

NSW Arbovirus Surveillance and Mosquito Monitoring 2022-2023

Weekly Update: Week ending 4 February 2023

(Report Number 16)



Summary

Arbovirus Detections

- **Sentinel Chickens:** Murray Valley encephalitis virus antibodies were detected in blood samples collected at Menindee and Macquarie Marshes indicating exposure to these viruses.
- **Mosquito Isolates:** Murray Valley encephalitis virus was detected in mosquitoes collected at Albury, Mathoura and Leeton.

Mosquito Abundance

- **Inland:** LOW at Albury, Armidale, Balranald, Bourke, Cootamundra, Corowa, Deniliquin, Goulburn, Macquarie Marshes, Menindee, Moama, Moree, Narrabri, Narrandera, Temora, Walgett, West Wyalong, Yass and Young. MEDIUM at Forbes, Mathoura and Murrumbidgee. HIGH at Griffith, Grong Grong, Leeton, Wagga Wagga and Wilcannia.
- **Coast:** LOW at Byron Bay, Coffs Harbour, Kempsey, Kiama, Lismore, Millbank, Mullumbimby, Murwillumbah, Port Macquarie, Shoalhaven and Wauchope. MEDIUM at Tweed Heads and Wyong. HIGH at Ballina, Bega, Gosford, Lake Cathie, Newcastle.
- **Sydney:** LOW at Bankstown, Blacktown, Camden, Earlwood, Hawkesbury and Northern Beaches. HIGH at Canada Bay, Liverpool, Penrith and Sydney Olympic Park. VERY HIGH at Parramatta.

Environmental Conditions

- **Climate:** In the week ending 4 February 2023, rainfall totals were low to moderate across NSW. About average rainfall is predicted for NSW in February 2023, except for the south coast where rainfall is likely to be higher than usual. Minimum temperatures are predicted to be higher than usual along the south coast of NSW and about average elsewhere. Maximum temperatures are likely to be lower than usual in NSW.
- **Tides:** High tides over 1.8 metres are predicted for 18-23 February, which could trigger hatching of *Aedes vigilax*.

Human Arboviral Disease Notifications

- **Ross River Virus:** 8 cases were notified in the week ending 31 December 2022.
- **Barmah Forest Virus:** 0 cases were notified in the week ending 31 December 2022.

Comments and other findings of note

A high proportion of the mosquitoes collected inland continue to be the species *Culex annulirostris*, which is a vector for Japanese Encephalitis virus, Murray Valley encephalitis virus (MVEV) and Kunjin virus. The distance between detections indicates MVEV and Kunjin virus are likely to be widespread in inland NSW. The primary hosts of MVEV and Kunjin in natural transmission cycles are thought to be waterbirds. Only a small proportion of people infected with MVEV or Kunjin experience symptoms, which may include fever, headache, nausea, vomiting, loss of appetite, diarrhoea, and muscle aches. Severe MVEV or Kunjin infection causing brain inflammation is very rare but can result in lifelong neurological complications or be fatal. Signs of severe infection may include severe headache, neck stiffness, sensitivity to bright lights, drowsiness, confusion, seizures, and loss of consciousness.

Weekly reports are available at:

www.health.nsw.gov.au/Infectious/mosquito-borne/Pages/surveillance.aspx

Please send questions or comments about this report to:

Surveillance and Risk Unit, Environmental Health Branch, Health Protection NSW:
hssg-ehbsurveillance@health.nsw.gov.au

Testing and scientific services are provided by the Department of Medical Entomology, NSW Health Pathology, Institute of Clinical Pathology and Medical Research (ICPMR) for mosquito surveillance, and the Arbovirus Emerging Diseases Unit, NSW Health Pathology (ICPMR) for sentinel chicken surveillance.

The arbovirus surveillance and mosquito monitoring results in this report remain the property of the NSW Ministry of Health and may not be used or disseminated to unauthorised persons or organisations without permission.

SPHN (EH) 220867

Cover photos: **Bottom left** - Common banded mosquito, *Culex annulirostris*
Top and bottom right - Saltmarsh mosquito, *Aedes vigilax*
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Arbovirus Detections

