

NSW Arbovirus Surveillance and Mosquito Monitoring 2022-2023

Weekly Update: Week ending 25 March 2023

(Report Number 23)



Summary

Arbovirus Detections

- **Sentinel Chickens:** Murray Valley encephalitis virus antibodies were detected in blood samples collected at Moree from chickens that previously tested negative indicating recent exposure to this virus. Kunjin virus antibodies were similarly detected in blood samples collected at Deniliquin, Menindee, Leeton and Moree indicating recent exposure.
- **Mosquito Isolates:** There were no detections of Ross River, Barmah Forest, Murray Valley encephalitis, Kunjin and Japanese encephalitis viruses in mosquitoes.

Mosquito Abundance

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

Environmental Conditions

- **Climate:** In the week ending 25 March 2023, there was moderate rainfall across most of eastern NSW and low levels of rainfall along the south coast and most of western NSW. About average rainfall is predicted for most of eastern NSW and below average rainfall for most of western NSW in April. Minimum temperatures are likely to be about average across most of NSW and above average along the coast and Victorian border in April. Maximum temperatures are likely to be above average in northern and western NSW and about average elsewhere.
- **Tides:** High tides over 1.8 metres are predicted for 17-23 April, which could trigger hatching of *Aedes vigilax*.

Human Arboviral Disease Notifications

- **Ross River Virus:** 10 cases were notified in the week ending 4 March 2023.
- **Barmah Forest Virus:** 3 cases were notified in the week ending 4 March 2023.

Comments and other findings of note

The Bureau of Meteorology has announced that the La Niña climate driver in the tropical Pacific Ocean has ended. The La Niña tends to be associated with higher rainfall in eastern Australia and NSW received above average rainfall over the past three years while the La Niña was present. There are some signs that the climate driver, El Niño, could form later in 2023. El Niño is normally associated with lower than average winter/spring rainfall over eastern Australia and has been associated with severe rainfall deficiency and drought in NSW.

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

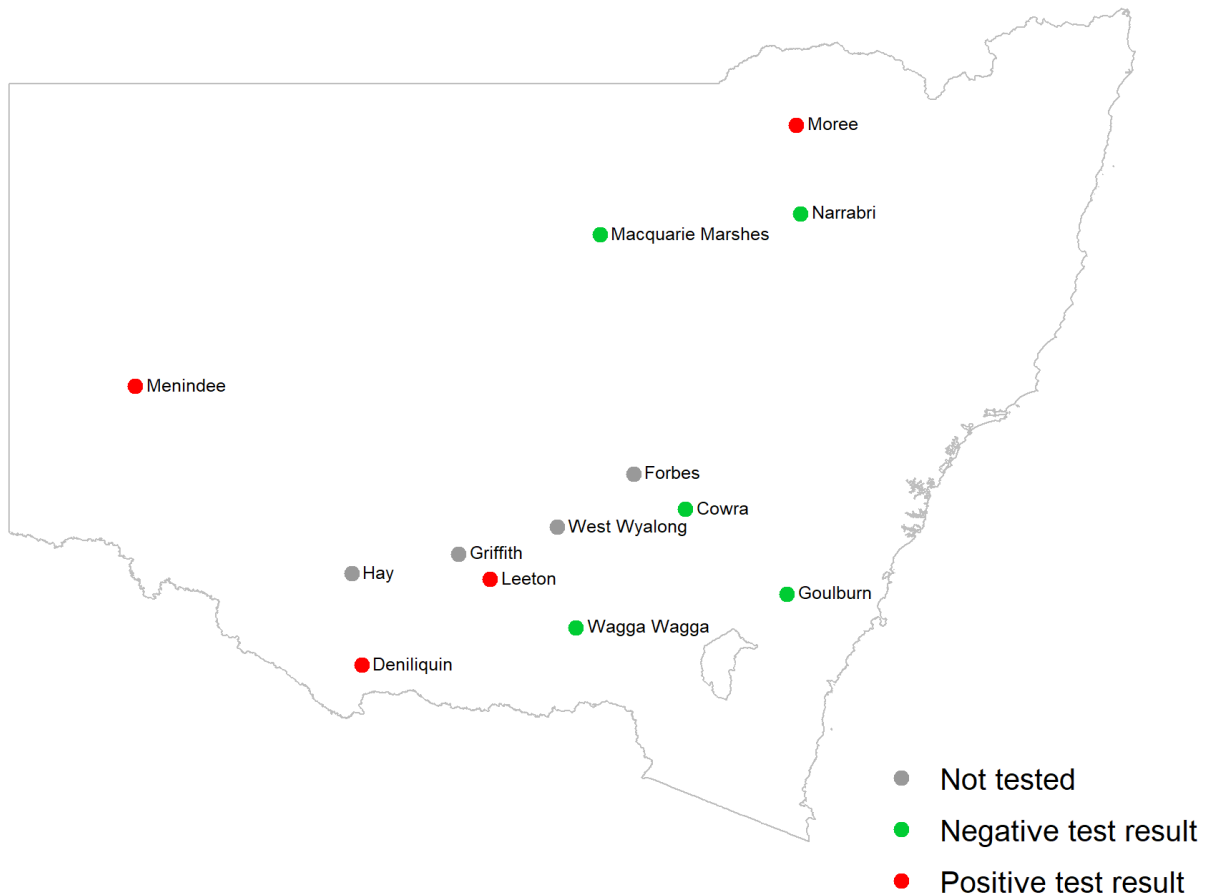
This section details detections of Murray Valley encephalitis virus, Kunjin virus, Ross River virus, Barmah Forest virus and Japanese encephalitis virus in the NSW Arbovirus Surveillance and Mosquito Monitoring Program.

