

NSW ARBOVIRUS SURVEILLANCE & MOSQUITO MONITORING PROGRAM 2016-2017

Weekly Update

Date: 24/Mar/2017

SUMMARY

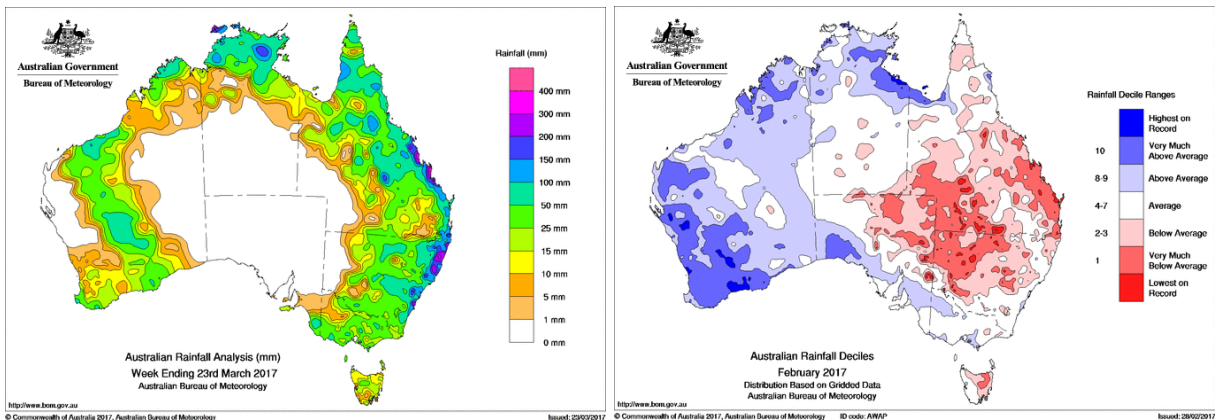
- **Climate:** over the last week, there was moderate to heavy rainfall right across the state, and was especially heavy along the coast. For February, rainfall below average for most of the state with parts of the inland very much below average. Maximum temperatures for February were up to 4-5 degrees above average.
- **Three Month Forecast:** for March to May 2017, rainfall predictions for NSW are for below average precipitation, with western areas of the state having a higher probability of being drier than average. Maximum and minimum temperatures are expected to be well above normal across the state. According to the BOM as of 14/Mar/2017, the El Niño-Southern Oscillation remains neutral, but an El Niño is predicted to form by July of this year.
- **Tidal:** the next series of high tides that may initiate *Aedes vigilax* egg hatching are forecasted for 25-30/Mar/2017.
- **MVEV models:** the data relevant to both the Forbes' and Nichols' hypotheses have been updated to the end of February 2017 and both theories remain inconsistent with past MVEV outbreaks.
- **Mosquito Numbers Inland:** mosquito numbers were considerably lower this week and only just 'high' from Griffith and Leeton. All other locations continue to produce 'low' numbers.
- **Mosquito Numbers Coast:** with the ongoing wet weather, the abundant rainfall has resulted in a surge in mosquito diversity. All sites are now catching a range of freshwater species including noted vectors such as *Culex annulirostris*.
- **Mosquito Numbers Sydney:** Mosquito numbers at the saltmarsh sites (Georges River and Homebush Bay) continue to be 'high' with large numbers *Aedes vigilax*. However, the rainfall has led to an increase in production of numerous freshwater mosquitoes.
- **Arboviral Isolates:** there were 13 arboviral detections from Georges River including 9 Ross River viruses and 4 flaviviruses yet to be typed.
- **Chicken Sentinel Seroconversions:** there were no new seroconversions.
- **Human Notifications:** there were 41 Ross River virus notifications for the week 12-18/Mar. Cases are now dominated by reports from the coastal region.

Comment: the ongoing wet has seen a dramatic increase in freshwater mosquito species along the coast, as well as high numbers of *Aedes vigilax*. In past years, an increase in freshwater mosquitoes has been associated with a rise in Ross River notifications. There has been a large number of arboviral detections at Georges River over the last week and perhaps this is a portent for wider activity for the remainder of the season.

