Murray Operational Drought update

Adrian Langdon, Executive Manager,
System Operation
Murray Darling Basin

Northern Basin feeds into the Barwon Darling and includes valleys from Macquarie north

Basin Plan extraction target 3,468 GL

Southern Basin feeds into the Murray and includes valleys from Lachlan south

Basin Plan extraction target 7,450 GL
Southern Valley Situation
Murray System Inflows vs Allocation

Last 10 Year Average Inflow (5,076 GL)

Last 6 Year Average Inflow (3,360 GL)

66% of 10 year average

Volume (GL)
Murrumbidgee system inflows vs allocations

Allocations to extractive users (GS and Supplementary) has been 30% of total inflows over this period.

- Long Term Average Inflow (4,360 GL)
- Last 10 Year Average Inflow (3,559 GL)
- Last 6 Year Average Inflow (2,822 GL)

82% of long term average
64% of long term average
Allocations to extractive users (GS and Supplementary) has been 22.5% of total inflows over this period.

Lachlan system inflows vs allocations

- Long Term Average Inflow (1,212 GL)
- Last 10 Year Average Inflow (851 GL)
- Last 6 Year Average Inflow (740 GL)
- 70% of long term average
- 61% of long term average

Allocations to extractive users (GS and Supplementary) has been 22.5% of total inflows over this period.
Northern Valley Situation
Macquarie system inflows vs allocations

Allocations to extractive users has been 17% of total inflows over this period.

- Combined inflows in 2017-18 was 42GL.
- Allocations made from 2016 floods water is storage.

Long term average inflow (1448 GL)

Last 10 Year average inflow (1066 GL)

Last 6 Year average inflow (690 GL)

Combined inflows in 2018-19 up to 10th Feb 55 GL

74% of long term average

47% of long term average

Unallocated Inflows
Env Allocations - GS+EWA
Irrigation Allocation - GS
Allocations to extractive users (GS and Supplementary) has been 16% of total inflows over this period.
Extractive users (GS and Supplementary) have taken 22% of total inflows over this period.
Border Rivers system inflows vs allocations

Last 10 Year Average Inflow (966 GL)
Extractive users have taken 12% of total inflows over this period.
Situation at Menindee?
Lower Darling Valley

[Map of Lower Darling Valley with key to symbols: Major towns, Major dams, River system, Channel system, Lower darling river system, River catchment, Major weirs, Water bodies]
Barwon Darling versus Menindee Lakes inflows

Flow per annum (GL)

- 09/10
- 10/11
- 11/12
- 12/13
- 13/14
- 14/15
- 15/16
- 16/17
- 17/18
- 18/19
Water losses
July 2016 – January 2019

Initial 2016 storage level = 133,899 ML
Total inflows from July 16 until Jan 19 = 2,097,991 ML

TOTAL WATER (storage + inflows) = 2,231,890 ML

MINUS

Total releases from July 16 until Jan 19 = 898,336 ML
(MDBA, Enviro, River Ops, Customers)

Total losses from July 16 to Jan 19 = 1,273,934

EQUALS

January 2019 storage level = 59,620 ML

TOTAL WATER− releases + actual storage = LOSSES
Menindee Lakes Storage Operations 2017-18

Darling River Flows and Menindee Storage Volume

- Approaching 480GL negotiated lower rate of call for MDBA - extended time above 480 GL improving the ratio of water held in Wetherell + Pamamaroo against that held in Cawndilla + Menindee
- E-water delivery continued at Weir 32 from 22 Nov to 15 Dec 2017
- 15 December 2017 - 480 GL total storage
- 15 December 2017 - Weir 32 reduced below WSP requirements
- 1 July 2017 - e-water delivery continues at low rates
- 1 Oct - 21 Nov 2017 - MDBA call - 38 GL
- 28 March 2018 - Cawndilla Outlet releases cease
Menindee Lakes Storage Operations 2018-19

Darling River Flows and Menindee Storage Volume

- 19 July 2018 - increased release for filling of block banks
- 25 September 2018 - Commenced pumping from Pamamaroo to Copi Hollow
- 20 November 2018 - increased release to 300 ML/day for bank filling
- 10 December 2018 - Pumping to Copi Hollow complete
- 5 January 2019 - Pamamaroo outlet capacity constrained
- 12 January 2019 - closed Weir 32 fishway and Wetherell outlet

Weir 32 Release
Cawndilla Release
Evaporation (30 day moving avg)
Total System Storage Volume

Forecast Conditions - approximate only
Distribution of Water – July 2016 – January 2019

- System loss including Evaporation, 58.6%
- MDBA, 17.4%
- OEH Environmental, 11.3%
- River Operations, 8.5%
- Lower Darling Customers, 4.1%
Why are we in this situation?
Maximum temperature
1 January 2017 – 31 December 2018

