

NSW ARBOVIRUS SURVEILLANCE & MOSQUITO MONITORING PROGRAM 2016-2017 Weekly Update

Date: 5/May/2017

SUMMARY

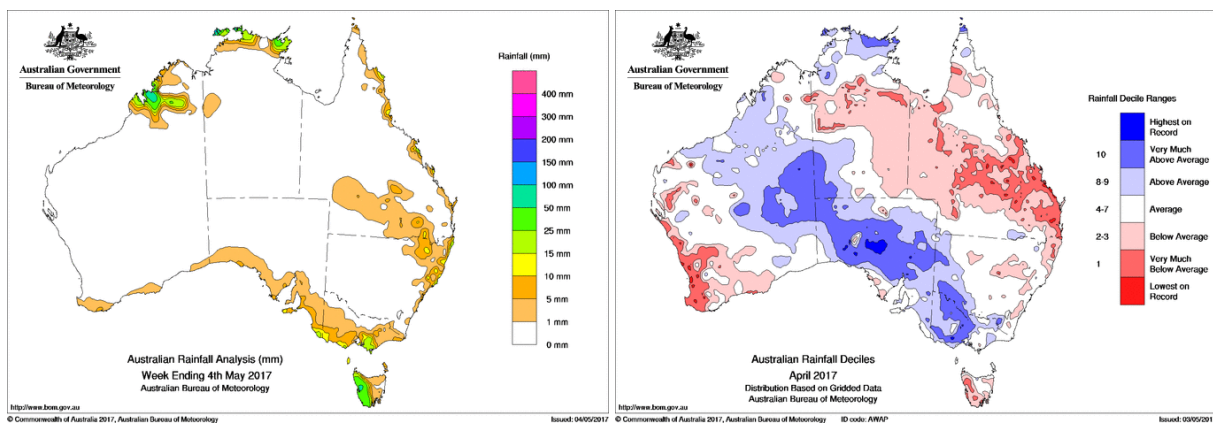
- **Climate:** over the last week, there little rainfall across the state. Precipitation during April was average for most of the state, but below average in for the coast in the far north and above average in the south west inland region. Maximum and minimum temperatures for April were close to average.
- **Three Month Forecast:** for May to July 2017, rainfall predictions for NSW are for below average precipitation, with southern areas of the state having a higher probability of being drier than average. Maximum and minimum temperatures are expected to be above normal for most of the state and higher towards the southeast. According to the BOM as of 26/Apr/2017, there is a 50% chance of an El Niño forming year.
- **Tidal:** the current series of high tides in the north of the state and southeast Qld were well above the predicted height and extensive spraying was undertaken in the region.
- **MVEV models:** the data relevant to both the Forbes' and Nichols' hypotheses have been updated to the end of March 2017 and both theories remain inconsistent with past MVEV outbreaks.
- **Mosquito Numbers Inland:** surveillance has ceased for the season.
- **Mosquito Numbers Coast:** 'high' mosquito numbers continue at almost all sites along the coast north of Sydney, with few *Aedes vigilax*.
- **Mosquito Numbers Sydney:** surveillance has ceased for the season.
- **Arboviral Isolates:** the flavivirus detection mentioned in last week's report from Georges River was Edge Hill virus and there was another flavivirus detection (to be typed) from the same locality.
- **Chicken Sentinel Seroconversions:** surveillance activities have ceased.
- **Human Notifications:** there were 17 Ross River virus notifications for the week 16/Apr-22/Apr, with a total of 1,241 cases reported for the season.

Comment: mosquito numbers continue to be high from the coastal regions of NSW north of Sydney, with little increase in human notifications of Ross River virus. It is unlikely that much further arboviral activity will occur for the season.

ENVIRONMENTAL CONDITIONS

Rainfall

Rainfall across Australia for the week ending 4/May/2017 is depicted on the left and monthly rainfall deciles for April 2017 are on the right. Over the last week, there little rainfall across the state. Precipitation during April (right graph below) was average for most of the state, but below average in for the coast in the far north and above average in the south west inland region. Maximum and minimum temperatures for April were close to average.