ENVIRONMENTAL CONDITIONS

Rainfall

Rainfall across Australia for the week ending 23/Mar/2017 is depicted on the left and monthly rainfall deciles for February 2017 are on the right. Over the last week, there was moderate to heavy rainfall right across the state, and was especially heavy along the coast. Precipitation during February (right graph below) was below average for most of the state with parts of the inland very much below average. Maximum temperatures for February were up to 4-5 degrees above average, while minimum temperatures were around 2-3 degrees above normal. Temperatures tended to be more above average in the north of the state.



Three Month Rainfall & Temperature Forecast

For March to May 2017, rainfall predictions for NSW are for below average precipitation, with western areas of the state having a higher probability of being drier than average. Maximum and minimum temperatures are expected to be well above normal across the state. The following pages contain graphics of the seasonal outlook:

www.bom.gov.au/climate/outlooks/#/rainfall/median (Rainfall outlook).

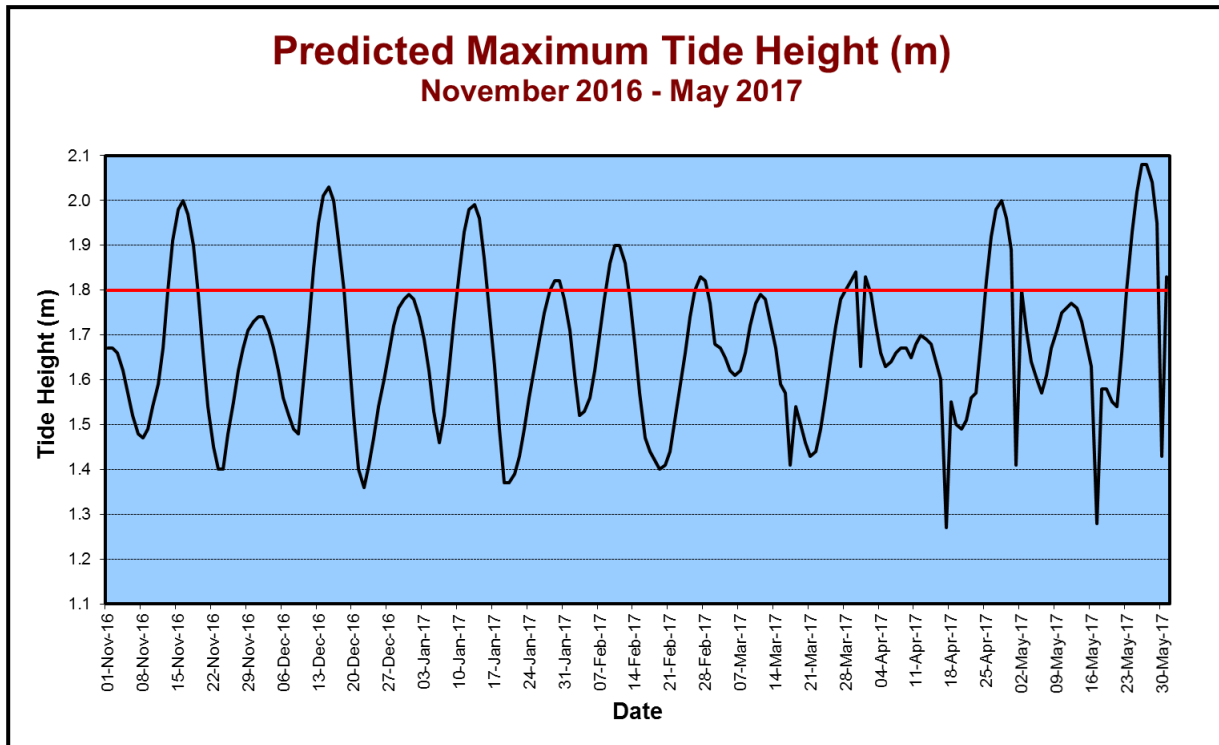
www.bom.gov.au/climate/outlooks/#/temperature/summary (Max & min temperature outlook).

According to the BOM as of 14/Mar/2017 the El Niño-Southern Oscillation remains neutral, however most climatic models are suggesting that an El Niño will form by July this year (a La Niña event is typically associated with wetter than average conditions and an El Niño with drier conditions).