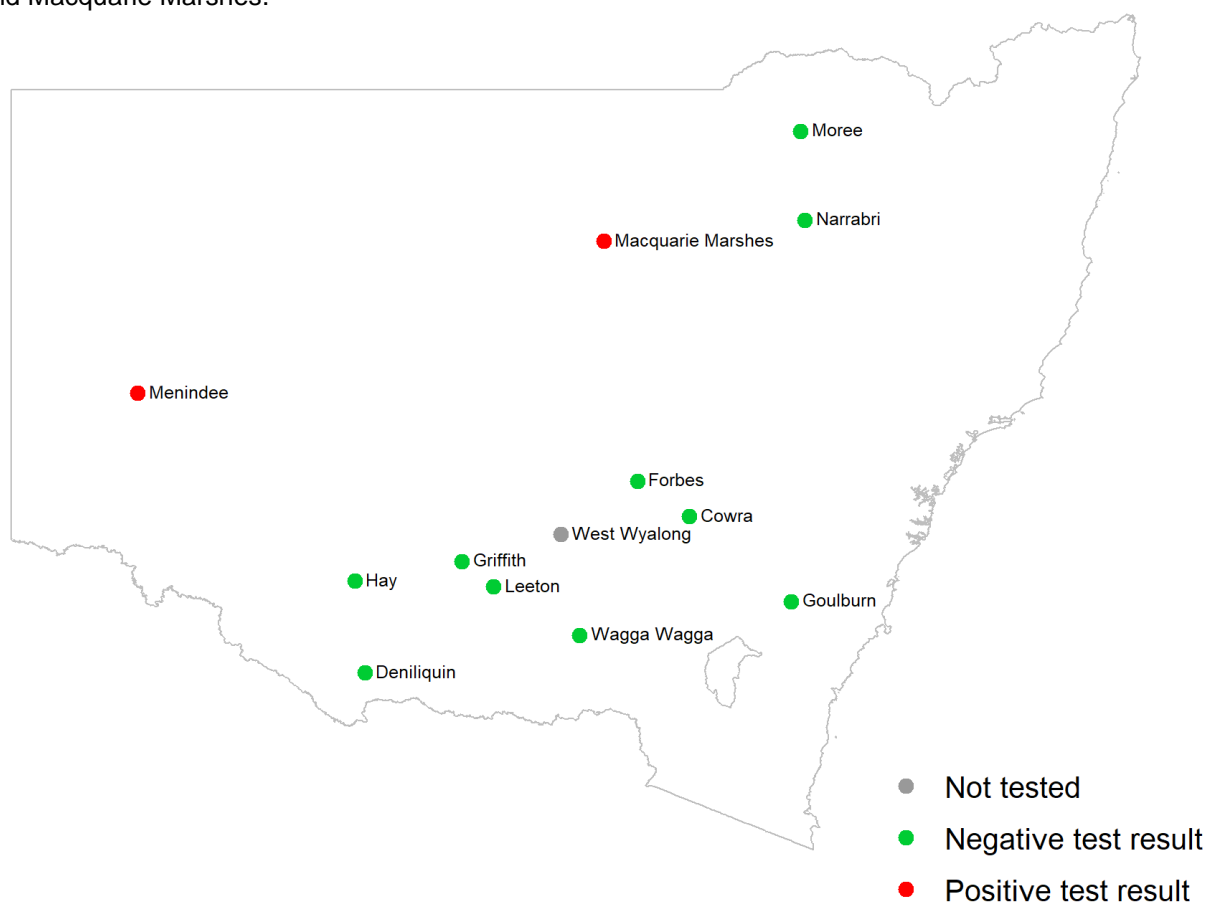
This section details detections of Murray Valley encephalitis virus, Kunjin virus, Ross River virus, Barmah Forest virus and Japanese encephalitis virus in the NSW Arbovirus Surveillance and Mosquito Monitoring Program.

Sentinel chickens

Chickens are bled for detection of antibodies directed against Murray Valley encephalitis virus, Kunjin virus and Japanese encephalitis virus, indicating exposure to these viruses. Test results for the past three weeks are shown in the map below and all positive test results for the season are detailed in the table.

Sentinel chicken antibody test results for samples collected in the three weeks to 4 February 2023

There were positive test results for Murray Valley encephalitis virus for samples collected at Menindee and Macquarie Marshes.



Positive test results in the 2022-2023 surveillance season

Date of sample collection	Location	Virus
12 January 2023	Menindee	Murray Valley encephalitis
12 January 2023	Menindee	Kunjin
19 January 2023	Menindee	Murray Valley encephalitis
20 January 2023	Macquarie Marshes	Murray Valley encephalitis