Three Month Rainfall & Temperature Forecast

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

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

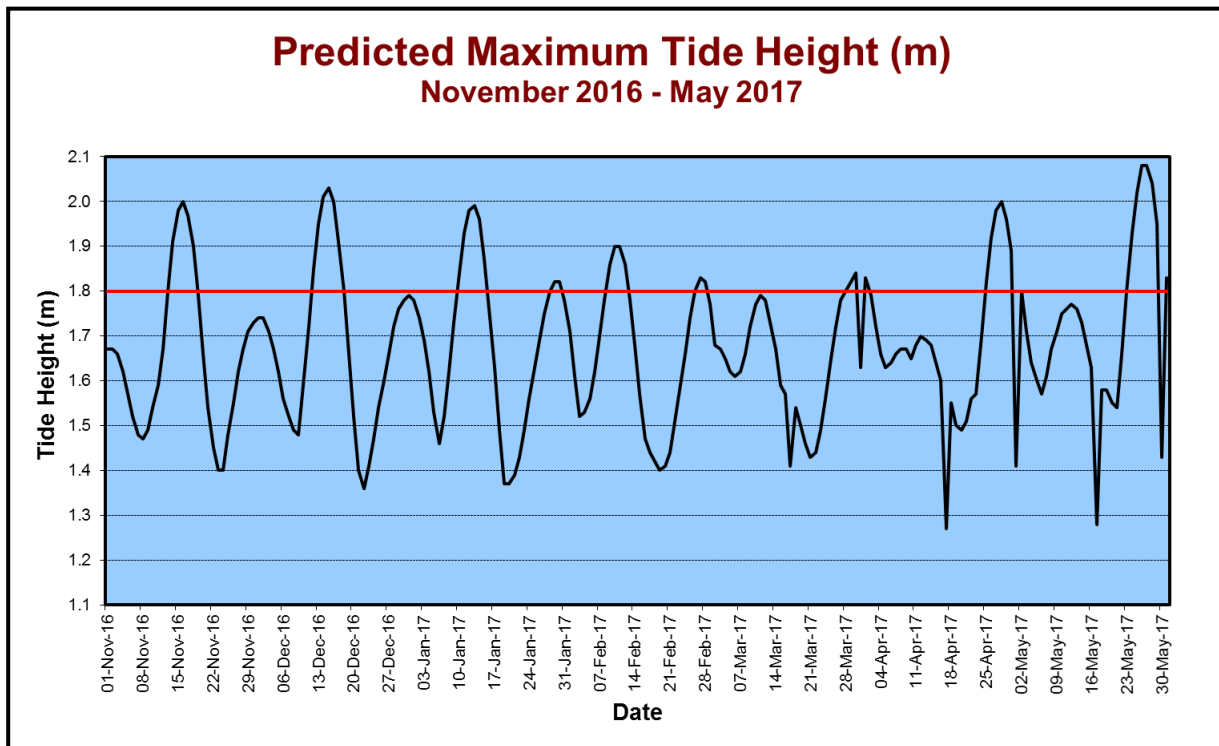
www.bom.gov.au/climate/outlooks/#/temperature/summary (Max & min temperature outlook).

According to the BOM as of 26/Apr/2017 the El Niño-Southern Oscillation remains neutral, however current climatic models are suggesting that there is a 50% chance of an El Niño forming 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 current series of high tides in the north of the state and southeast Qld were well above the predicted height and extensive spraying was undertaken in the region (Mike Muller, Brisbane City Council, *pers. comm.*).

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 | 0.81 |
| Lachlan/Murrumbidgee/Murray Rivers | 0.70 | 1.14 | 0.92 | 1.01 |
| Northern Rivers | 1.35 | 0.57 | 0.98 | 1.03 |
| North Lake Eyre system | 1.35 | 0.63 | 1.09 | 0.73 |

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 – Illawong | 20/Apr/17 | <i>Aedes notoscriptus</i> | Flavivirus |
| GEORGES RIVER – Illawong | 20/Apr/17 | <i>Aedes procax</i> | Edge Hill |
| PORT MACQUARIE – Partridge Ck | 10/Apr/17 | * | Sindbis |
| GEORGES RIVER – Alford's Point | 26/Mar/17 | * | Kokobera |
| GEORGES RIVER – Alford's Point | 26/Mar/17 | <i>Aedes vigilax</i> | Ross River |
| GEORGES RIVER – Alford's Point | 26/Mar/17 | <i>Coquillettidia linealis</i> | Ross River |
| GEORGES RIVER – Alford's Point | 26/Mar/17 | <i>Coquillettidia linealis</i> | Ross River |
| GEORGES RIVER – Alford's Point | 26/Mar/17 | <i>Coquillettidia linealis</i> | Ross River |
| GEORGES RIVER – Picnic Point | 26/Mar/17 | <i>Coquillettidia linealis</i> | Ross River |
| GEORGES RIVER – Picnic Point | 26/Mar/17 | * | Edge Hill |
| GEORGES RIVER – Picnic Point | 19/Mar/17 | <i>Aedes vigilax</i> | Ross River |
| GEORGES RIVER – Picnic Point | 19/Mar/17 | <i>Aedes vigilax</i> | Stratford |
| 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> | Stratford |
| GEORGES RIVER – Picnic Point | 13/Mar/17 | <i>Aedes vigilax</i> | Stratford |
| 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 – 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 | STRV | |
| 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 | 20/Apr/17 | | | | 1 | | | | 1 |
| GEORGES RIVER | 26/Mar/17 | | 6 | | 1 | | | | 7 |
| GEORGES RIVER | 19/Mar/17 | | 2 | | | | | 1 | 3 |
| GEORGES RIVER | 13/Mar/17 | | 8 | | | | | 2 | 10 |
| 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 |
| PORT MACQUARIE | 10/Apr/17 | | | 1 | | | | | 1 |
| TOTAL | | 6 | 69 | 46 | 3 | 2 | 1 | 3 | 129 |