For more information: www.bom.gov.au/climate/enso/ and, <http://www.bom.gov.au/climate/iod/>

Tidal

Tidal information is relevant for the prediction of the activity of the salt marsh mosquito, *Aedes vigilax*. Typically for NSW, tides of over 1.8m can induce hatching of *Aedes vigilax* larvae and the graph below of predicted tide heights can provide some indication of when this is likely to occur.



The next series of high tides that may initiate *Aedes vigilax* egg hatching are forecasted for 25-30/Mar/2017.

Note that actual tide heights can vary by 0.3m (or more in unusual circumstances) due to variations in atmospheric pressure, rainfall, wind and other climatic phenomena. Thus predicted tide height should be used as a gauge only for potential *Aedes vigilax* activity. The larvae of the saltmarsh mosquito relies on a inundation/drying cycle for the mudflats in which it lives; continual wet weather prevents the drying cycles thereby reducing larval production.

MVEV Climatic Models

Three predictive environmental based models for MVEV activity have been developed; the Forbes (which relies on rainfall in the river catchment basins of Eastern Australia), Nichols (based on the Southern Oscillation), and the Bennett theory (based on the Indian Ocean Dipole). The latter theory is poorly developed (and unreliable), and is not considered below. Note that all the predictive models have been developed on a limited data set and do not always forecast activity. There can also be unusual environmental conditions that may lead to the introduction of the virus to southeastern Australia, such as the movement of low pressure cells from the north to the south of the country during 2008 and 2011. Vertical transmission of the virus (from adult to the egg in *Aedes* species) can result in restricted activity following localised heavy precipitation (as per 2003 at Menindee).

i. Forbes' Hypothesis

Rainfall was not above Decile 7 in all of the river catchment basins in eastern Australia for the last quarter of 2015 or the majority of the catchments for the first quarter of 2016 (Table 1). For the Oct-Dec 2016 and Jan-Mar 2017 periods, rainfall was not above Decile 7 in all of the catchment basins.

Table 1. Rainfall indices for the main catchment basins of eastern Australia as per Forbes' hypothesis, relevant to the 2016-2017 season. Note that a value of 1 equals Decile 7 rainfall.

Catchment Basin	Oct-Dec 2015	Jan-Mar 2016	Oct-Dec 2016	Jan-Mar 2017*
Darling River	0.72	0.67	0.58	0.51
Lachlan/Murrumbidgee/Murray Rivers	0.70	1.14	0.92	0.92
Northern Rivers	1.35	0.57	0.98	1.10
North Lake Eyre system	1.35	0.63	1.09	0.80

*Data for January and February 2017 only.

ii. Nichol's Hypothesis

Table 2. The seasonal atmospheric pressures (in mm) according to Nichol's hypothesis, relevant to the 2016-2017 season.

	Autumn 2016	Winter 2016	Spring 2016
2015 Value	1010.30	1012.57	1010.07
Pre past MVEV seasons	<1009.74	<1012.99	<1009.99

Only the Winter period pertaining to the Nichol's hypothesis is in line with past MVEV active years.