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. A positive test result indicates one or more chickens in a flock tested positive for the first time to antibodies directed against a particular virus, indicating newly acquired infection.

Sentinel chicken antibody test results for samples collected in the three weeks to 25 March 2023

There were positive test results for Murray Valley encephalitis virus for samples collected at Moree. There were positive test results for Kunjin virus for samples collected at Deniliquin, Menindee, Leeton and Moree.



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
26 January 2023	Menindee	Murray Valley encephalitis
29 January 2023	Leeton	Murray Valley encephalitis
5 February 2023	Menindee	Murray Valley encephalitis
5 February 2023	Menindee	Kunjin
6 February 2023	Deniliquin	Murray Valley encephalitis
6 February 2023	Forbes	Murray Valley encephalitis
6 February 2023	Hay	Murray Valley encephalitis
6 February 2023	Macquarie Marshes*	Murray Valley encephalitis
12 February 2023	Deniliquin	Murray Valley encephalitis
12 February 2023	Leeton	Murray Valley encephalitis
12 February 2023	Leeton	Kunjin
13 February 2023	Macquarie Marshes	Murray Valley encephalitis
13 February 2023	Macquarie Marshes	Kunjin
14 February 2023	Forbes	Murray Valley encephalitis
19 February 2023	Leeton	Murray Valley encephalitis
19 February 2023	Leeton	Kunjin
21 February 2023	Hay	Murray Valley encephalitis
23 February 2023	West Wyalong	Murray Valley encephalitis
3 March 2023	Deniliquin	Murray Valley encephalitis
5 March 2023	Macquarie Marshes	Kunjin
7 March 2023	Griffith	Murray Valley encephalitis
12 March 2023	Deniliquin	Kunjin virus
12 March 2023	Menindee	Kunjin virus
13 March 2023	Leeton	Kunjin virus
13 March 2023	Moree	Murray Valley encephalitis
13 March 2023	Moree	Kunjin virus

*Chickens in Macquarie Marshes had previously seroconverted to Murray Valley encephalitis virus and continue to test positive for antibodies to this virus.

