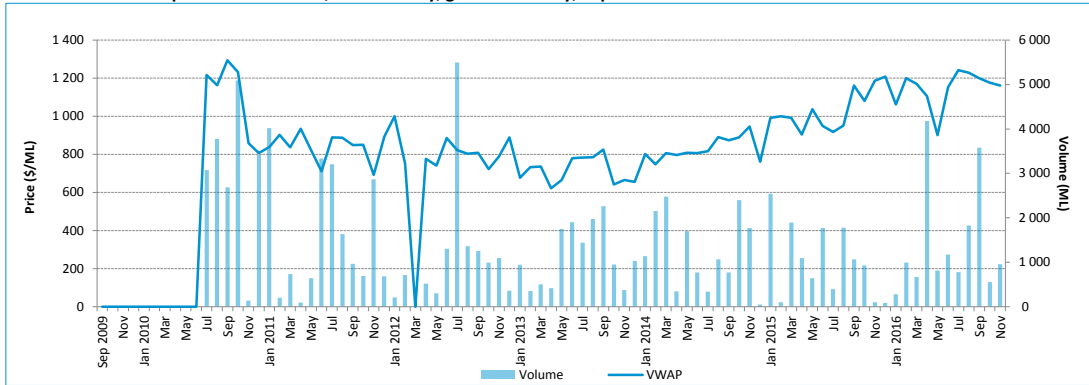
Entitlement market prices and volumes, Loddon, high reliability

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean			
-	-	1 520	-	-	-	-	-	-	No listings

Water entitlement market prices Murray–Darling Basin (November 2016)

New South Wales Murray: general security

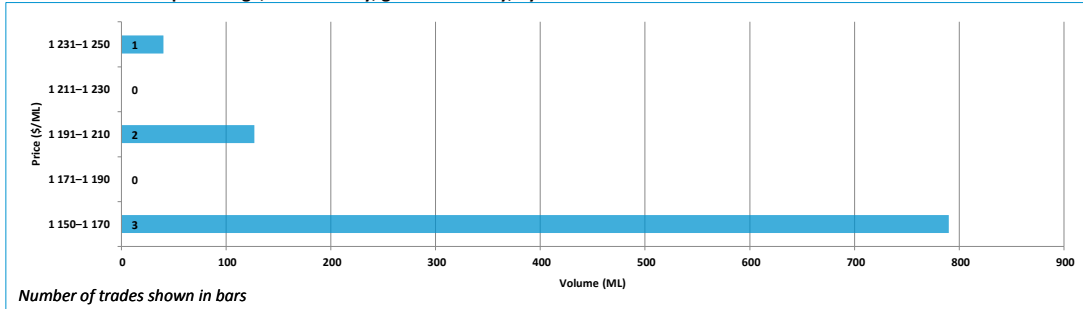
Entitlement market prices and volumes, NSW Murray, general security, September 2009 to November 2016



Entitlement market prices and volumes, NSW Murray, general security

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)	
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean				Mode
1 161	1 190	1 155	1 150	1 200	1 175	1 183	1 150	957	6	1 100 - 1 300

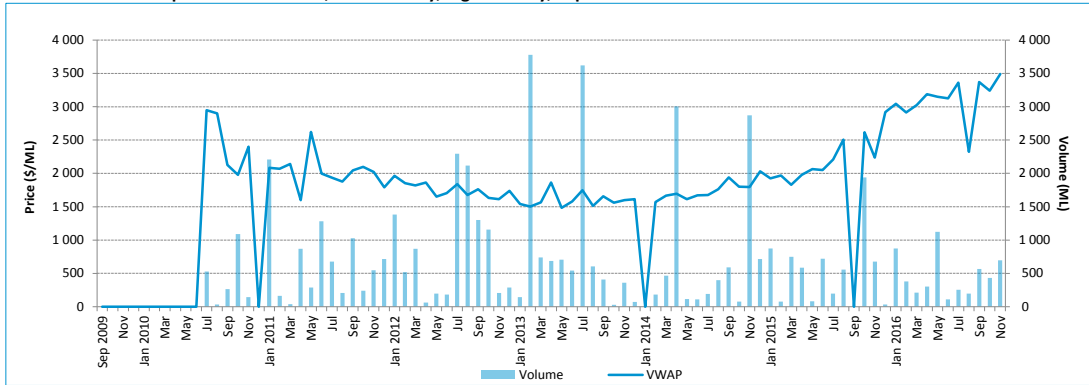
Entitlement market price range, NSW Murray, general security, by volume month November 2016



Water entitlement market prices Murray–Darling Basin (November 2016)

New South Wales Murray: high security

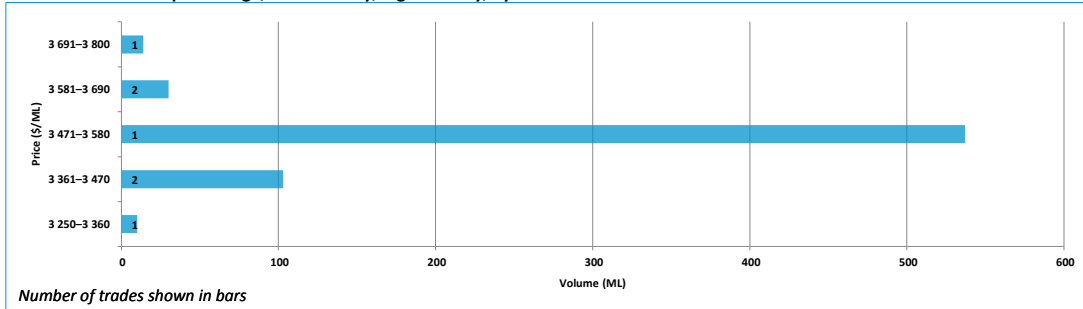
Entitlement market prices and volumes, NSW Murray, high security, September 2009 to November 2016



Entitlement market prices and volumes, NSW Murray, high security

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)	
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean				Mode
3 492	3 387	3 166	3 400	3 600	3 500	3 507	3 400	694	7	3 100 - 3 400