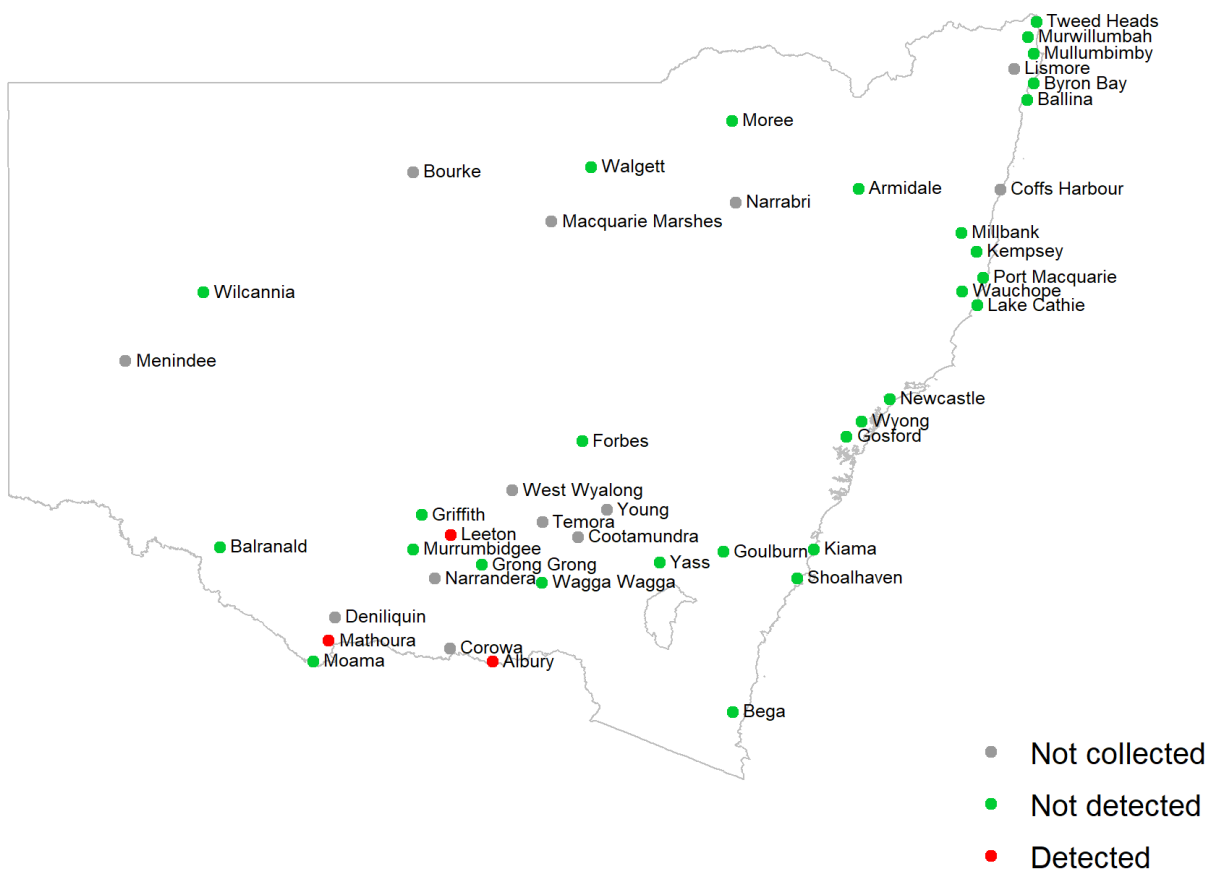
Mosquito isolates

Whole grinds of collected mosquitoes are tested for arbovirus nucleic acids to determine the presence of arboviruses in mosquitoes. Test results for detections of Ross River virus, Barmah Forest virus, Murray Valley encephalitis virus, Kunjin virus and Japanese encephalitis virus for the past week are shown in the maps below. Detections of all arboviruses (including Edge Hill virus) for the season are detailed in the table.

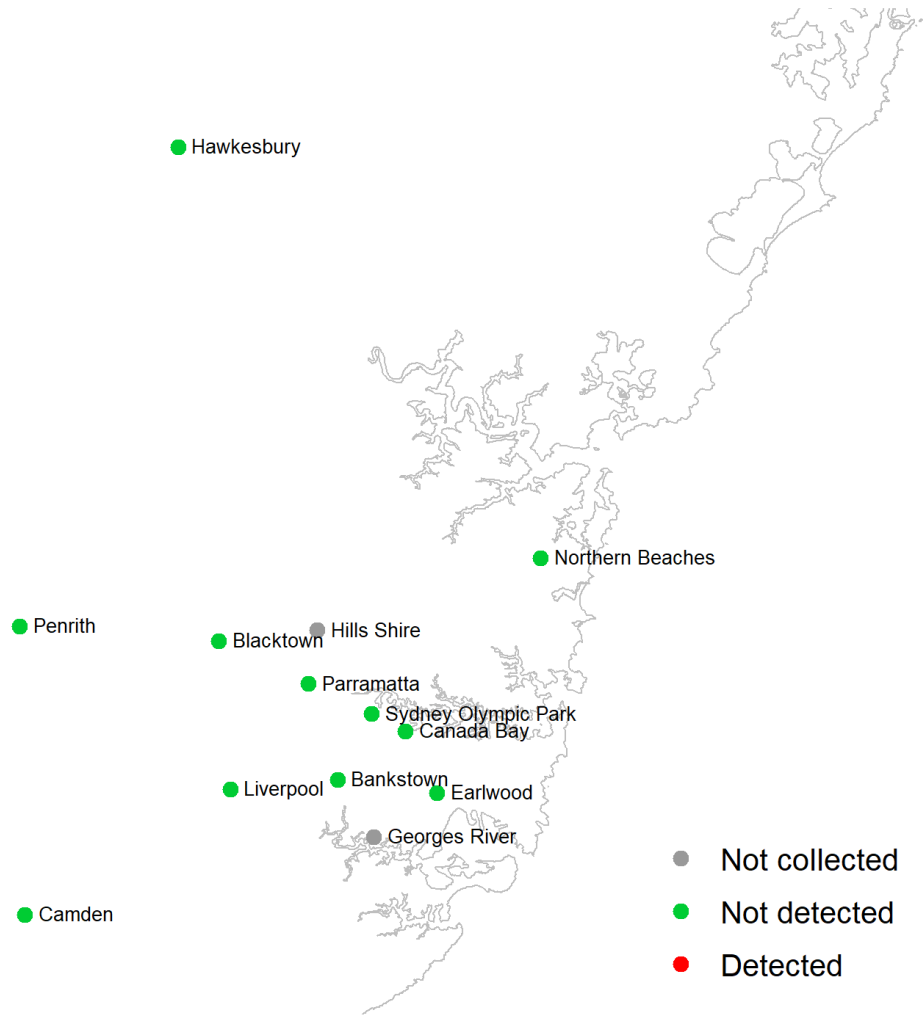
Test results for mosquito trapping sites reported in the week ending 4 February 2023