Table 3. ARBOVIRAL ISOLATES

LOCATION - Site	Date Trapped	Mosquito Species	Virus
GEORGES RIVER – Picnic Point	19/Mar/17	<i>Aedes vigilax</i>	Ross River
GEORGES RIVER – Picnic Point	19/Mar/17	<i>Aedes vigilax</i>	Flavivirus
GEORGES RIVER – Picnic Point	19/Mar/17	*	Ross River
GEORGES RIVER – Alford's Point	13/Mar/17	<i>Aedes vigilax</i>	Ross River
GEORGES RIVER – Alford's Point	13/Mar/17	<i>Aedes vigilax</i>	Ross River
GEORGES RIVER – Illawong	13/Mar/17	<i>Aedes vigilax</i>	Ross River
GEORGES RIVER – Illawong	13/Mar/17	<i>Aedes vigilax</i>	Ross River
GEORGES RIVER – Illawong	13/Mar/17	<i>Aedes vigilax</i>	Ross River
GEORGES RIVER – Picnic Point	13/Mar/17	<i>Aedes vigilax</i>	Flavivirus
GEORGES RIVER – Picnic Point	13/Mar/17	<i>Aedes vigilax</i>	Flavivirus
GEORGES RIVER – Picnic Point	13/Mar/17	<i>Aedes vigilax</i>	Flavivirus
GEORGES RIVER – Picnic Point	13/Mar/17	<i>Aedes vigilax</i>	Ross River
GEORGES RIVER – Picnic Point	13/Mar/17	<i>Aedes vigilax</i>	Ross River
GEORGES RIVER – Picnic Point	13/Mar/17	*	Ross River
GEORGES RIVER – Illawong	7/Mar/17	*	Edge Hill
GEORGES RIVER – Picnic Point	2/Mar/17	<i>Aedes vigilax</i>	Ross River
GEORGES RIVER – Picnic Point	2/Mar/17	<i>Aedes vigilax</i>	Ross River
GEORGES RIVER – Illawong	2/Mar/17	*	Ross River
GRIFFITH – Lake Wyangan	6/Feb/17	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Lake Wyangan	6/Feb/17	*	Kokobera
GRIFFITH – Hanwood	31/Jan/17	<i>Culex annulirostris</i>	Kunjin
GRIFFITH – Hanwood	31/Jan/17	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Hanwood	31/Jan/17	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Hanwood	31/Jan/17	<i>Anopheles annulipes</i>	Sindbis
GRIFFITH – Lake Wyangan	31/Jan/17	<i>Culex annulirostris</i>	Sindbis
ALBURY – Kremur St	23/Jan/17	*	Kokobera
GRIFFITH – Hanwood	22/Jan/17	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Hanwood	22/Jan/17	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Hanwood	22/Jan/17	*	Sindbis
GRIFFITH – Lake Wyangan	22/Jan/17	*	Sindbis
LEETON – Farm 347	17/Jan/17	<i>Culex annulirostris</i>	Sindbis
LEETON – Farm 347	17/Jan/17	<i>Culex annulirostris</i>	Sindbis
ALBURY – Waterworks Rd	16/Jan/17	<i>Culex annulirostris</i>	Ross River
ALBURY – Waterworks Rd	16/Jan/17	*	Ross River
GRIFFITH – Hanwood	16/Jan/17	*	Barmah Forest
GRIFFITH – Hanwood	16/Jan/17	<i>Culex annulirostris</i>	Barmah Forest
GRIFFITH – Hanwood	10/Jan/17	<i>Culex annulirostris</i>	Ross River
GRIFFITH – Hanwood	10/Jan/17	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Hanwood	10/Jan/17	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Hanwood	10/Jan/17	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Hanwood	10/Jan/17	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Hanwood	10/Jan/17	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Lake Wyangan	10/Jan/17	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Lake Wyangan	10/Jan/17	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Lake Wyangan	10/Jan/17	<i>Culex annulirostris</i>	Sindbis

