

NSW Arbovirus Surveillance and Mosquito Monitoring 2022-2023

Weekly Update: Week ending 8 April 2023

(Report Number 25)



Summary

Arbovirus Detections

- **Sentinel Chickens:** Kunjin virus antibodies were detected in blood samples collected at Leeton from chickens that previously tested negative indicating recent exposure to this virus.
- **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 Balranald, Bourke, Corowa, Forbes, Griffith, Grong Grong, Leeton, Macquarie Marshes, Moama, Moree, Murrumbidgee, Narrabri, Narrendera, Wagga Wagga and Wilcannia. MEDIUM in Mathoura and Yass. HIGH in Temora.
- **Coast:** LOW at Kempsey, Murwillumbah, Nambucca, Wauchope and Wyong. MEDIUM at Lake Cathie and Tweed Heads. HIGH at Ballina, Byron Bay, Gosford, Newcastle and Port Macquarie.
- **Sydney:** LOW at Bankstown, Blacktown, Camden, Canada Bay, Earlwood, Hills Shire, Northern Beaches, Parramatta, Penrith and Sydney Olympic Park. MEDIUM at Liverpool.

Environmental Conditions

- **Climate:** In the week ending 8 April 2023, there was moderate rainfall across eastern NSW and low rainfall in the west. There is likely to be below average rainfall across most of NSW in May and about average rainfall along the south coast. In May, Minimum temperatures are likely to be about average across most of NSW and above average along the south coast and Victorian border in May, and maximum temperatures are likely to be about average along the coast between Sydney and Port Macquarie and above 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:** 9 cases were notified in the week ending 25 March 2023.
- **Barmah Forest Virus:** 2 cases were notified in the week ending 25 March 2023.

Comments and other findings of note

Mosquito numbers have declined as temperatures have decreased, especially inland where overnight minimum temperatures have been low.

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

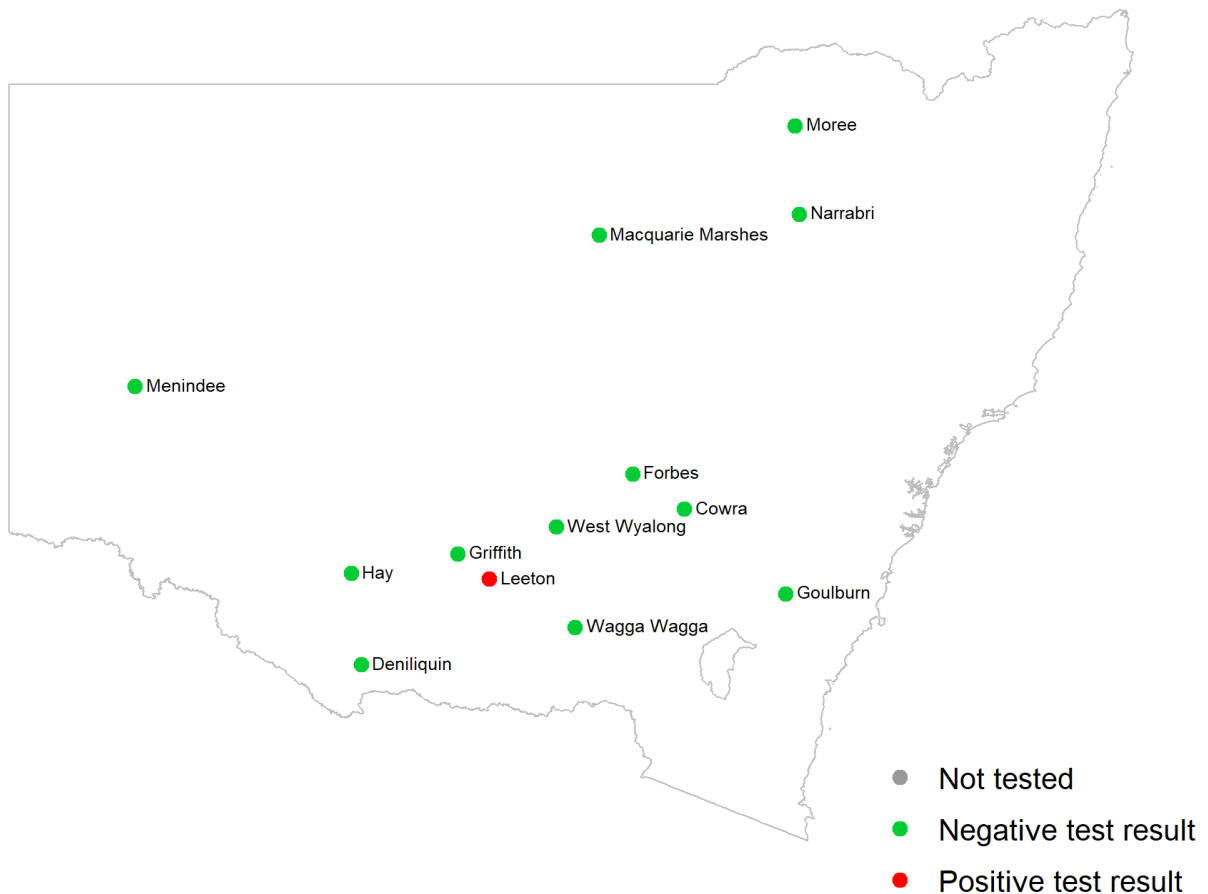
This section details detections of Murray Valley encephalitis virus, Kunjin virus, Ross River virus, Barmah Forest virus and Japanese encephalitis virus in the NSW Arbovirus Surveillance and Mosquito Monitoring Program.