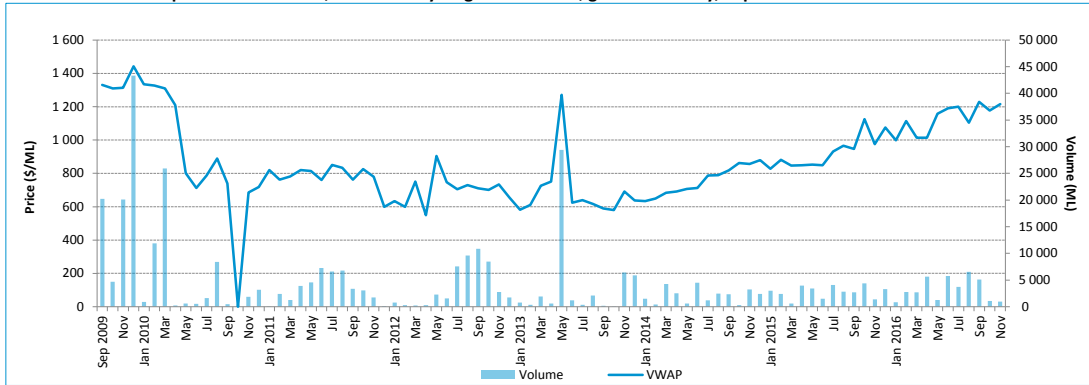
Entitlement market price range, NSW Murray, high security, by volume month November 2016



Water entitlement market prices Murray-Darling Basin (November 2016)

New South Wales Murray Irrigation Limited

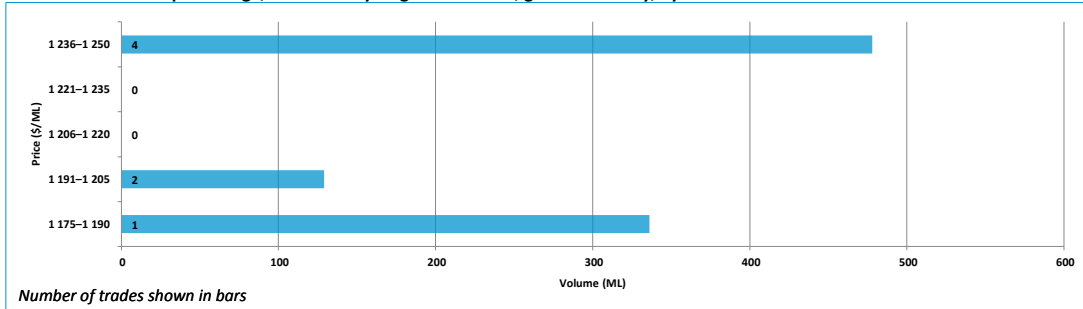
Entitlement market prices and volumes, NSW Murray Irrigation Limited, general security, September 2009 to November 2016



Entitlement market prices and volumes, NSW Murray Irrigation Limited, general security

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean			
1 216	1 220	1 125	1 200	1 250	1 250	1 225	1 250	943	7 1 100 - 1 300

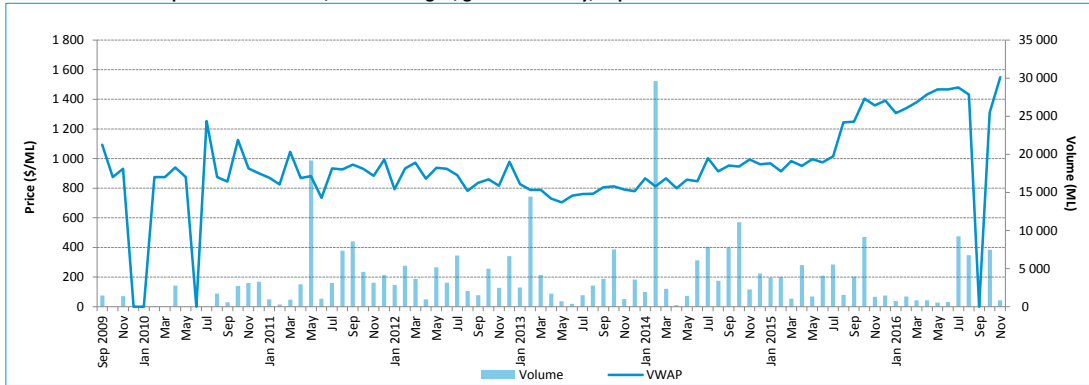
Entitlement market price range, NSW Murray Irrigation Limited, general security, by volume month November 2016



Water entitlement market prices Murray-Darling Basin (November 2016)

Murrumbidgee: general security

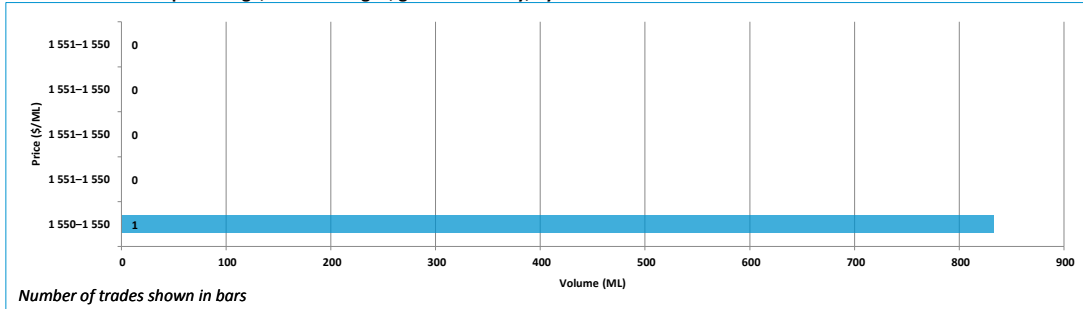
Entitlement market prices and volumes, Murrumbidgee, general security, September 2009 to November 2016



Entitlement market prices and volumes, Murrumbidgee, general security

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)	
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean				Mode
1 550	1 336	1 412	1 550	1 550	1 550	1 550	0	833	1	1 500 - 1 550

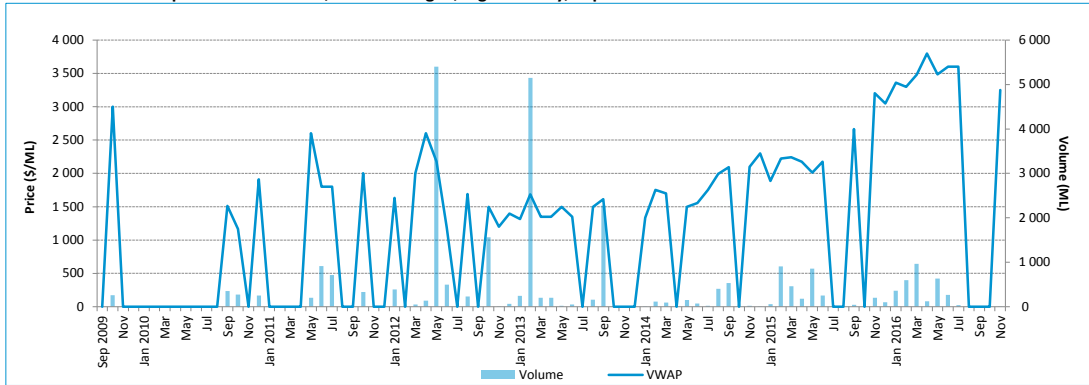
Entitlement market price range, Murrumbidgee, general security, by volume month November 2016