Murray Valley encephalitis virus was detected in mosquitoes collected at Albury, Mathoura and Leeton.

Inland and Coastal sites



Sydney sites



Arboviruses detected in the 2022-2023 surveillance season

Date of sample collection	Location	Virus
14 November 2022	Macquarie Marshes	Barmah Forest
15 November 2022	Griffith	Ross River
22 November 2022	Griffith	Barmah Forest
5 December 2022	Leeton	Barmah Forest
5 December 2022	Temora	Ross River
5 December 2022	Grong Grong	Edge Hill
6 December 2022	Deniliquin	Barmah Forest
6 December 2022	Griffith	Barmah Forest
12 December 2022	Grong Grong	Barmah Forest
13 December 2022	Penrith	Edge Hill
4 January 2023	Menindee	Murray Valley encephalitis
9 January 2023	Corowa	Ross River
9 January 2023	Corowa	Edge Hill
9 January 2023	Young	Barmah Forest
10 January 2023	Griffith	Murray Valley encephalitis
10 January 2023	Menindee	Murray Valley encephalitis
16 January 2023	Griffith	Murray Valley encephalitis
17 January 2023	Mathoura	Murray Valley encephalitis
17 January 2023	Moama	Murray Valley encephalitis
23 January 2023	Macquarie Marshes	Murray Valley encephalitis
23 January 2023	Macquarie Marshes	Kunjin
23 January 2023	Temora	Murray Valley encephalitis
23 January 2023	Griffith	Kunjin
23 January 2023	Balranald	Murray Valley encephalitis
30 January 2023	Albury	Murray Valley encephalitis
30 January 2023	Mathoura	Murray Valley encephalitis
31 January 2023	Leeton	Murray Valley encephalitis

Note:

Human cases of Edge Hill virus have rarely been reported. Infection may present as a mild self-limiting febrile illness with body aches.

Mosquito Abundance

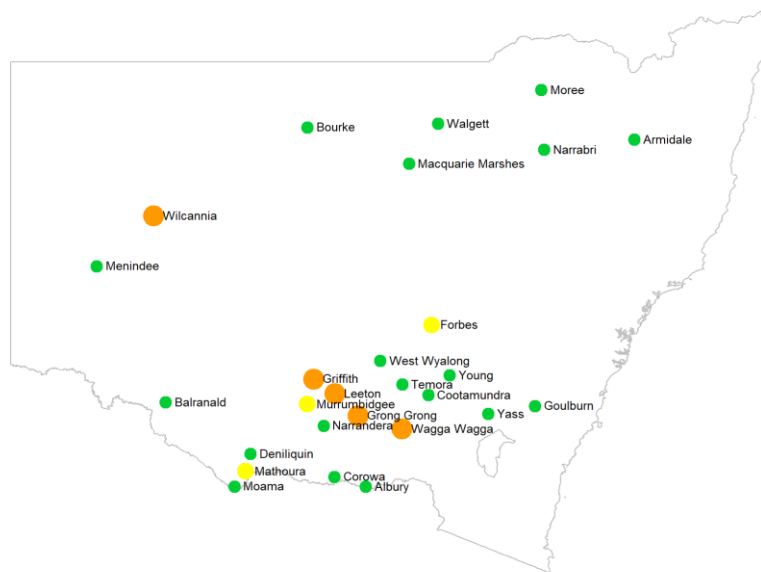
This section details counts of mosquitoes in the NSW Arbovirus Surveillance and Mosquito Monitoring Program. Each location represents the count average for all trapping sites at that location for the most recent week that collections were provided prior to preparation of this report.

Culex annulirostris and *Aedes vigilax* are vectors of interest for Ross River virus and Barmah Forest virus, *Culex annulirostris* is also a vector for Japanese encephalitis virus.