LEETON – Almond Rd	9/Jan/17	<i>Culex annulirostris</i>	Ross River
LEETON – Almond Rd	9/Jan/17	*	Ross River
LEETON – Farm 347	9/Jan/17	*	Sindbis
GRIFFITH – Lake Wyangan	3/Jan/17	<i>Culex annulirostris</i>	Sindbis
GEORGES RIVER – Alford's Point	29/Dec/16	<i>Aedes alboannulatus</i>	Ross River
GEORGES RIVER – Alford's Point	29/Dec/16	*	Ross River
ALBURY – Kremur St	19/Dec/16	*	Ross River
ALBURY – Kremur St	19/Dec/16	<i>Culex annulirostris</i>	Ross River
GRIFFITH – Barren Box	19/Dec/16	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Barren Box	19/Dec/16	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Barren Box	19/Dec/16	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Barren Box	19/Dec/16	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Lake Wyangan	19/Dec/16	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Lake Wyangan	19/Dec/16	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Lake Wyangan	19/Dec/16	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Lake Wyangan	19/Dec/16	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Lake Wyangan	19/Dec/16	<i>Culex annulirostris</i>	Sindbis
LEETON – Farm 347	13/Dec/16	<i>Culex annulirostris</i>	Ross River
LEETON – Farm 347	13/Dec/16	<i>Culex annulirostris</i>	Ross River
LEETON – Farm 347	13/Dec/16	<i>Culex annulirostris</i>	Sindbis
LEETON – Farm 347	13/Dec/16	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Barren Box	12/Dec/16	<i>Culex annulirostris</i>	Ross River
GRIFFITH – Barren Box	12/Dec/16	<i>Culex annulirostris</i>	Ross River
GRIFFITH – Barren Box	12/Dec/16	*	Ross River
GRIFFITH – Barren Box	12/Dec/16	<i>Anopheles annulipes</i>	Sindbis
GRIFFITH – Barren Box	12/Dec/16	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Barren Box	12/Dec/16	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Barren Box	12/Dec/16	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Lake Wyangan	12/Dec/16	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Lake Wyangan	12/Dec/16	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Lake Wyangan	12/Dec/16	<i>Culex annulirostris</i>	Sindbis
GEORGES RIVER – Illawong	8/Dec/16	*	Ross River
LEETON – Farm 347	7/Dec/16	*	Ross River
LEETON – Farm 347	7/Dec/16	<i>Culex annulirostris</i>	Sindbis
MURRAY – Moama	6/Dec/16	*	Ross River
ALBURY – Kremur St	5/Dec/16	*	Ross River
ALBURY – Kremur St	5/Dec/16	<i>Culex annulirostris</i>	Ross River
ALBURY – Kremur St	5/Dec/16	<i>Aedes bancroftianus</i>	Ross River
FORBES – STP	5/Dec/16	*	Ross River
FORBES – STP	5/Dec/16	<i>Culex annulirostris</i>	Ross River
FORBES – STP	5/Dec/16	<i>Culex annulirostris</i>	Ross River
FORBES – STP	5/Dec/16	<i>Culex annulirostris</i>	Ross River
FORBES – STP	5/Dec/16	<i>Culex australicus</i>	Ross River
GRIFFITH – Barren Box	5/Dec/16	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Lake Wyangan	5/Dec/16	<i>Culex australicus</i>	Ross River
GRIFFITH – Lake Wyangan	5/Dec/16	<i>Culex australicus</i>	Ross River
GRIFFITH – Hanwood	31/Nov/16	<i>Culex annulirostris</i>	Ross River
GRIFFITH – Hanwood	31/Nov/16	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Hanwood	31/Nov/16	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Hanwood	31/Nov/16	<i>Culex annulirostris</i>	Sindbis

GRIFFITH – Lake Wyangan	31/Nov/16	<i>Anopheles annulipes</i>	Ross River
GRIFFITH – Lake Wyangan	31/Nov/16	<i>Anopheles annulipes</i>	Ross River
GRIFFITH – Lake Wyangan	31/Nov/16	*	Ross River
FORBES – STP	29/Nov/16	<i>Culex annulirostris</i>	Ross River
FORBES – STP	29/Nov/16	<i>Culex australicus</i>	Ross River
FORBES – Toms Lagoon	29/Nov/16	<i>Culex annulirostris</i>	Ross River
LEETON – Farm 347	29/Nov/16	<i>Culex annulirostris</i>	Ross River
GRIFFITH – Barren Box	21/Nov/16	<i>Culex annulirostris</i>	Ross River
GRIFFITH – Barren Box	21/Nov/16	<i>Culex annulirostris</i>	Ross River
GRIFFITH – Barren Box	21/Nov/16	<i>Anopheles annulipes</i>	Ross River
GRIFFITH – Barren Box	21/Nov/16	<i>Culex annulirostris</i>	Sindbis
GRIFFITH – Hanwood	21/Nov/16	<i>Culex annulirostris</i>	Ross River
GRIFFITH – Hanwood	21/Nov/16	<i>Culex annulirostris</i>	Ross River
GRIFFITH – Hanwood	21/Nov/16	<i>Culex annulirostris</i>	Ross River
GRIFFITH – Barren Box	21/Nov/16	*	Ross River
LEETON – Farm 347	16/Nov/16	<i>Culex annulirostris</i>	Ross River
LEETON – Farm 347	16/Nov/16	<i>Anopheles annulipes</i>	Ross River
LEETON – Farm 347	16/Nov/16	*	Ross River
FORBES – Toms Lagoon	15/Nov/16	<i>Culex annulirostris</i>	Ross River
FORBES – STP	15/Nov/16	<i>Culex annulirostris</i>	Barmah Forest
FORBES – STP	15/Nov/16	*	Barmah Forest
GRIFFITH – Lake Wyangan	14/Nov/16	<i>Aedes sagax</i>	Barmah Forest
GRIFFITH – Lake Wyangan	14/Nov/16	*	Barmah Forest
MURRAY – Moama	8/Nov/16	*	Ross River
MURRAY – Moama	8/Nov/16	<i>Aedes sagax</i>	Ross River
FORBES – Toms Lagoon	7/Nov/16	<i>Aedes sagax</i>	Sindbis
GRIFFITH – Lake Wyangan	1/Nov/16	<i>Aedes theobaldi</i>	Ross River
GRIFFITH – Lake Wyangan	1/Nov/16	<i>Anopheles annulipes</i>	Ross River