Distribution Based on Gridded Data
Australian Bureau of Meteorology

Temp. Decile Ranges
- Highest on Record
- Very Much Above Average
- Above Average
- Average
- Below Average
- Very Much Below Average
- Lowest on Record

http://www.bom.gov.au
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Issued: 05/01/2019
How do inflows to our dams compare to previous droughts?
Comparison of drought inflows – Burrinjuck Dam

Comparison of drought inflows - Burrinjuck Dam
Drought inflows for 24 months ending in February
Comparison of drought inflows – Blowering Dam

Comparison of drought inflows - Blowering Dam
Drought inflows for 24 months ending in February

Cumulative inflows in 10^12 L

No of Months

0 4 8 12 16 20 24

0 500000 1000000 1500000 2000000 2500000 3000000 3500000

Comparison of drought inflows – Wyangala Dam

Comparison of drought inflows - Wyangala
Drought inflows for 24 months ending in February

- 1979-1981
- 2002-2004
- 2008-2010
- 2003-2005
- 2018-19

Cumulative inflows in GL

No of Months

0 4 8 12 16 20 24

0 50 100 150 200 250 300
Comparison of drought inflows – Burrendong Dam

Drought inflows for 36 months
Comparison of drought inflows – Keepit and Split Rock Dams

Drought inflows for 24 months

Cumulative Inflows in GL

No. of Months


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Comparison of drought inflows – Copeton Dam

Drought inflows for 18 months starting in January

<table>
<thead>
<tr>
<th>Cumulative Inflows in GL</th>
<th>No. of Months</th>
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<tbody>
<tr>
<td>Jan 1918 - Dec 1919</td>
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<tr>
<td>Jan 1993 - Dec 1994</td>
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<tr>
<td>Jan 2008 - Dec 2009</td>
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<tr>
<td>Jan 2009 - Dec 2010 (50th %)</td>
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<tr>
<td>Current Drought Jan 2017 - Dec 2018</td>
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</tbody>
</table>
Comparison of drought inflows – Pindari Dam

Drought inflows for 24 months

Cumulative Inflows in GL vs No of Months

- Jan 1918 - Dec 1919
- Jan 1979 - Dec 1980
- Jan 1986 - Dec 1987
- Jan 1993 - Dec 1994
- Jan 2018 - Dec 2018
Comparison of drought inflows – Glenlyon Dam

Drought inflows for 24 months starting in January

[Graph showing cumulative inflows in GL over 24 months for different periods]
ENSO Outlook
An alert system for the El Niño–Southern Oscillation

Issued 14 May 2019  Next issue 28 May 2019

ENSO Outlook eases back to El Niño WATCH

The ENSO Outlook has been eased to El Niño WATCH. This means the chance of El Niño forming in 2019 is around 50%, still double the normal likelihood.

Sea surface temperatures in the tropical Pacific have hovered around the El Niño threshold since late February but there are signs the warm anomalies may soon ease. The atmosphere has generally remained ENSO neutral. Most models indicate the tropical Pacific will remain at or above the El Niño threshold heading into winter, before cooling in late winter and spring. By October, five of eight models indicate a neutral ENSO state is most likely.

El Niño WATCH is not a guarantee that El Niño will occur; it is an indication that some of the typical precursors of an event are in place.

Further information on the current status of ENSO can be found in the ENSO Wrap-Up.

Details: ENSO Wrap-Up
Murray Flows and Portion to SA

Volume of Murray Water flowing to South Australia

- Murray Flows
- SA Flows

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<tr>
<th>Year</th>
<th>Murray Flows</th>
<th>SA Flows</th>
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<tr>
<td>2009/10</td>
<td>42%</td>
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<tr>
<td>2010/11</td>
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<td>2011/12</td>
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<td>2017/18</td>
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<td>2018/19</td>
<td>41%</td>
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Storages Capacity North v’s South

Total Volume of Public Storages 15,643 GL

Southern Storage Volume
- Lake Menindee
- Lake William Hovell
- Lake Buffalo
- Goulburn Weir
- Tallaroop
- Nillahcootie
- Cairn Curran
- Eppalock
- Warranga Basin
- Lake Eildon
- Burniujck
- Blowering
- Hume
- Dartmouth

Total Volume of Public Storages 4,575 GL

Northern Storage Volume
- Coolmunda Dam
- EJ Beardmore Dam
- Leslie Dam
- Windamere
- Burrendong
- Keepit
- Split Rock
- Copeton
- Pindari
- Glynlyon
# State Entitlements

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<th>NSW Entitlements</th>
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<td>High Reliability</td>
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<td>Local Water Utilities</td>
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<td>High Security</td>
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<td>711,790</td>
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