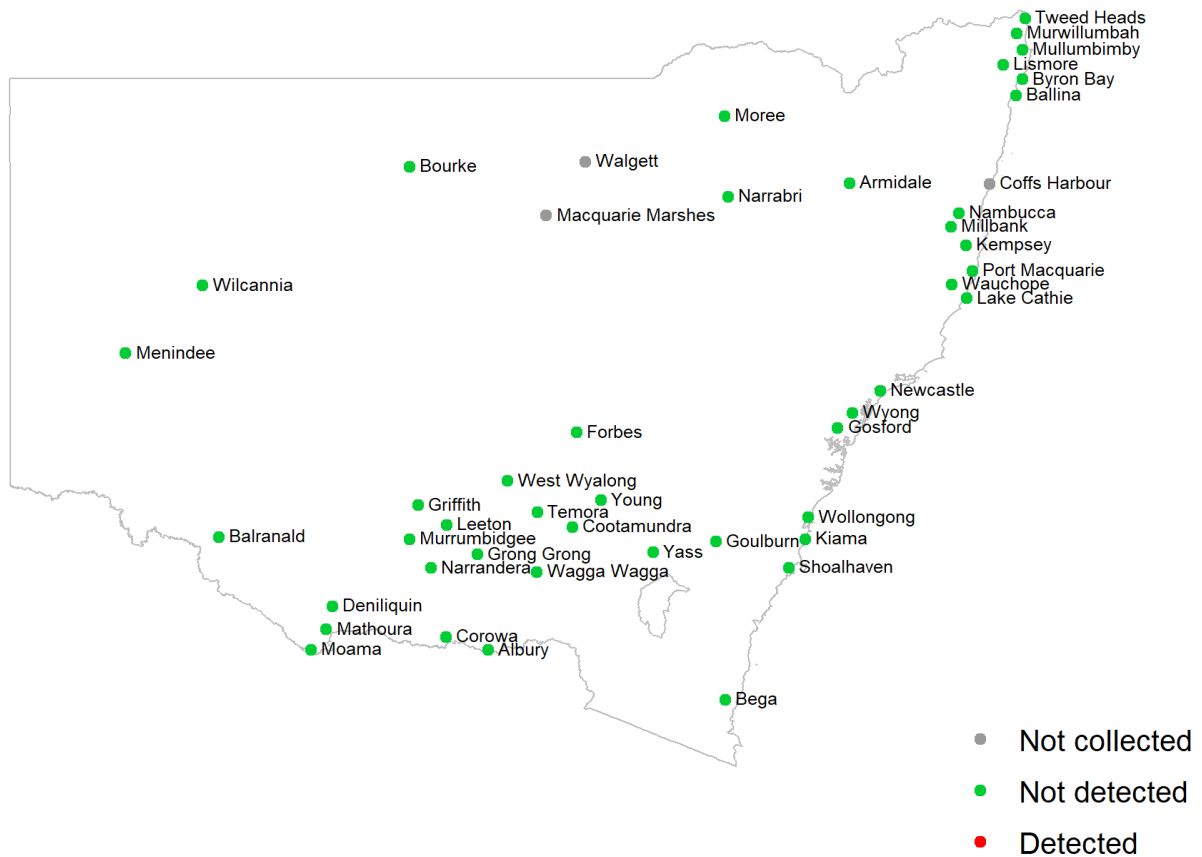
Mosquito isolates

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 and Stratford virus) for the season are detailed in the table.