Water entitlement market prices Murray-Darling Basin (November 2016)

Murrumbidgee: high security

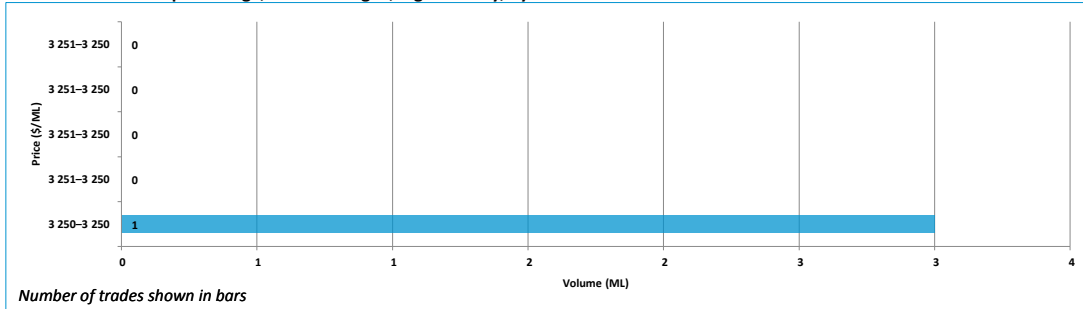
Entitlement market prices and volumes, Murrumbidgee, high security, September 2009 to November 2016



Entitlement market prices and volumes, Murrumbidgee, high security

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)	
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean				Mode
3 250	3 250	3 442	3 250	3 250	3 250	3 250	-	3	1	3 500 - 3 750

Entitlement market price range, Murrumbidgee, high security, by volume month November 2016

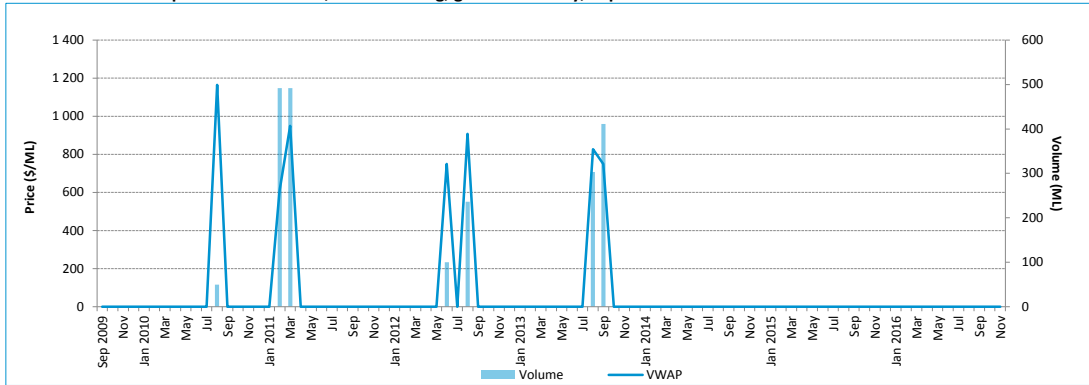


Number of trades shown in bars

Water entitlement market prices Murray-Darling Basin (November 2016)

Lower Darling: general security

Entitlement market prices and volumes, Lower Darling, general security, September 2009 to November 2016



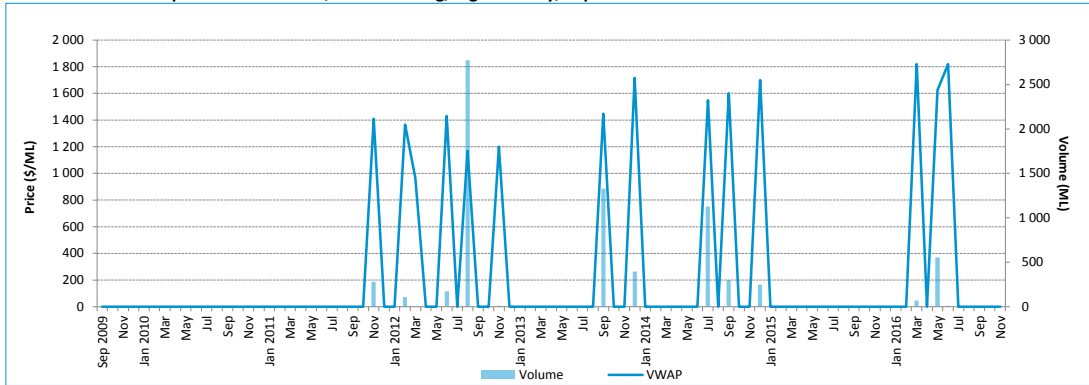
Entitlement market prices and volumes, Lower Darling, general security

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean			
-	-	-	-	-	-	-	-	-	No listings

Water entitlement market prices Murray–Darling Basin (November 2016)

Lower Darling: high security

Entitlement market prices and volumes, Lower Darling, high security, September 2009 to November 2016