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 two 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 two weeks to 8 April 2023

There were positive test results for Kunjin virus for samples collected at Leeton.



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
12 March 2023	Menindee	Kunjin
13 March 2023	Leeton	Kunjin
13 March 2023	Moree	Murray Valley encephalitis
13 March 2023	Moree	Kunjin
20 March 2023	Hay	Murray Valley encephalitis
20 March 2023	Hay	Kunjin
26 March 2023	Leeton	Kunjin

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

Mosquito isolates

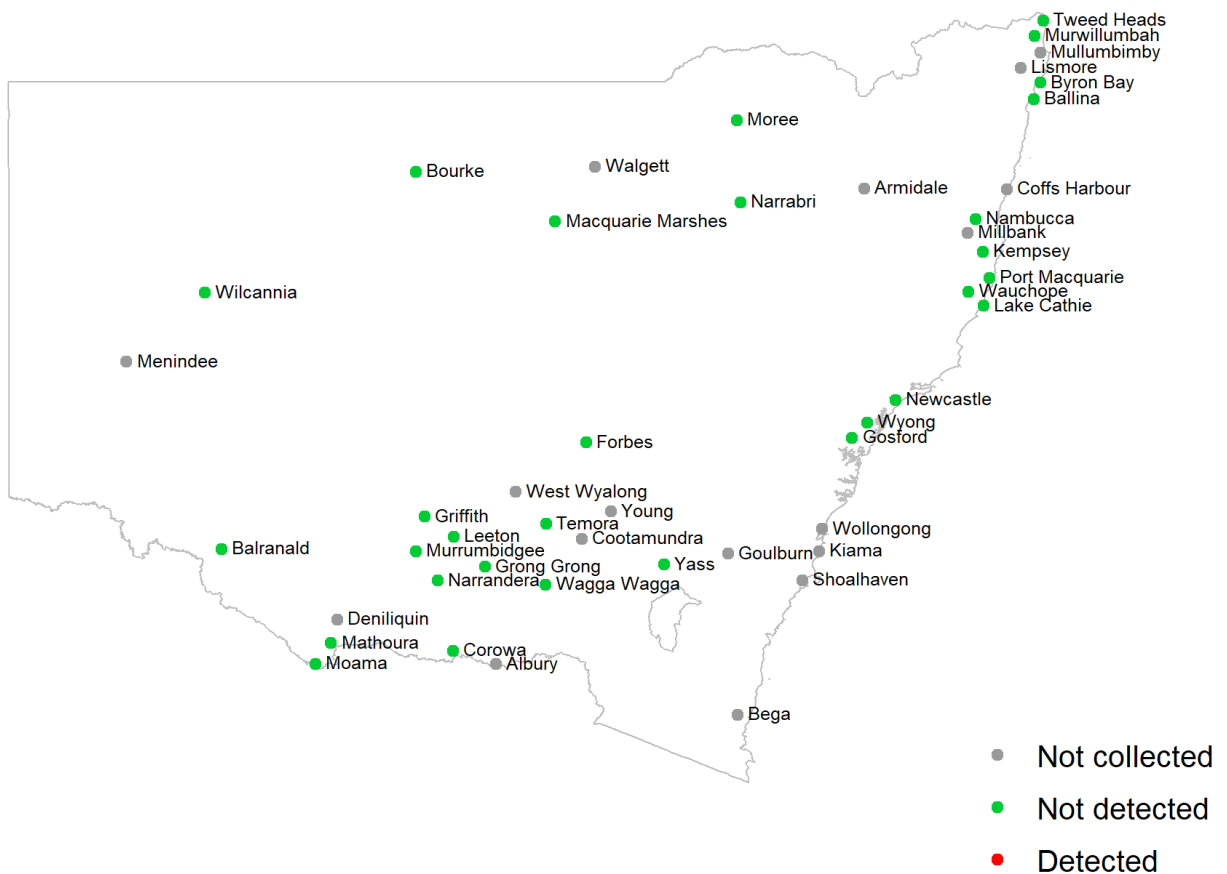
Whole grinds of collected mosquitoes are tested for arbovirus nucleic acids to determine the presence of arboviruses in mosquitoes. Test results for detections of Ross River virus, Barmah Forest virus, Murray Valley encephalitis virus, Kunjin virus and Japanese encephalitis virus for the past week are 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 8 April 2023