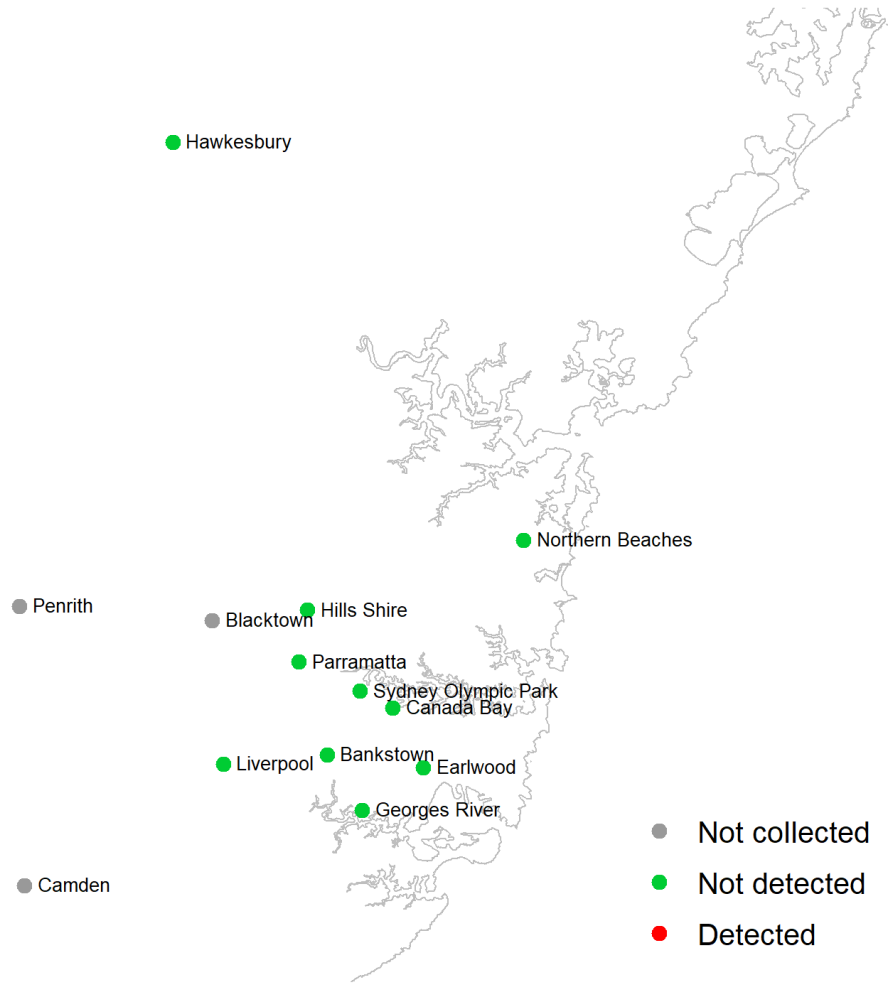
Test results for mosquito trapping sites reported in the week ending 25 March 2023

There were no detections of Ross River, Barmah Forest, Murray Valley encephalitis, Kunjin and Japanese encephalitis viruses in mosquitoes in the week ending 25 March 2023.

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
6 February 2023	Griffith	Murray Valley encephalitis
13 February 2023	Macquarie Marshes	Murray Valley encephalitis
13 February 2023	Corowa	Murray Valley encephalitis
19 February 2023	Moree	Edge Hill
20 February 2023	Corowa	Murray Valley encephalitis
21 February 2023	Deniliquin	Murray Valley encephalitis
6 March 2023	Kiama	Stratford
7 March 2023	Wyang	Stratford
7 March 2023	Penrith	Stratford
12 March 2023	Macquarie Marshes	Murray Valley encephalitis
13 March 2023	Narrandera	Ross River
13 March 2023	Georges River	Stratford
21 March 2023	Northern Beaches	Stratford

Note:

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

Mosquito Abundance

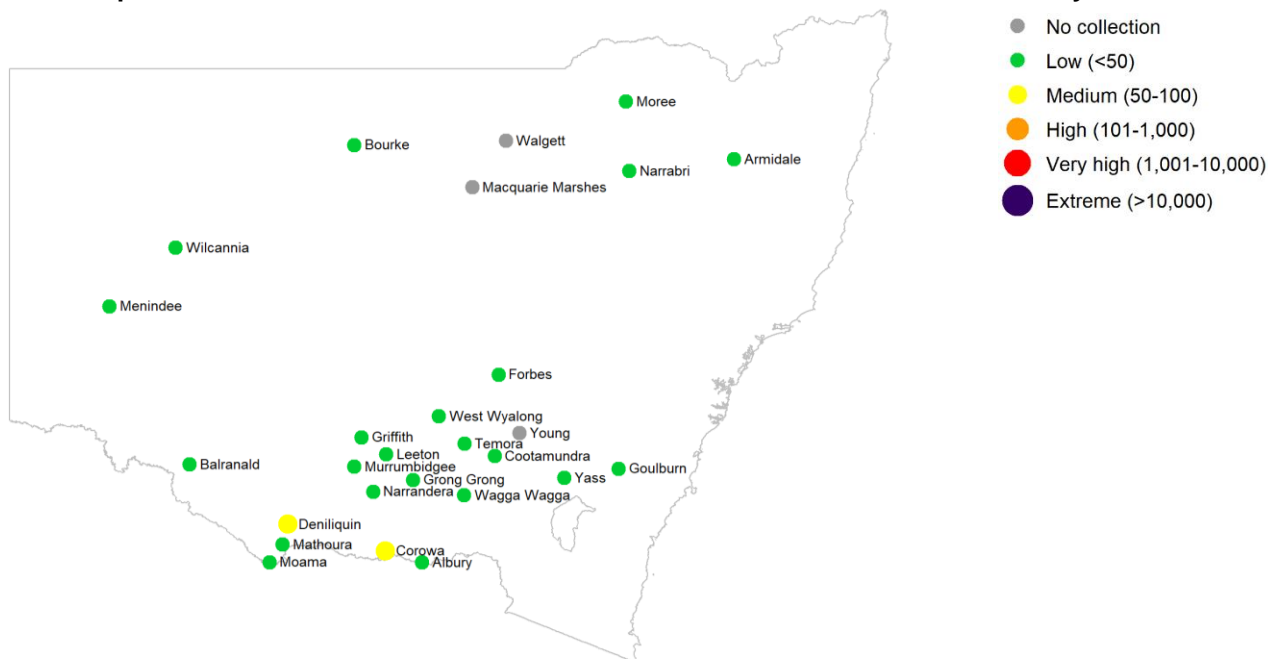
This section details counts of mosquitoes in the NSW Arbovirus Surveillance and Mosquito Monitoring Program. Each location represents the count average for all trapping sites at that location for the most recent week that collections were provided prior to preparation of this report.

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.

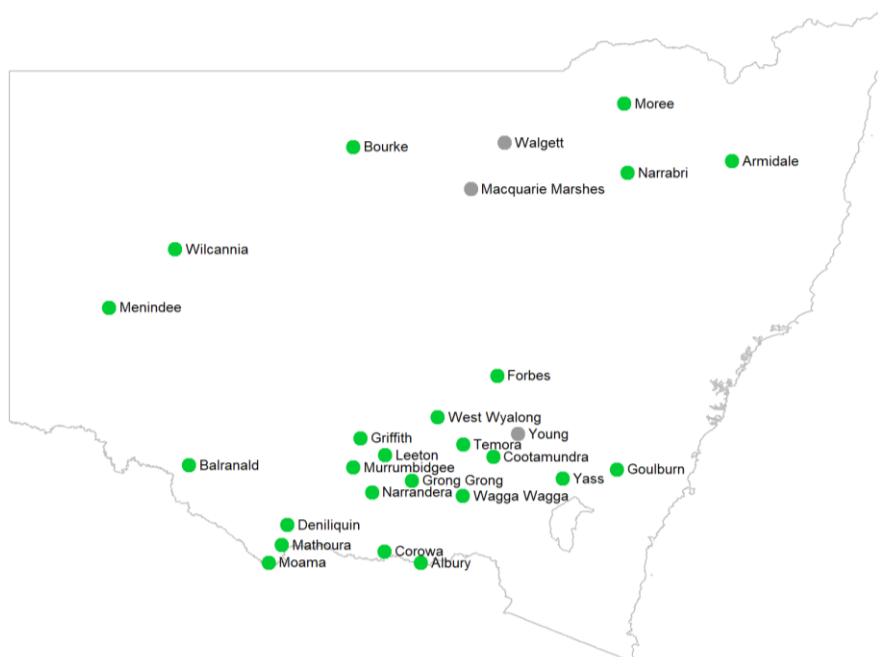
Mosquito counts (average per trap per location) for mosquito trapping sites reported in the week ending 25 March 2023