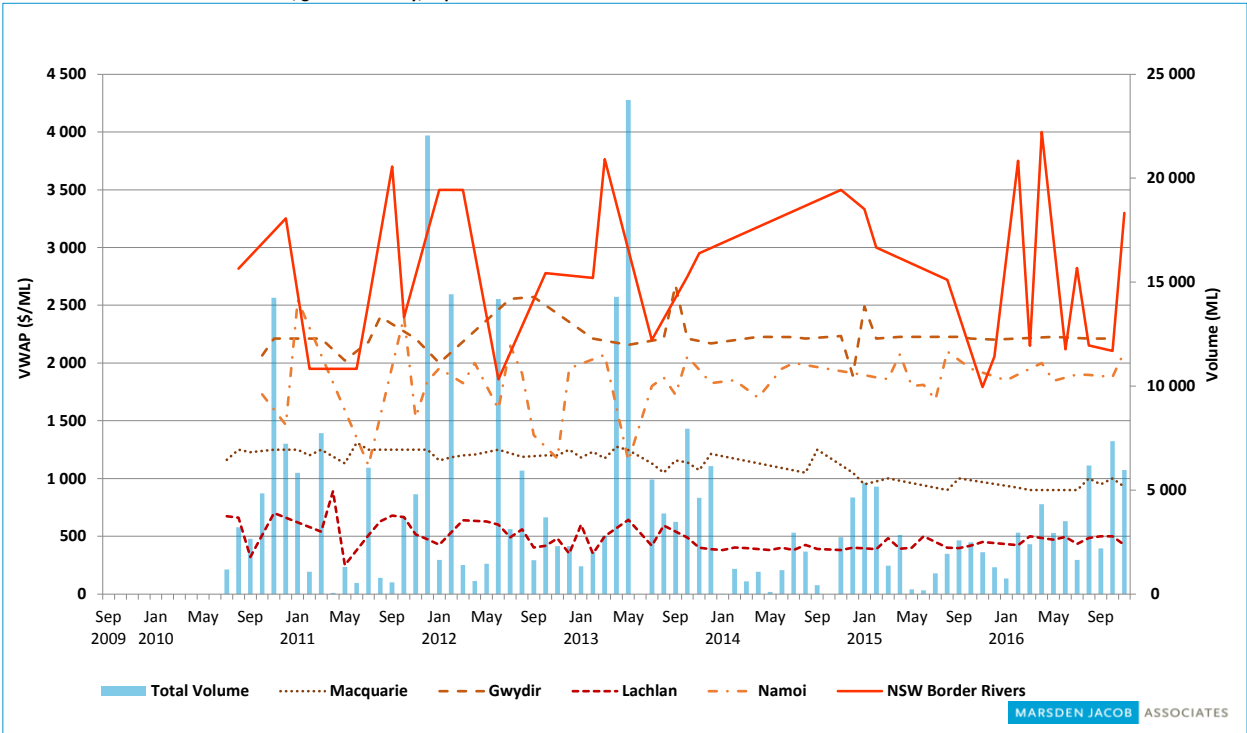
Entitlement market prices and volumes, Lower Darling, high security

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean			
-	-	1 650	-	-	-	-	-	-	No listings

Water entitlement market prices Murray–Darling Basin (November 2016)

Northern Murray–Darling Basin

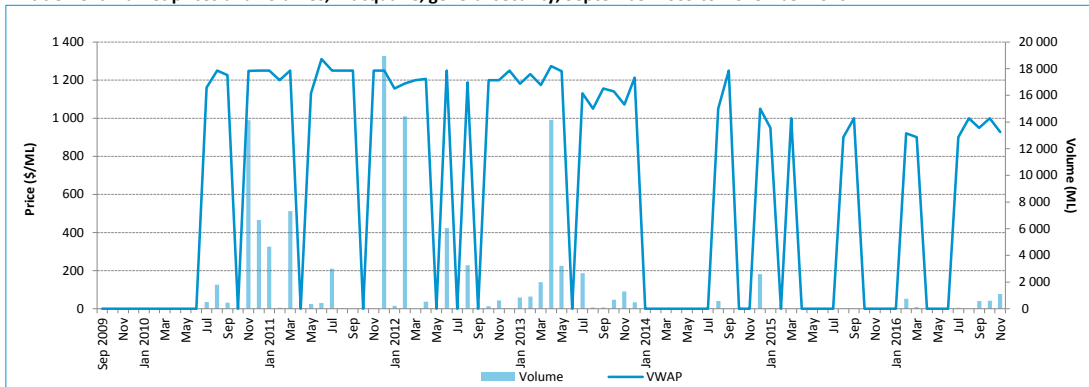
Price correlations in the northern MDB, general security, September 2009 to November 2016



Water entitlement market prices Murray–Darling Basin (November 2016)

Macquarie: general security

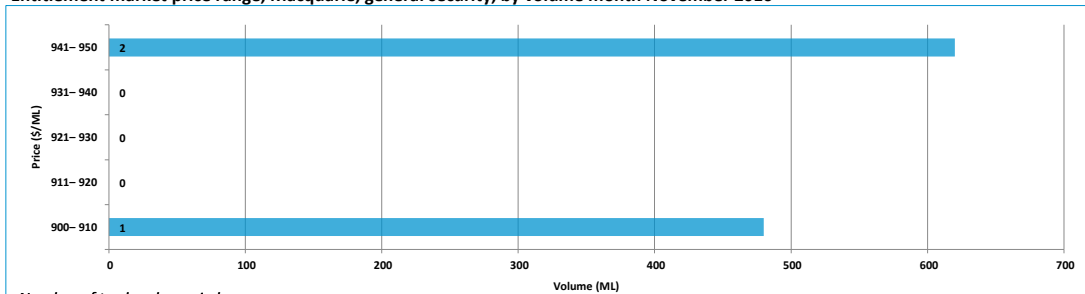
Entitlement market prices and volumes, Macquarie, general security, September 2009 to November 2016



Entitlement market prices and volumes, Macquarie, general security

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)	
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean				Mode
928	952	942	925	950	950	933	950	1 100	3	950 - 1 250

Entitlement market price range, Macquarie, general security, by volume month November 2016

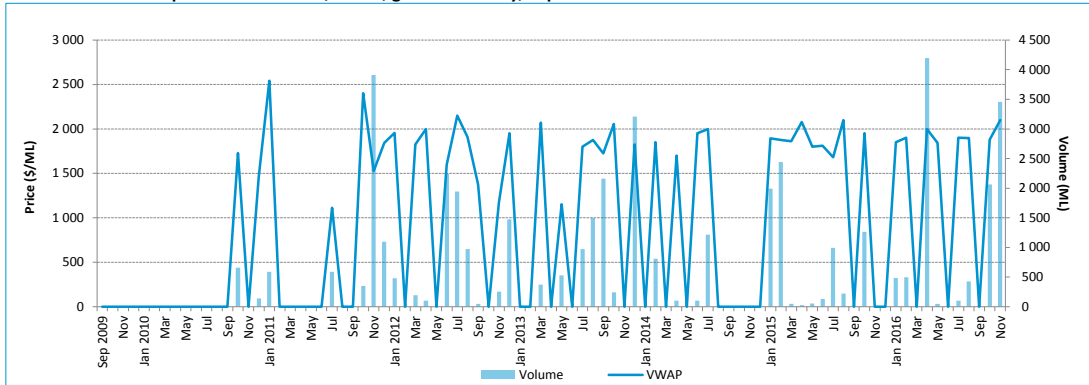


Number of trades shown in bars

Water entitlement market prices Murray-Darling Basin (November 2016)