*Detection via Honey-Baited Cards, the mosquito species cannot be determined.

<http://medent.usyd.edu.au/arbovirus/results/virusisolates.htm>

Table 4. Arboviral Detections* 2016-2017, Summary Table

LOCATION	Date Trapped	Virus						Total
		BFV	RRV	SINV	EHV	KOKV	KUNV	
ALBURY	23/Jan/17					1		1
ALBURY	16/Jan/17		2					2
ALBURY	19/Dec/16		2					2
ALBURY	5/Dec/16		3					3
FORBES	5/Dec/16		5					5
FORBES	29/Nov/16		3					3
FORBES	15/Nov/16	2	1					3
FORBES	7/Nov/16			1				1
GEORGES RIVER	19/Mar/17		2					1
GEORGES RIVER	13/Mar/17		8					8
GEORGES RIVER	7/Mar/17				1			1
GEORGES RIVER	2/Mar/17		3					3
GEORGES RIVER	29/Dec/16		2					2
GEORGES RIVER	8/Dec/16		1					1
GRIFFITH	6/Feb/17			1		1	1	3
GRIFFITH	31/Jan/17			4				4
GRIFFITH	22/Jan/17			4				4
GRIFFITH	16/Jan/17	2						2
GRIFFITH	10/Jan/17		1	7				8
GRIFFITH	3/Jan/17			1				1
GRIFFITH	19/Dec/16			9				9
GRIFFITH	12/Dec/16		3	7				10
GRIFFITH	5/Dec/16		2	1				3
GRIFFITH	31/Nov/16		4	3				7
GRIFFITH	21/Nov/16		7	1				8
GRIFFITH	14/Nov/16	2						2
GRIFFITH	1/Nov/16		2					2
LEETON	17/Jan/17			2				2
LEETON	9/Jan/17		2	1				3
LEETON	13/Dec/16		2	2				4
LEETON	7/Dec/16		1	1				2
LEETON	29/Nov/16		1					1
LEETON	16/Nov/16		3					3
MURRAY	6/Dec/16		1					1
MURRAY	8/Nov/16		2					2
TOTAL		6	63	45	1	2	1	118

*This is a summary of the detections via FTA card and cell culture, in some cases both systems will be detecting the same virus.

HUMAN NOTIFICATIONS

Weekly notifications of human mosquito-borne diseases infections are available from the NSW Ministry of Health, Communicable Disease Weekly Report and summarised in the Table below*: www.health.nsw.gov.au/Infectious/reports/Pages/CDWR.aspx. It should also be noted that notifications are for NSW residents and that infection may have been acquired elsewhere.