Mosquito counts (average per trap per location) for mosquito trapping sites reported in the week ending 4 February 2023

Inland sites

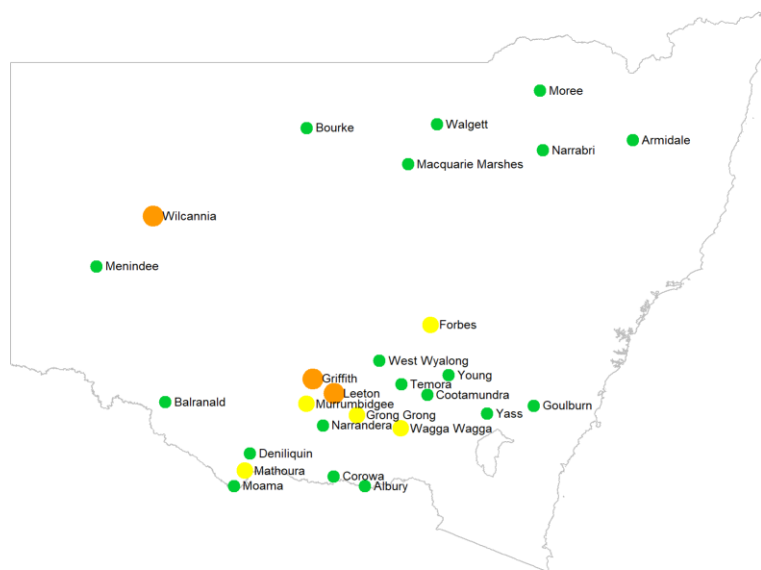
Total mosquito counts



Key:

- No collection
- Low (<50)
- Medium (50-100)
- High (101-1,000)
- Very high (1,001-10,000)
- Extreme (>10,000)

Culex annulirostris counts



Coastal sites
Total mosquito counts



Key:

- No collection
- Low (<50)
- Medium (50-100)
- High (101-1,000)
- Very high (1,001-10,000)
- Extreme (>10,000)

***Culex annulirostris* counts**



***Aedes vigilax* counts**



Sydney sites Total mosquito counts



Key:

- No collection
- Low (<50)
- Medium (50-100)
- High (101-1,000)
- Very high (1,001-10,000)
- Extreme (>10,000)

Culex annulirostris counts



Aedes vigilax counts



Mosquito counts for the 2022-23 surveillance season Inland

“Cx. annul” refers to *Culex annulirostris* and “Ae. vigilax” refers to *Aedes vigilax*.

Key:

- No collection
- Low (<50)
- Medium (50-100)
- High (101-1,000)
- Very high (1,001-10,000)
- Extreme (>10,000)

		WEEK ENDING																																		
		Oct-22			Nov-22				Dec-22					Jan-23				Feb-23			Mar-23				Apr-23			May-23								
Location	Mosquito	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	4	11	18	25	4	11	18	25	1	8	15	22	29	6	13				
Albury	Cx annul																																			
Albury	Total																																			
Armidale	Cx annul																																			
Armidale	Total																																			
Balranald	Cx annul																																			
Balranald	Total																																			
Bourke	Cx annul																																			
Bourke	Total																																			
Cootamundra	Cx annul																																			
Cootamundra	Total																																			
Corowa	Cx annul																																			
Corowa	Total																																			
Deniliquin	Cx annul																																			
Deniliquin	Total																																			
Forbes	Cx annul																																			
Forbes	Total																																			
Goulburn	Cx annul																																			
Goulburn	Total																																			
Griffith	Cx annul																																			
Griffith	Total																																			
Grong Grong	Cx annul																																			
Grong Grong	Total																																			
Leeton	Cx annul																																			
Leeton	Total																																			
Macquarie Marshes	Cx annul																																			
Macquarie Marshes	Total																																			
Mathoura	Cx annul																																			
Mathoura	Total																																			
Menindee	Cx annul																																			
Menindee	Total																																			
Moama	Cx annul																																			
Moama	Total																																			
Moree	Cx annul																																			
Moree	Total																																			
Murrumbidgee	Cx annul																																			
Murrumbidgee	Total																																			
Narrabri	Cx annul																																			
Narrabri	Total																																			
Narrandera	Cx annul																																			
Narrandera	Total																																			
Temora	Cx annul																																			
Temora	Total																																			
Wagga Wagga	Cx annul																																			
Wagga Wagga	Total																																			
Walgett	Cx annul																																			
Walgett	Total																																			
West Wyalong	Cx annul																																			
West Wyalong	Total																																			
Wilcannia	Cx annul																																			
Wilcannia	Total																																			
Yass	Cx annul																																			
Yass	Total																																			
Young	Cx annul																																			
Young	Total																																			