*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 | 44 | 1 | 7 | 1 | 0 | 0 | 53 |
| 25-Mar-17 | 34 | 2 | 2 | 0 | 1 | 0 | 39 |
| 1-Apr-17 | 50 | 0 | 1 | 0 | 0 | 0 | 51 |
| 8-Apr-17 | 30 | 3 | 3 | 3 | 0 | 0 | 39 |
| 15-Apr-17 | 24 | 0 | 3 | 1 | 0 | 0 | 28 |
| 22-Apr-17 | 17 | 1 | 1 | 0 | 0 | 0 | 19 |
| Total | 1064 | 21 | 225[†] | 56[†] | 16[†] | 3[†] | 1,386 |

[†]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 33 notifications of Ross River virus disease in the most recent report. 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 | 11 | 20 | 17 | 37 | 213 | 416 | 248 | 177 | 78 | | | 1,241 |

*updated 13/Apr/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>

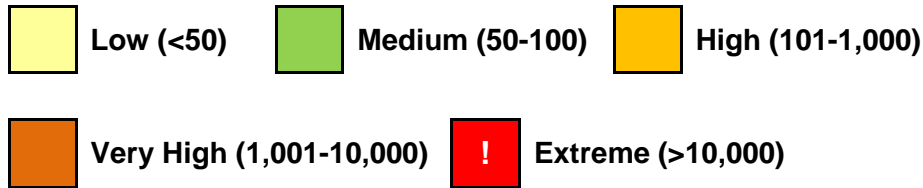
For more data on Barmah Forest virus notifications in NSW see:

<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 | Nov | | | | Dec | | | | Jan-17 | | | | Feb | | | | Mar | | | | Apr | | | | | |
|--------------------------|------------------|-----|----|----|----|-----|---|---|---|--------|---|----|----|-----|---|----|----|-----|---|----|----|-----|---|---|----|----|----|
| | | 6 | 13 | 20 | 27 | 4 | 2 | 2 | 2 | 2 | 8 | 15 | 22 | 29 | 5 | 12 | 19 | 26 | 5 | 12 | 19 | 26 | 2 | 9 | 16 | 23 | 30 |
| 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 | 8N | | | | | |
| Forbes | | | | 15N | 15N | 15N | 15N | 15N | 15N | 15N | 15N | 15N | | 15N | 15N | | | 15N | 14N | 15N | | | 13N | 15N | 15N | | | | | |
| Griffith | | | 15N | 15N | 15N | 15N | 15N | 15N | 15N | 15N | 13N | 14N | | 14N | 14N | 14N | 14N | 14N | 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 | 14N | 15N | 15N | 15N | 15N | 15N |
| Leeton | | | 15N | 15N | 15N | 15N | 15N | 15N | 15N | | 15N | 14N | 15N | 15N | | 15N | 15N | 15N | 15N | | | 15N | 14N | 14N | 14N | 14N | 14N | 14N | 14N | 14N |
| Macquarie Marshes | | | | | | | | 15N | 15N | | 15N | | | 15N | 15N | ¹ KUNV, 13N | ⁵ KUNV 9N | 9N | | | | 8N | | 14N | 15N | | 15N | | 15N | |
| Menindee | | | | | 15N | 15N | 15N | 14N | 14N | 15N | 13N | 13N | 13N | 13N | | 13N | 13N | 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 | 15N | 15N | 15N | 15N | 15N | 15N |
| Wee Waa | | | | | | | 15N | 13N | 15N | 15N | 15N | | 15N | 15N | | 14N | 14N | 14N | 14N | 14N | 14N | 14N | 14N | 14N | 14N | 14N | 15N | 15N | 13N | 13N |

N= Negative for MVEV & KUNV

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