There were no detections of Ross River, Barmah Forest, Murray valley encephalitis, Kunjin and Japanese encephalitis viruses detected in mosquitoes in the week ending 8 April 2023.

Note, there were detections of Stratford and Edge Hill viruses (detailed in the table).

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
23 March 2023	Gosford	Barmah Forest
23 March 2023	Gosford	Stratford
3 April 2023	Port Macquarie	Stratford
3 April 2023	Newcastle	Edge Hill

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

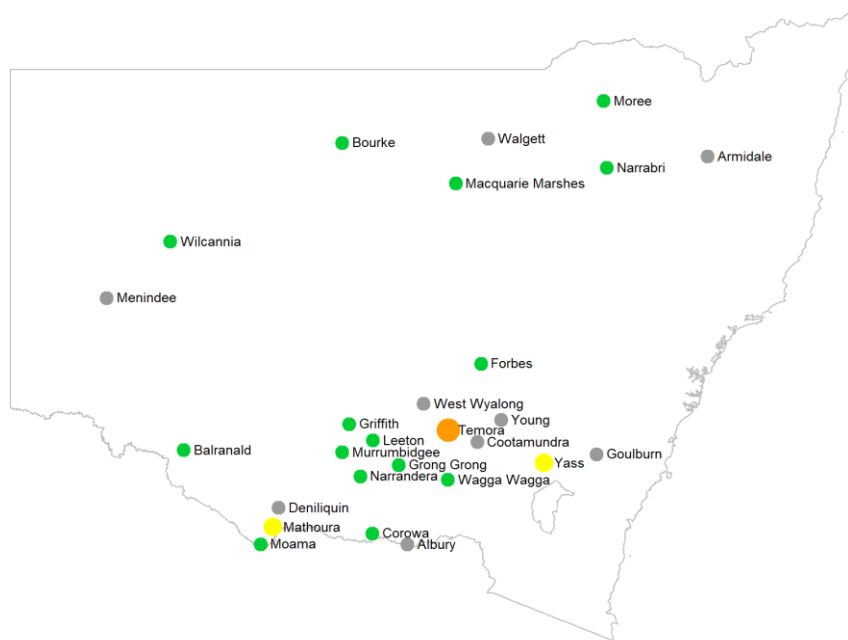
This section details counts of mosquitoes in the NSW Arbovirus Surveillance and Mosquito Monitoring Program. Each location represents the count average for all trapping sites at that location for the most recent week that collections were provided prior to preparation of this report.