Namoi: general security

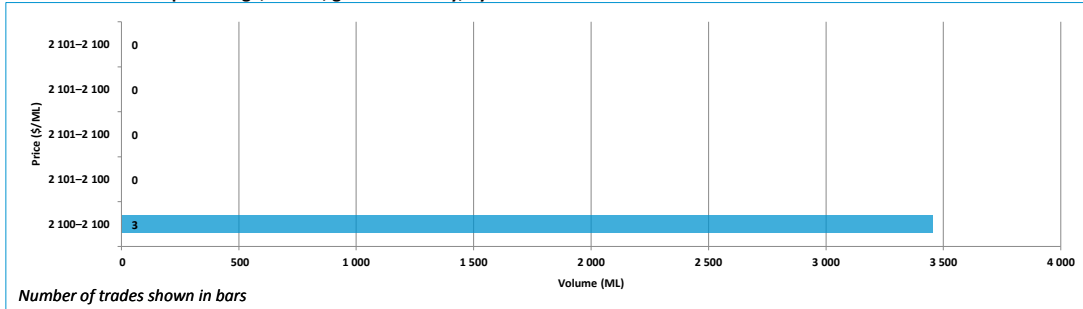
Entitlement market prices and volumes, Namoi, general security, September 2009 to November 2016



Entitlement market prices and volumes, Namoi, general security

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)	
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean				Mode
2 100	2 017	1 992	2 100	2 100	2 100	2 100	2 100	3 455	3	1 950 - 2 100

Entitlement market price range, Namoi, general security, by volume month November 2016

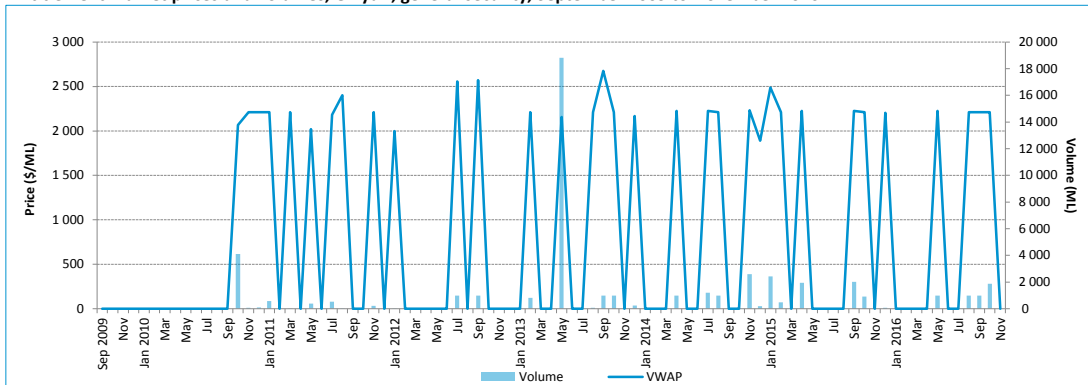


Note: Three trades which are outside two standard deviations of the average price of water entitlements have been included for this region.

Water entitlement market prices Murray–Darling Basin (November 2016)

Gwydir: general security

Entitlement market prices and volumes, Gwydir, general security, September 2009 to November 2016



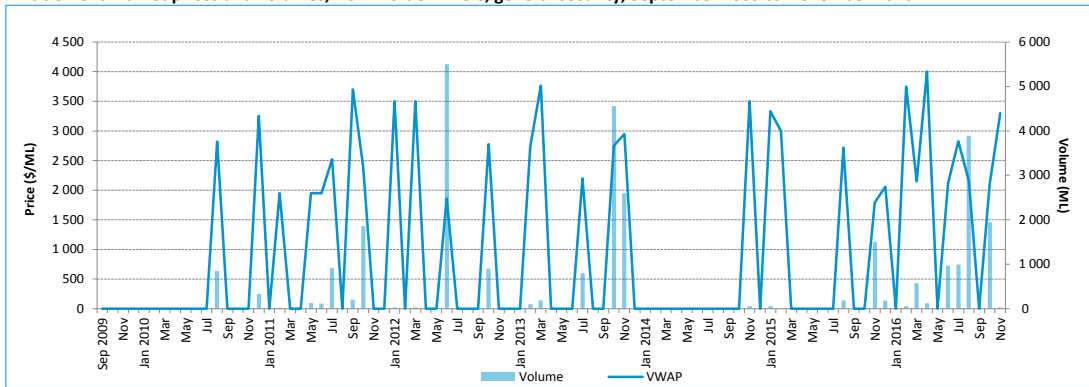
Entitlement market prices and volumes, Gwydir, general security

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean			
-	2 212	2 215	-	-	-	-	-	-	2 000 - 2 300

Water entitlement market prices Murray–Darling Basin (November 2016)

New South Wales Border Rivers: general security

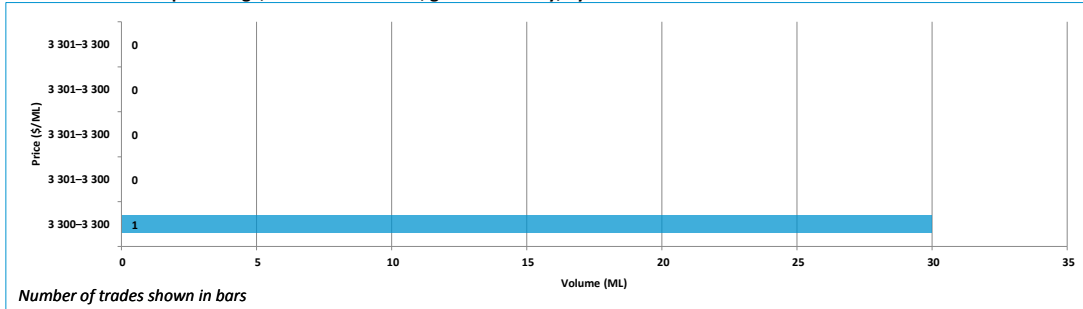
Entitlement market prices and volumes, NSW Border Rivers, general security, September 2009 to November 2016



Entitlement market prices and volumes, NSW Border Rivers, general security

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean			
3 300	2 124	2 252	3 300	3 300	3 300	3 300	-	30	1 2 000 - 2 500

Entitlement market price range, NSW Border Rivers, general security, by volume month November 2016