Inland sites

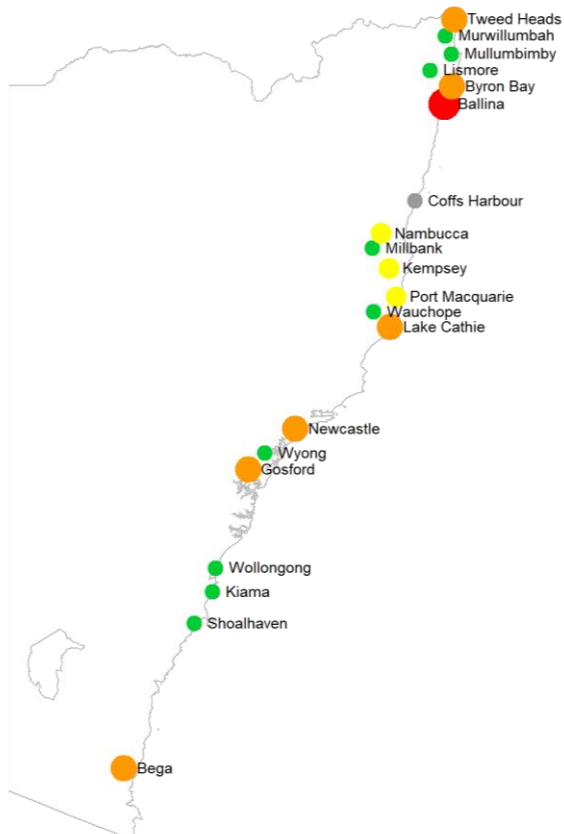
Total mosquito counts



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)

Location	Mosquito	WEEK ENDING																																						
		Oct-22			Nov-22				Dec-22					Jan-23				Feb-23			Mar-23				Apr-23			May-23												
		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																																							
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Griffith	Cx. annul																																							
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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																																							
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Wagga Wagga	Cx. annul																																							
Wagga Wagga	Total																																							
Walgett	Cx. annul																																							
Walgett	Total																																							
West Wyalong	Cx. annul																																							
West Wyalong	Total																																							
Wilcannia	Cx. annul																																							
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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																															
	Ae. vigilax																															
	Total																															
Gosford	Cx. annul																															
	Ae. vigilax																															
	Total																															
Kempsey	Cx. annul																															
	Ae. vigilax																															
	Total																															
Kiama	Cx. annul																															
	Ae. vigilax																															
	Total																															
Lake Cathie	Cx. annul																															
	Ae. vigilax																															
	Total																															
Lismore	Cx. annul																															
	Ae. vigilax																															
	Total																															
Millbank	Cx. annul																															
	Ae. vigilax																															
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Mullumbimby	Cx. annul																															
	Ae. vigilax																															
	Total																															
Murwillumbah	Cx. annul																															
	Ae. vigilax																															
	Total																															
Nambucca	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																															
Wollongong	Cx. annul																															
	Ae. vigilax																															
	Total																															
Wyong	Cx. annul																															
	Ae. vigilax																															
	Total																															

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																															
Blacktown	<i>Cx. annul</i>																															
	<i>Ae. vigilax</i>																															
	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																															