Coastal

		WEEK ENDING																														
		Oct-22			Nov-22			Dec-22					Jan-23				Feb-23			Mar-23			Apr-23				May-23					
Location	Mosquito	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	4	11	18	25	4	11	18	25	1	8	15	22	29	6	13
Ballina	Cx. annul																															
	Ae. vigilax																															
	Total																															
Bega	Cx. annul																															
	Ae. vigilax																															
	Total																															
Byron Bay	Cx. annul																															
	Ae. vigilax																															
	Total																															
Coffs Harbour	Cx. annul																															
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Gosford	Cx. annul																															
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Kempsey	Cx. annul																															
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Kiama	Cx. annul																															
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Lake Cathie	Cx. annul																															
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	Total																															
Lismore	Cx. annul																															
	Ae. vigilax																															
	Total																															
Millbank	Cx. annul																															
	Ae. vigilax																															
	Total																															
Mullumbimby	Cx. annul																															
	Ae. vigilax																															
	Total																															
Murwillumbah	Cx. annul																															
	Ae. vigilax																															
	Total																															
Newcastle	Cx. annul																															
	Ae. vigilax																															
	Total																															
Port Macquarie	Cx. annul																															
	Ae. vigilax																															
	Total																															
Shoalhaven	Cx. annul																															
	Ae. vigilax																															
	Total																															
Tweed Heads	Cx. annul																															
	Ae. vigilax																															
	Total																															
Wauchope	Cx. annul																															
	Ae. vigilax																															
	Total																															
Wyong	Cx. annul																															
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Sydney

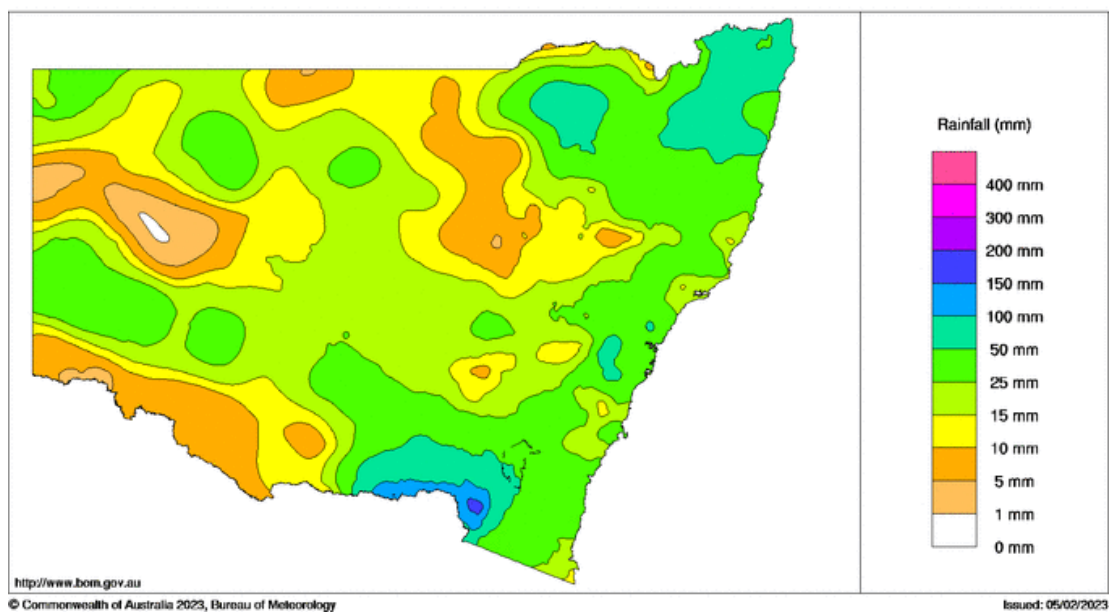
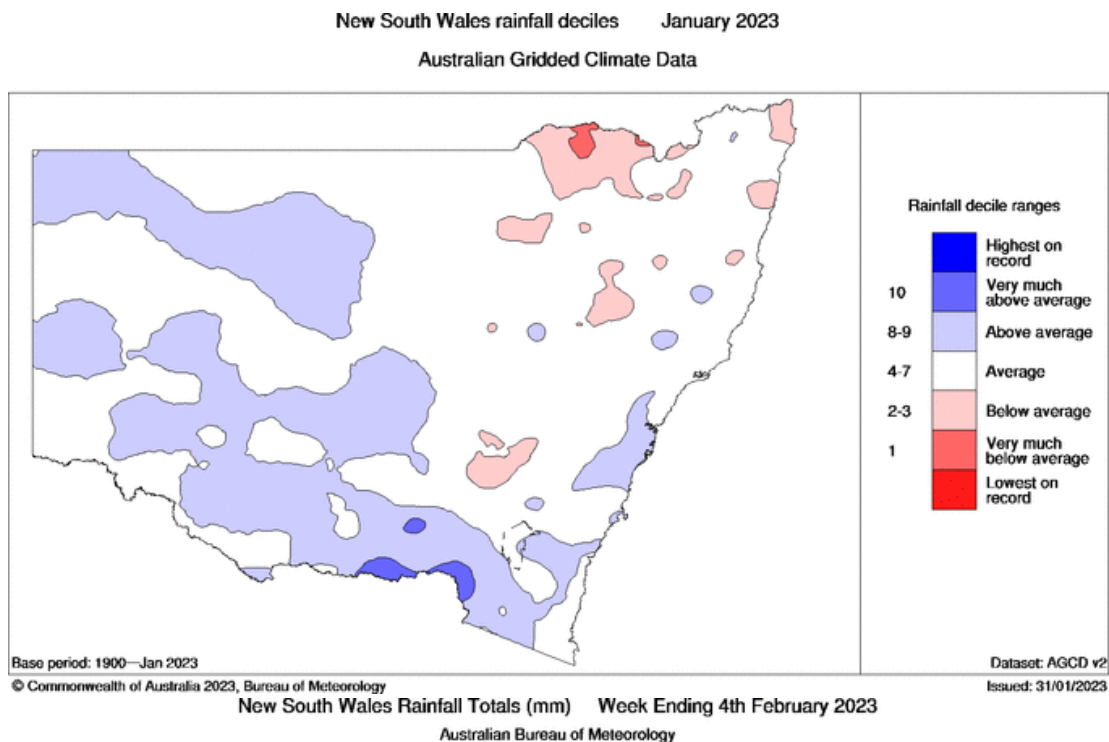
		WEEK ENDING																																		
		Oct-22			Nov-22				Dec-22					Jan-23				Feb-23			Mar-23				Apr-23			May-23								
Location	Mosquito	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	4	11	18	25	4	11	18	25	1	8	15	22	29	6	13				
Bankstown	<i>Cx. annul</i>																																			
	<i>Ae. vigilax</i>																																			
	Total																																			
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	Total																																			
Camden	<i>Cx. annul</i>																																			
	<i>Ae. vigilax</i>																																			
	Total																																			
Canada Bay	<i>Cx. annul</i>																																			
	<i>Ae. vigilax</i>																																			
	Total																																			
Earlwood	<i>Cx. annul</i>																																			
	<i>Ae. vigilax</i>																																			
	Total																																			
Georges River	<i>Cx. annul</i>																																			
	<i>Ae. vigilax</i>																																			
	Total																																			
Hawkesbury	<i>Cx. annul</i>																																			
	<i>Ae. vigilax</i>																																			
	Total																																			
Hills Shire	<i>Cx. annul</i>																																			
	<i>Ae. vigilax</i>																																			
	Total																																			
Liverpool	<i>Cx. annul</i>																																			
	<i>Ae. vigilax</i>																																			
	Total																																			
Northern Beaches	<i>Cx. annul</i>																																			
	<i>Ae. vigilax</i>																																			
	Total																																			
Parramatta	<i>Cx. annul</i>																																			
	<i>Ae. vigilax</i>																																			
	Total																																			
Penrith	<i>Cx. annul</i>																																			
	<i>Ae. vigilax</i>																																			
	Total																																			
Sydney Olympic Park	<i>Cx. annul</i>																																			
	<i>Ae. vigilax</i>																																			
	Total																																			