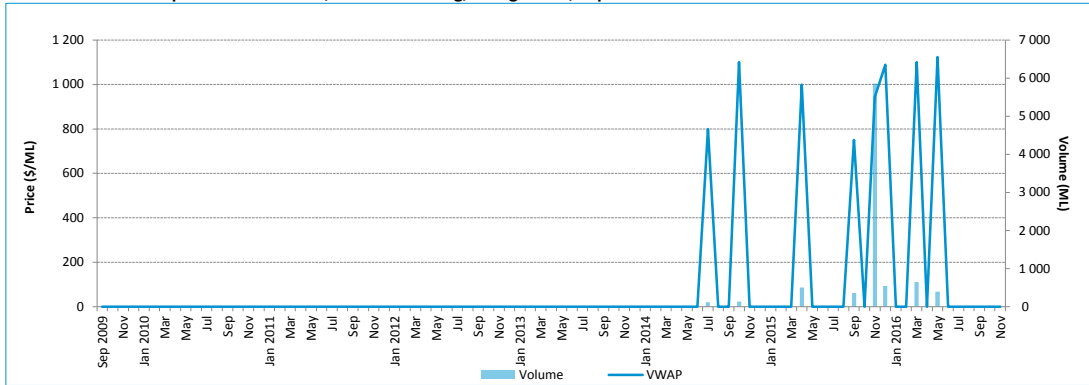


Number of trades shown in bars

Water entitlement market prices Murray–Darling Basin (November 2016)

Barwon–Darling: unregulated

Entitlement market prices and volumes, Barwon–Darling, unregulated, September 2009 to November 2016



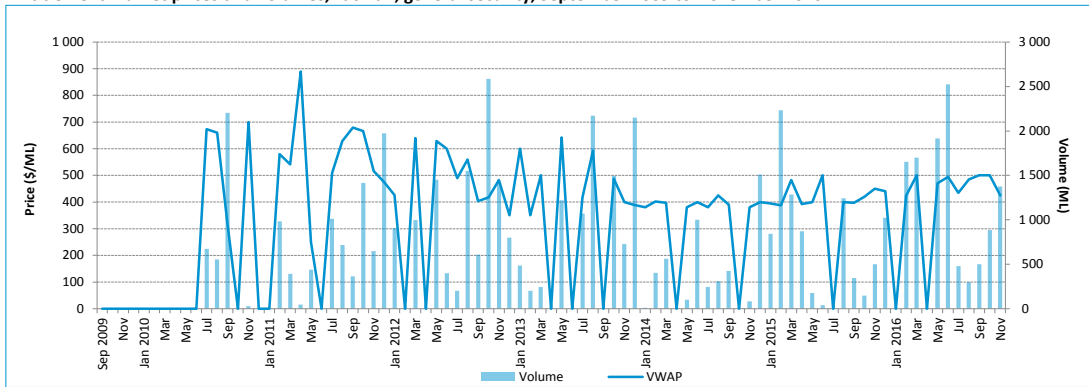
Entitlement market prices and volumes, Barwon–Darling, unregulated

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean			
-	-	1 102	-	-	-	-	-	-	No listing

Water entitlement market prices Murray–Darling Basin (November 2016)

Lachlan: General security

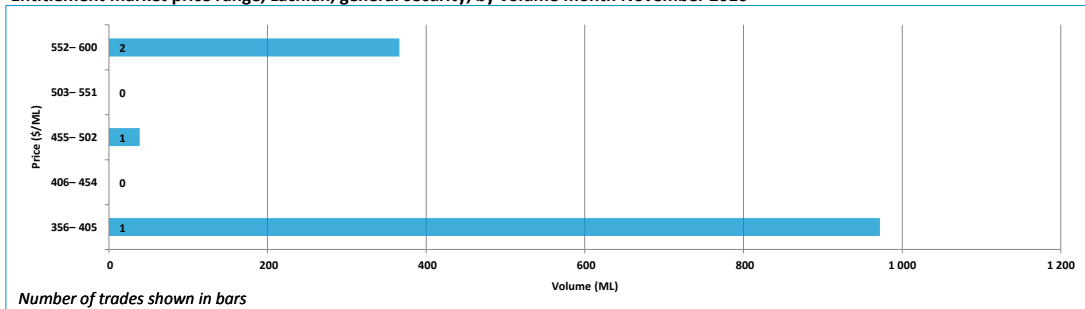
Entitlement market prices and volumes, Lachlan, general security, September 2009 to November 2016



Entitlement market prices and volumes, Lachlan, general security

Volume weighted average price (\$/ML)		November 2016 (in \$/ML)					November 2016 Volume	November 2016 # of trades	Broker buy/sell range (\$/ML)	
Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean				Mode
424	462	468	453	600	543	510	600	1377	4	400 - 600

Entitlement market price range, Lachlan, general security, by volume month November 2016



Note: Two trades which are outside two standard deviations of the average price of water entitlements have been included for this region.

Water entitlement market prices Murray-Darling Basin (November 2016)

Queensland: Trade Summary

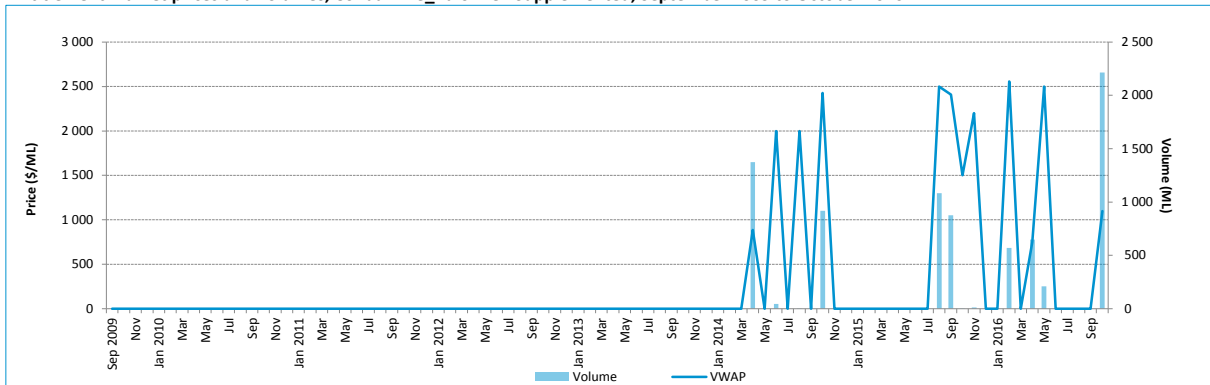
Entitlement market prices and volumes, Lachlan, general security