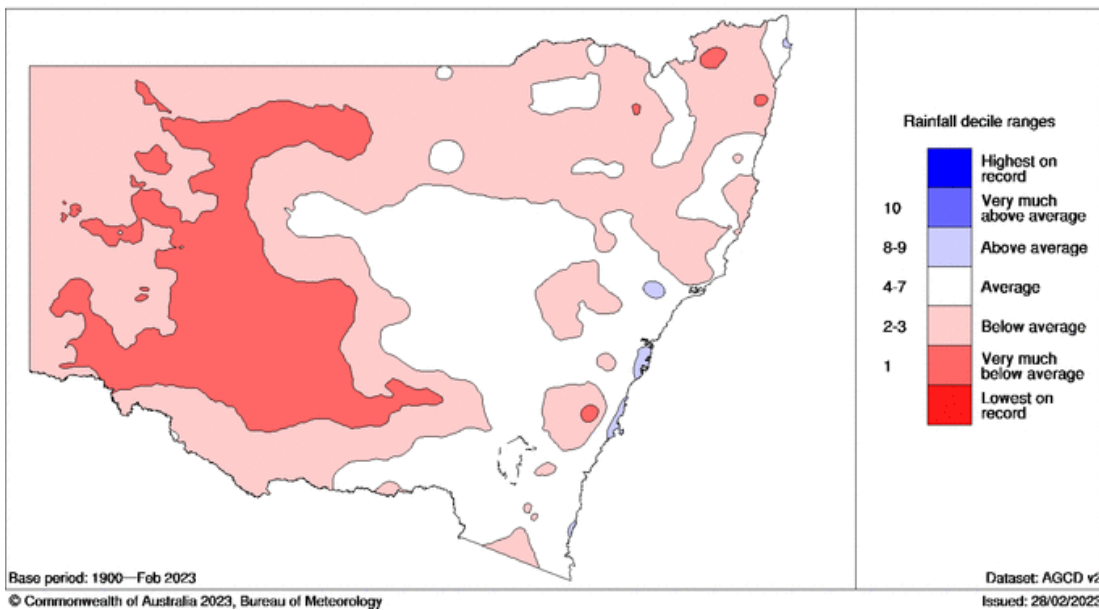
Environmental Conditions

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.

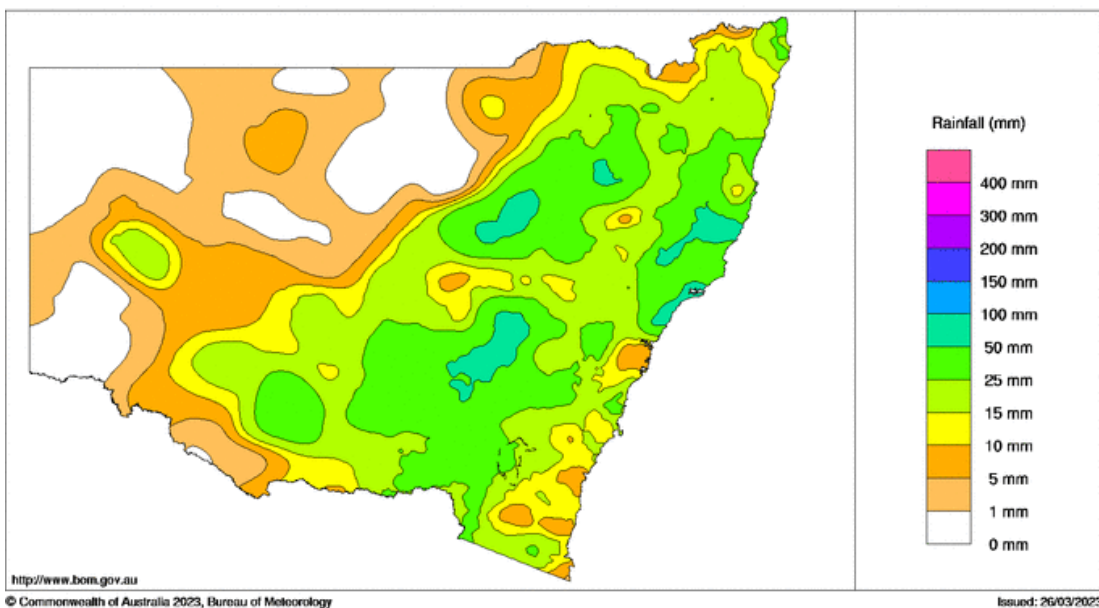
Rainfall

In February, rainfall was below average in western and northern NSW and average for most other areas of the state. In the week ending 25 March 2023, there were moderate rainfall totals across most of eastern NSW with low levels of rainfall along the south coast and in most of western NSW.