Environmental Conditions

Mosquitoes require water to breed. Rainfall and tides (for the salt marsh mosquito, *Aedes vigilax*) are important contributing factors for proliferation of mosquito numbers. Unseasonably warm weather can also contribute to higher mosquito numbers.

Rainfall

In January, rainfall was above average in southern and parts of western NSW and average for most other areas of the state. In the week ending 4 February 2023, rainfall totals were low to moderate across NSW.



Source: Australian Government, Bureau of Meteorology: www.bom.gov.au/climate/maps/rainfall

Next month's rainfall and temperature outlook

The Bureau of Meteorology's rainfall outlook predicts that central NSW is likely to receive below average rainfall for February, except along some parts of the south coast where higher than usual rainfall is predicted.

www.bom.gov.au/climate/outlooks/#/rainfall/median/monthly/0

The Bureau of Meteorology's temperature outlook predicts that minimum temperatures are likely to be below average across NSW for February but likely to be higher than usual along the south coast. Maximum temperatures are likely to be lower than usual across NSW.

www.bom.gov.au/climate/outlooks/#/temperature/maximum/median/monthly/0

www.bom.gov.au/climate/outlooks/#/temperature/minimum/median/monthly/0

Tides

Tidal information is relevant for the prediction of the activity of the salt marsh mosquito, *Aedes vigilax*. Typically for NSW, high tides of over 1.8 m, as measured at Sydney, can induce hatching of *Aedes vigilax* larvae. Predicted tide heights can provide some indication of when this is likely to occur.

Dates of predicted high tides of over 1.8 m at Sydney (Fort Denison)

- 18-23 February 2023

Source: Australian Government, Bureau of Meteorology: www.bom.gov.au/australia/tides/#!/nsw-sydney-fort-denison

Note: Measured tides at Sydney Port Jackson for the current week are available from the NSW Government, Manly Hydraulics Laboratory: <https://mhl.nsw.gov.au/Data-OceanTide>.

Human Arboviral Disease Notifications

Under the *NSW Public Health Act 2010*, human arboviral infections are notifiable in NSW. The NSW Health Communicable Diseases Weekly Report (CDWR) reports confirmed and probable case numbers by the week they are received by the NSW notifiable diseases surveillance system, and is available at: www.health.nsw.gov.au/Infectious/reports/Pages/CDWR.aspx.