Resource Operation Plan	Water Supply Scheme / Water Management Area	Type of Entitlement	Volume weighted average price (\$/ML)			November 2016 (in \$/ML)					November 2016 # of trades	Broker buy/sell range (\$/ML)	
			Month of November 2016	November 2016 Quarter	YTD	25th percentile	75th percentile	Median	Mean	Mode			
QLD Border Rivers	Border Rivers/ Macintyre Brook	Supplemented	-	1 600	498	-	-	-	-	-	-	-	No listings
QLD Border Rivers	Border Rivers	Unsupplemented	-	1 800	1 777	-	-	-	-	-	-	-	No listings
Condamine-Balonne	St. George / Upper Condamine	Supplemented	-	1 098	1 346	-	-	-	-	-	-	-	No listings
Condamine-Balonne	Condamine Balonne / Lower Balonne / Upper Condamine	Unsupplemented	-	1 600	1 393	-	-	-	-	-	-	-	No listings
Condamine-Balonne	Upper Condamine	Alluvium Ground-water	-	-	-	-	-	-	-	-	-	-	No listings
Condamine-Balonne	Lower Balonne	Overland Flow	-	-	-	-	-	-	-	-	-	-	No listings

Water entitlement market prices Murray-Darling Basin (November 2016)

Condamine Balonne: Supplemented

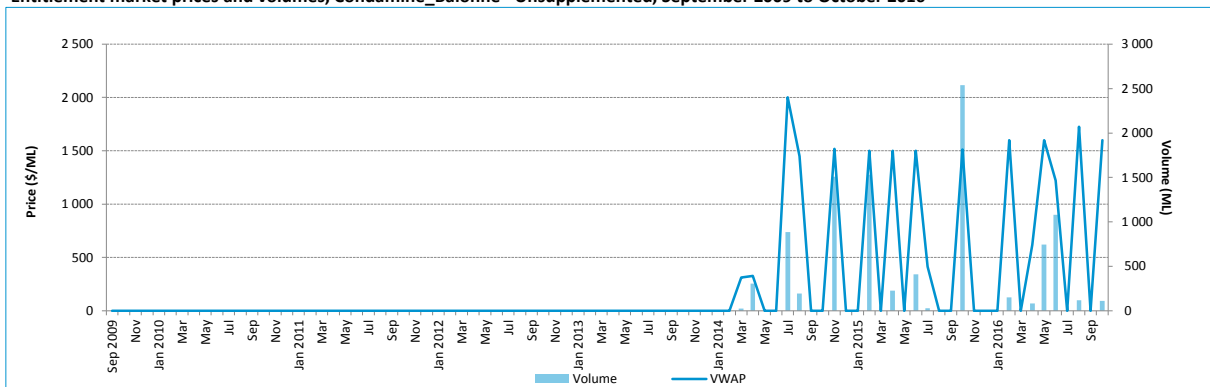
Entitlement market prices and volumes, Condamine_Balonne - Supplemented, September 2009 to October 2016



Note: No trades have been reported for Queensland. Charts show the monthly trade volume and value until the end of October.

Condamine Balonne: Unsupplemented

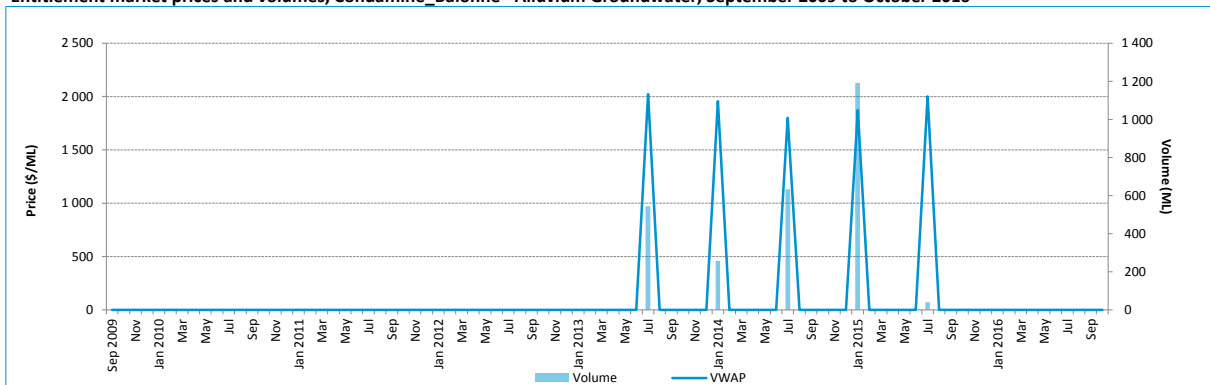
Entitlement market prices and volumes, Condamine_Balonne - Unsupplemented, September 2009 to October 2016



Note: No trades have been reported for Queensland. Charts show the monthly trade volume and value until the end of October.

Condamine Balonne: Alluvium Groundwater

Entitlement market prices and volumes, Condamine_Balonne - Alluvium Groundwater, September 2009 to October 2016

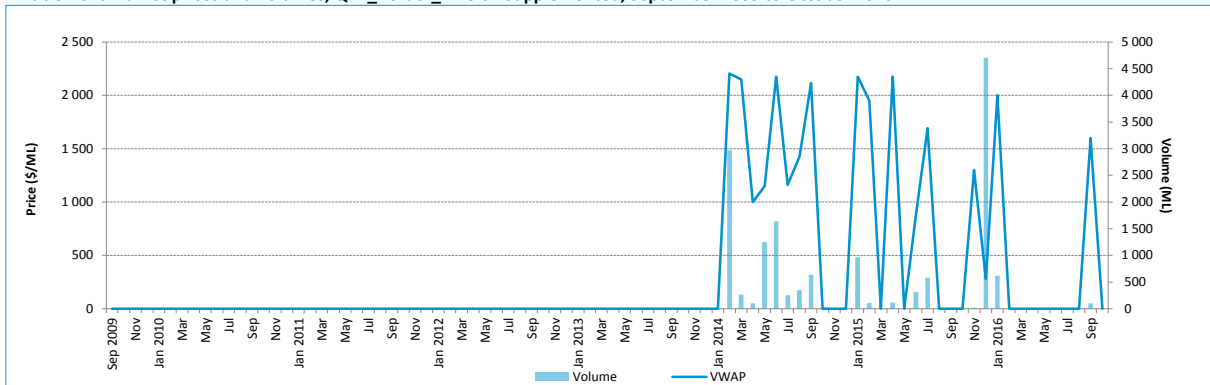


Note: No trades have been reported for Queensland. Charts show the monthly trade volume and value until the end of October.