New South Wales rainfall deciles February 2023
Australian Gridded Climate Data



New South Wales Rainfall Totals (mm) Week Ending 25th March 2023
Australian Bureau of Meteorology



Source: Australian Government, Bureau of Meteorology, <http://www.bom.gov.au/climate/maps/rainfal>

Next month's rainfall and temperature outlook

The Bureau of Meteorology's rainfall outlook predicts that NSW is likely to receive about average rainfall across most of eastern NSW and below average rainfall across most of western NSW.

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 about average across most of NSW and above average along the coast and Victorian border in April. Maximum temperatures are likely to be above average in northern and western parts of NSW and about average elsewhere.

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

www.bom.gov.au/climate/outlooks/#/temperature/maximum/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)

- 17-23 April

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.

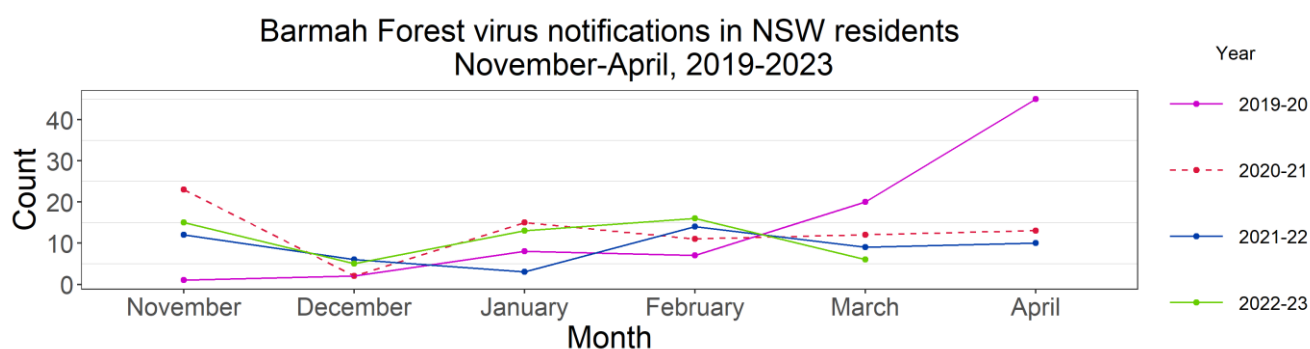
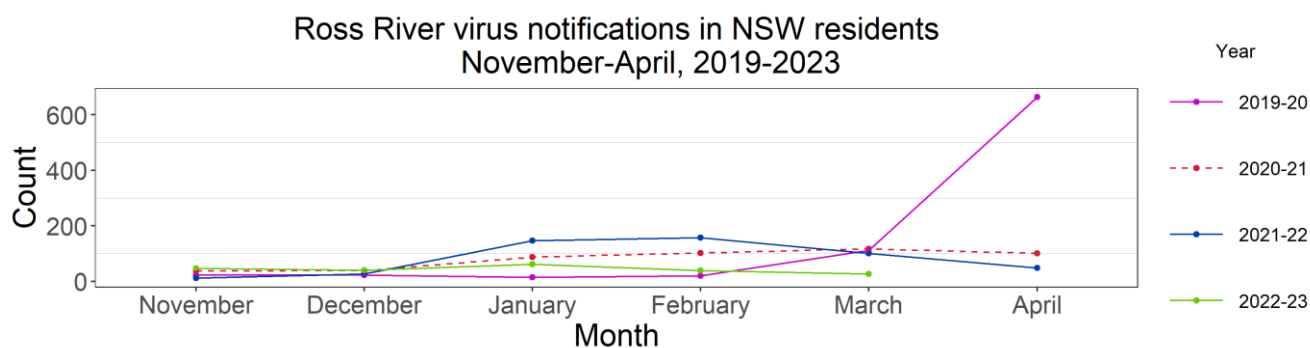
Recent notifications of Ross River virus and Barmah Forest virus infections in humans

(by date of case report received)

	Week		
	Latest week (26 Feb – 4 Mar 2023)	1-week prior (19-25 Feb 2023)	2-weeks prior (12-18 Feb 2023)
Ross River virus	10	5	12
Barmah Forest virus	3	7	3

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 27 March 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.