The data for Ross River virus and Barmah Forest virus from the CDWR for the latest reported 3 weeks are below.

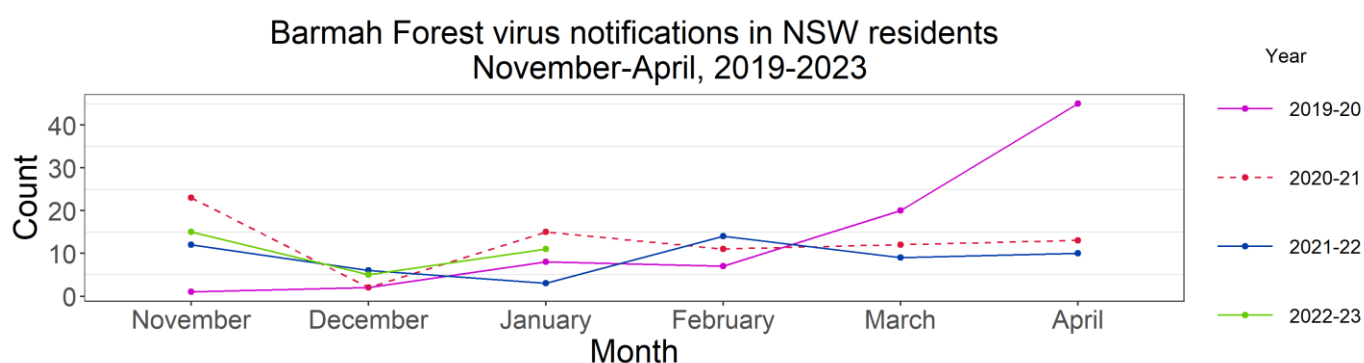
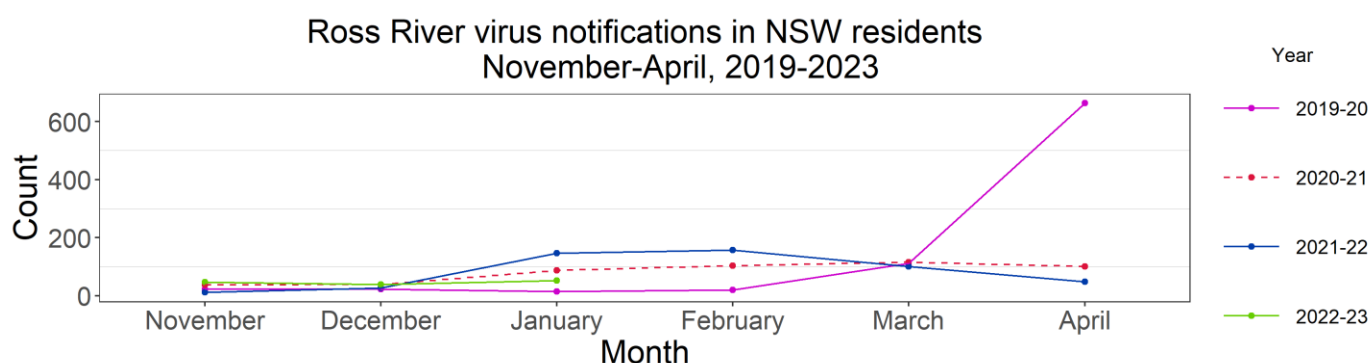
Recent notifications of Ross River virus and Barmah Forest virus infections in humans

(by date of case report received)

	Week		
	Latest week (25 – 31 Dec 2022)	1-week prior (18 – 24 Dec 2022)	2-weeks prior (11– 17 Dec 2022)
Ross River virus	8	9	8
Barmah Forest virus	0	0	2

Source: CDWR, Communicable Diseases Branch, Health Protection NSW, NSW Health

Notifications of Ross River virus and Barmah Forest virus infections, by month of disease onset (the earlier of patient-reported onset or specimen collection date), are available online at: www1.health.nsw.gov.au/IDD/pages/data.aspx. The following figures show this data for November to April of the current NSW Arbovirus Surveillance and Mosquito Monitoring season (2022-2023), and the same period in the previous three years.



Source: NSW Health Notifiable Conditions Information Management System (NCIMS), Communicable Diseases Branch and Centre for Epidemiology and Evidence, NSW Health

Notes: The data for the previous month are the notifications to date (data extracted on 3 February 2023). Notifications are for NSW residents, regardless of whether the infection was acquired or diagnosed in NSW. Notifications of Ross River virus and Barmah Forest virus infection lag the date of acquiring the infection due to the time taken for symptom development, diagnosis, notification, and other factors. The weekly numbers by date of notification are useful for monitoring recent short-term trends but represent infections that were acquired some time ago. The monthly numbers by date of onset are more timely but less exact because they represent the earlier of patient-reported onset or specimen collection date and are therefore useful for monitoring general trends in human arboviral disease over the course of a season.