Water entitlement market prices Murray–Darling Basin (November 2016)

QLD Border Rivers: Supplemented

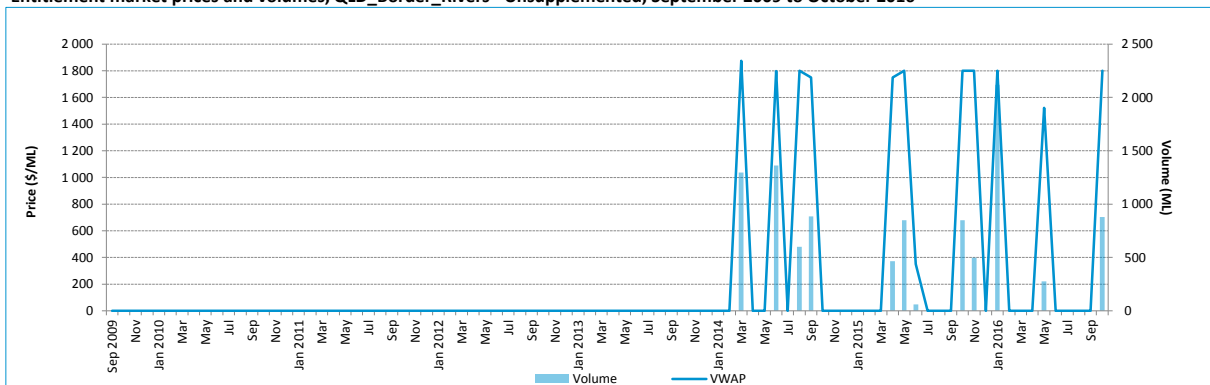
Entitlement market prices and volumes, QLD_Border_Rivers - Supplemented, September 2009 to October 2016



Note: No trades have been reported for Queensland. Charts show the monthly trade volume and value until the end of October.

QLD Border Rivers: Unsupplemented

Entitlement market prices and volumes, QLD_Border_Rivers - Unsupplemented, September 2009 to October 2016



Note: No trades have been reported for Queensland. Charts show the monthly trade volume and value until the end of October.

Water entitlement market prices Murray–Darling Basin (November 2016)

Appendix A: Regions and water sources

Table A1 Water sources (southern MDB)

Region	Water source
SA Murray	River Murray Prescribed Water Course (Class 3a)
Vic. Murray above Barmah Choke	6 Vic. Murray Dart to Barmah
Vic. Murray below Barmah Choke	7 Vic. Murray Barmah to SA 6B Lower Broken Creek
Goulburn	1A Greater Goulburn 1B Boort 3 Lower Goulburn
Campaspe	4A Campaspe Eppalock to WWC 4C Lower Campaspe
Loddon	5A Loddon–Coliban Channel to Lower Weir Pool (now SA Loddon – CC/Tull to LWP) 5B Bullarook
NSW Murray	New South Wales Murray Regulated River Water Source
Murrumbidgee	Murrumbidgee Regulated River Water Source
Lower Darling	Lower Darling Regulated River Water Source

Table A2 Water sources (northern MDB)

Region	Water source
Macquarie	Macquarie and Cudgegong Regulated Rivers Water Source
Namoi	Lower Namoi Regulated River Water Source Upper Namoi Regulated River Water Source
Gwydir	Gwydir Regulated River Water Source
NSW Border Rivers	Border Rivers Regulated River Water Source
Barwon–Darling	Barwon–Darling Unregulated River Water Source
Lachlan	Lachlan Regulated River Water Source

Appendix B: Trades Excluded

Table B1 shows trades that have been excluded from the November 2016 analysis.

Table B1 Outliers removed from trade data

Date	Catchment	Product name	Volume (ML)	Price (\$)	Price per ML (\$/ML)
30/11/2016	Broken	High Reliability	123.00	\$290,080	\$2,358.37
4/11/2016	Campaspe	High Reliability	16.00	\$12,000	\$750.00
9/11/2016	Goulburn	High Reliability	1.00	\$1,800	\$1,800.00
11/11/2016	Goulburn	High Reliability	1.00	\$3,000	\$3,000.00
17/11/2016	Goulburn	High Reliability	20.00	\$1	\$0.05
17/11/2016	Goulburn	High Reliability	9.50	\$1	\$0.11
17/11/2016	Goulburn	High Reliability	5.00	\$1	\$0.20
18/11/2016	Goulburn	High Reliability	1.00	\$3,000	\$3,000.00
24/11/2016	Goulburn	High Reliability	1.00	\$1,200	\$1,200.00
24/11/2016	Goulburn	High Reliability	160.00	\$224,000	\$1,400.00
24/11/2016	Goulburn	High Reliability	35.50	\$49,700	\$1,400.00
17/11/2016	Goulburn	Low Reliability	0.90	\$1	\$1.11
17/11/2016	Goulburn	Low Reliability	23.50	\$1	\$0.04
29/11/2016	Goulburn	Low Reliability	44.10	\$7,717	\$174.99
29/11/2016	Lower_Darling	General Security	15.00	\$1	\$0.07
29/11/2016	Lower_Darling	High Security	35.00	\$1	\$0.03
17/11/2016	NSW_Murray	General Security	15.00	\$1	\$0.07
17/11/2016	NSW_Murray	General Security	184.00	\$77,000	\$418.48
18/11/2016	NSW_Murray	General Security	104.00	\$34,500	\$331.73
30/11/2016	NSW_Murray	General Security	40.00	\$1	\$0.03
25/11/2016	Vic_Murray_AboveBC	High Reliability	1.00	\$1,800	\$1,800.00
8/11/2016	Vic_Murray_AboveBC	Low Reliability	34.60	\$6,228	\$180.00
17/11/2016	Vic_Murray_BelowBC	High Reliability	10.00	\$1.00	\$0.10
23/11/2016	Vic_Murray_BelowBC	High Reliability	9.00	\$13,500.00	\$1,500.00
23/11/2016	Vic_Murray_BelowBC	High Reliability	4.90	\$7,350.00	\$1,500.00 *
28/11/2016	Vic_Murray_BelowBC	High Reliability	8.00	\$1.04	\$0.13
30/11/2016	Vic_Murray_BelowBC	High Reliability	3.80	\$3,800.00	\$1,000.00
28/11/2016	Vic_Murray_BelowBC	Low Reliability	4.20	\$1.01	\$0.24
28/11/2016	Vic_Murray_BelowBC	Low Reliability	5.30	\$899.99	\$169.81

* - Trades are within the bounds of two standard deviations for the catchment, but have been excluded