Table 5. Notifications of Mosquito-Borne Disease in NSW, 2016-2017*

Week Ending	RRV	BFV	DENV [†]	Malaria [†]	CHIKV [†]	ZIKV [†]	Total
3-Jul-16	3	0	1	1	0	0	5
10-Jul-16	2	0	5	2	0	0	9
17-Jul-16	4	1	6	0	0	0	11
24-Jul-16	3	3	9	2	0	0	17
31-Jul-16	2	0	6	4	0	0	12
7-Aug-16	2	0	6	3	0	0	11
14-Aug-16	1	0	5	1	0	0	7
21-Aug-16	4	0	1	1	1	0	7
28-Aug-16	2	0	4	0	1	0	7
4-Sep-16	3	0	4	0	0	0	7
11-Sep-16	1	0	3	2	0	0	6
18-Sep-16	3	0	3	1	0	1	8
25-Sep-16	9	0	4	1	0	1	15
2-Oct-16	2	0	0	0	0	1	3
9-Oct-16	3	0	5	2	0	0	10
16-Oct-16	2	0	8	4	1	0	15
23-Oct-16	3	0	9	0	1	0	13
30-Oct-16	6	0	5	0	1	0	12
6-Nov-16	4	0	4	2	2	0	12
13-Nov-16	2	0	9	0	1	0	12
20-Nov-16	6	0	10	0	1	0	17
27-Nov-16	8	0	4	2	1	0	15
4-Dec-16	13	0	6	2	1	0	22
11-Dec-16	18	0	8	3	0	0	29
18-Dec-16	21	0	2	0	2	0	25
25-Dec-16	31	0	0	2	0	0	33
1-Jan-17	8	0	3	1	0	0	12
7-Jan-17	35	0	2	2	1	0	40
14-Jan-17	82	1	7	1	1	0	92
21-Jan-17	122	1	8	3	0	0	134
28-Jan-17	84	3	12	0	0	0	99
4-Feb-17	85	0	10	1	0	0	96

Week Ending	RRV	BFV	DENV [†]	Malaria [†]	CHIKV [†]	ZIKV [†]	Total
11-Feb-17	69	2	5	3	0	0	79
18-Feb-17	63	0	13	0	0	0	76
25-Feb-17	47	0	5	1	0	0	53
4-Mar-17	68	4	7	1	0	0	80
11-Mar-17	44	0	9	3	0	0	56
18-Mar-17	41	1	7	1	0	0	50
Total	906	16	215[†]	52[†]	15[†]	3[†]	1,207

[†]All of these viruses are acquired overseas, although some DENV cases may be from North Queensland. *The data in this table is updated once available from the NSW Ministry of Health.

Comment: there were 41 notifications of Ross River virus disease reported over the last week. Notifications from the coast are now likely to dominate the case numbers as the inland Ross River epidemic is now well over.

Barmah Forest virus disease notifications continue to be very low despite a series of arboviral detections. This decline appears to be artificial and due to the withdrawal of the commercial test that was over diagnosing patients.

Table 6. Ross River virus infection notifications in NSW residents, by month of disease onset per fiscal year. Jul 2013 to March 2017*.

Year	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
2013-2014	36	23	27	36	30	30	33	35	44	72	86	57	509
2014-2015	38	50	46	67	59	90	117	305	431	264	102	50	1,619
2015-2016	54	61	53	61	70	54	42	60	78	79	52	16	680
2016-2017	12	10	21	18	38	215	410	235	75				1,034

*updated 23/Mar/2017. Table from:

<http://www0.health.nsw.gov.au/data/diseases/rossriver.asp>

For more data on Ross River virus notifications in NSW see:

<http://www0.health.nsw.gov.au/data/diseases/rossriver.asp>

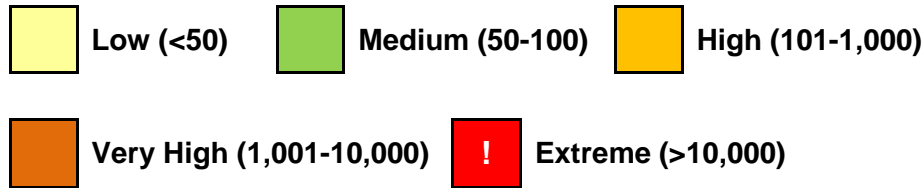
For more data on Barmah Forest virus notifications in NSW see:

<http://www0.health.nsw.gov.au/data/diseases/barmahforest.asp>

MOSQUITO RESULTS

All the full mosquito results can be obtained from:
<http://medent.usyd.edu.au/arbovirus/results/results.htm#site>

Mosquito abundances are best described in relative terms, and in keeping with the terminology from previous NSWASP Annual Reports, mosquito numbers are depicted on the tables below as:



Each location represents the average for all trapping sites at that location.

Inland

Location	Mosquito	Oct-16					Nov					Dec					Jan-17					Feb				Mar				
		2	9	16	23	30	6	13	20	27	4	11	18	25	1	8	15	22	29	5	12	19	26	5	12	19	26			
Albury	<i>Cx. annul</i>																													
	Total Mosq.																													
Bourke	<i>Cx. annul</i>																													
	Total Mosq.																													
Forbes	<i>Cx. annul</i>																													
	Total Mosq.																													
Griffith	<i>Cx. annul</i>																													
	Total Mosq.																													
Leeton	<i>Cx. annul</i>																													
	Total Mosq.																													
Mathoura	<i>Cx. annul</i>																													
	Total Mosq.																													
Menindee	<i>Cx. annul</i>																													
	Total Mosq.																													
Wagga	<i>Cx. annul</i>																													
	Total Mosq.																													

Coastal

Location	Mosquito	Nov				Dec				Jan-17					Feb				Mar				Apr				
		6	13	20	27	4	11	18	25	1	8	15	22	29	5	12	19	26	5	12	19	26	2	9	16	23	30
Ballina	<i>Ae. vigilax</i>																										
	Total Mosq.																										
Coffs Harbour	<i>Ae. vigilax</i>																										
	Total Mosq.																										
Gosford	<i>Ae. vigilax</i>																										
	Total Mosq.																										
Lake Macquarie	<i>Ae. vigilax</i>																										
	Total Mosq.																										
Port Macquarie	<i>Ae. vigilax</i>																										
	Total Mosq.																										
Tweed	<i>Ae. vigilax</i>																										
	Total Mosq.																										
Wyong	<i>Ae. vigilax</i>																										
	Total Mosq.																										

Sydney

Location	Mosquito	Nov				Dec				Jan-17					Feb				Mar				Apr				
		6	13	20	27	4	11	18	25	1	8	15	22	29	5	12	19	26	5	12	19	26	2	9	16	23	30
Banks-town	<i>Ae. vigilax</i>																										
	Total Mosq.																										
Blacktown	<i>Ae. vigilax</i>																										
	Total Mosq.																										
Georges River	<i>Ae. vigilax</i>																										
	Total Mosq.																										
Hawkes-bury	<i>Ae. vigilax</i>																										
	Total Mosq.																										
Hills Shire	<i>Ae. vigilax</i>																										
	Total Mosq.																										
Penrith	<i>Ae. vigilax</i>																										
	Total Mosq.																										
Sydney Olympic Park	<i>Ae. vigilax</i>																										
	Total Mosq.																										

Sentinel Chicken Seroconversions

http://medent.usyd.edu.au/arbovirus/results/chicken_results_all_sites.htm

Location	Oct-16					Nov				Dec				Jan-17					Feb				Mar							
	2	9	16	23	30	8	13	20	27	4	11	18	22	1	8	15	22	29	5	12	19	26	5	12	19	26				
Bourke																														
Deniliquin						15N	15N	13N		13N	13N	13N	13N	12N	10N	10N	15N	10N	9N	9N	9N	9N	9N	9N						
Forbes				15N	15N	15N	15N	15N	15N	15N	15N	15N		15N	15N			15N	14N	15N			13N	15N						
Griffith			15N	15N	15N	15N	15N	15N	15N	15N	13N	14N		14N	14N	14N	14N	14N	14N	14N	14N	14N	14N	14N						
Hay			15N	15N	15N	15N	15N	15N	15N		15N	15N	15N	15N	15N	15N		14N	15N	15N	15N	15N	15N	15N						
Leeton			15N	15N	15N	15N	15N	15N	15N		15N	14N	15N	15N		15N	15N	15N	15N			15N	14N	14N						
Macquarie Marshes								15N	15N		15N			15N	15N	¹ KUNV, 13N	⁵ KUNV 9N	9N			8N									
Menindee					15N	15N	15N	14N	14N	15N	13N	13N	13N	13N		13N	13N	13N	13N	13N	13N	13N	13N							
Moama								15N	15N			15N																		
Moree										15N	15N	15N	12N	15N	15N	15N	15N	15N	13N	14N	15N	15N	15N	15N						
Wee Waa						15N	13N	15N	15N	15N		15N	15N		14N	14N	14N	14N	14N	14N	14N	14N	14N	14N	15N	15N				

N= Negative for MVEV & KUNV

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