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 8 April 2023

Inland sites

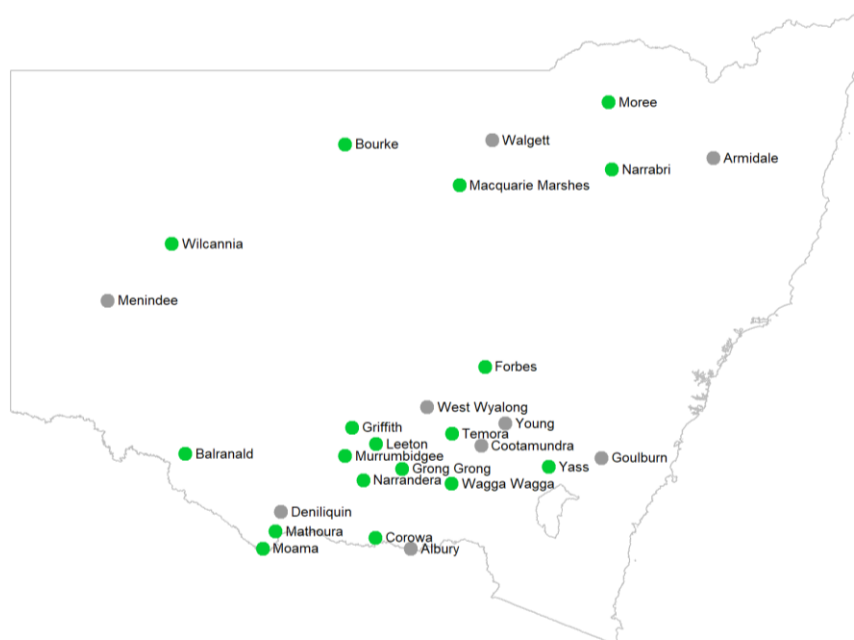
Total mosquito counts



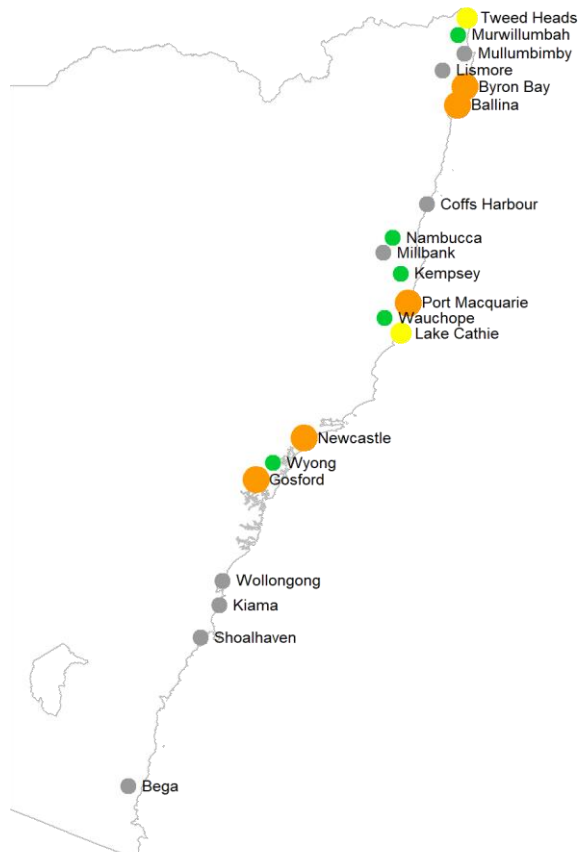
Key:

- 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



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	<i>Cx. annul</i>																																
Albury	Total																																
Armidale	<i>Cx. annul</i>																																
Armidale	Total																																
Balranald	<i>Cx. annul</i>																																
Balranald	Total																																
Bourke	<i>Cx. annul</i>																																
Bourke	Total																																
Cootamundra	<i>Cx. annul</i>																																
Cootamundra	Total																																
Corowa	<i>Cx. annul</i>																																
Corowa	Total																																
Deniliquin	<i>Cx. annul</i>																																
Deniliquin	Total																																
Forbes	<i>Cx. annul</i>																																
Forbes	Total																																
Goulburn	<i>Cx. annul</i>																																
Goulburn	Total																																
Griffith	<i>Cx. annul</i>																																
Griffith	Total																																
Grong Grong	<i>Cx. annul</i>																																
Grong Grong	Total																																
Leeton	<i>Cx. annul</i>																																
Leeton	Total																																
Macquarie Marshes	<i>Cx. annul</i>																																
Macquarie Marshes	Total																																
Mathoura	<i>Cx. annul</i>																																
Mathoura	Total																																
Menindee	<i>Cx. annul</i>																																
Menindee	Total																																
Moama	<i>Cx. annul</i>																																
Moama	Total																																
Moree	<i>Cx. annul</i>																																
Moree	Total																																
Murrumbidgee	<i>Cx. annul</i>																																
Murrumbidgee	Total																																
Narrabri	<i>Cx. annul</i>																																
Narrabri	Total																																
Narrandera	<i>Cx. annul</i>																																
Narrandera	Total																																
Temora	<i>Cx. annul</i>																																
Temora	Total																																
Wagga Wagga	<i>Cx. annul</i>																																
Wagga Wagga	Total																																
Walgett	<i>Cx. annul</i>																																
Walgett	Total																																
West Wyalong	<i>Cx. annul</i>																																
West Wyalong	Total																																
Wilcannia	<i>Cx. annul</i>																																
Wilcannia	Total																																
Yass	<i>Cx. annul</i>																																
Yass	Total																																
Young	<i>Cx. annul</i>																																
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	<i>Cx. annul</i>																															
	<i>Ae. vigilax</i>																															
	Total																															
Bega	<i>Cx. annul</i>																															
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Byron Bay	<i>Cx. annul</i>																															
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Coffs Harbour	<i>Cx. annul</i>																															
	<i>Ae. vigilax</i>																															
	Total																															
Gosford	<i>Cx. annul</i>																															
	<i>Ae. vigilax</i>																															
	Total																															
Kempsey	<i>Cx. annul</i>																															
	<i>Ae. vigilax</i>																															
	Total																															
Kiama	<i>Cx. annul</i>																															
	<i>Ae. vigilax</i>																															
	Total																															
Lake Cathie	<i>Cx. annul</i>																															
	<i>Ae. vigilax</i>																															
	Total																															
Lismore	<i>Cx. annul</i>																															
	<i>Ae. vigilax</i>																															
	Total																															
Millbank	<i>Cx. annul</i>																															
	<i>Ae. vigilax</i>																															
	Total																															
Mullumbimby	<i>Cx. annul</i>																															
	<i>Ae. vigilax</i>																															
	Total																															
Murwillumbah	<i>Cx. annul</i>																															
	<i>Ae. vigilax</i>																															
	Total																															
Nambucca	<i>Cx. annul</i>																															
	<i>Ae. vigilax</i>																															
	Total																															
Newcastle	<i>Cx. annul</i>																															
	<i>Ae. vigilax</i>																															
	Total																															
Port Macquarie	<i>Cx. annul</i>																															
	<i>Ae. vigilax</i>																															
	Total																															
Shoalhaven	<i>Cx. annul</i>																															
	<i>Ae. vigilax</i>																															
	Total																															
Tweed Heads	<i>Cx. annul</i>																															
	<i>Ae. vigilax</i>																															
	Total																															
Wauchope	<i>Cx. annul</i>																															
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Wollongong	<i>Cx. annul</i>																															
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Wyong	<i>Cx. annul</i>																															
	<i>Ae. vigilax</i>																															
	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>																															
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Parramatta	<i>Cx. annul</i>																															
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	Total																															
Penrith	<i>Cx. annul</i>																															
	<i>Ae. vigilax</i>																															
	Total																															
Sydney Olympic Park	<i>Cx. annul</i>																															
	<i>Ae. vigilax</i>																															
	Total																															

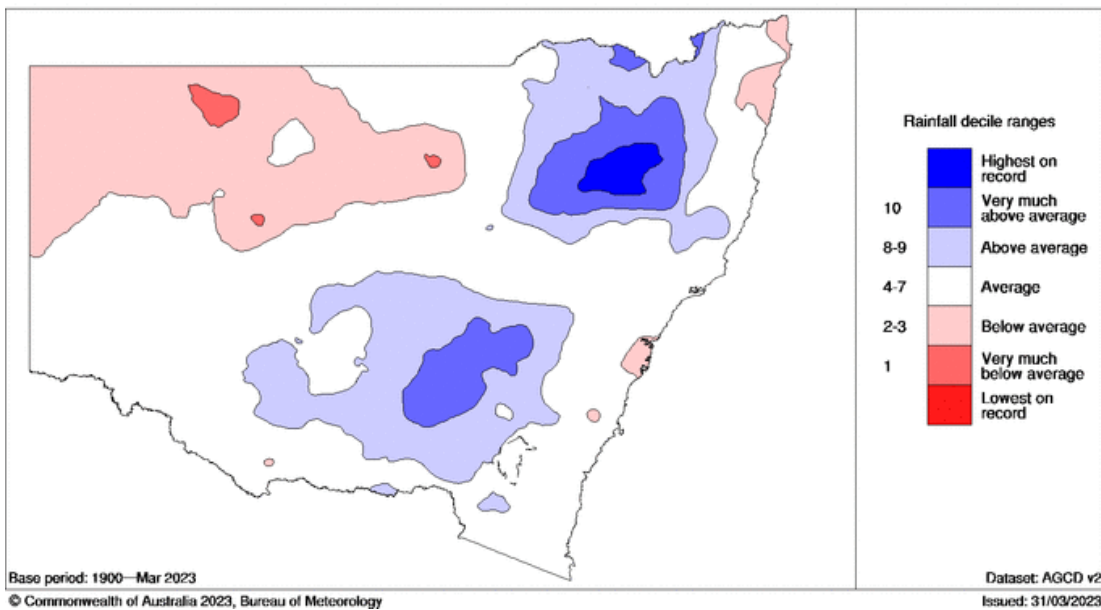
Environmental Conditions

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.

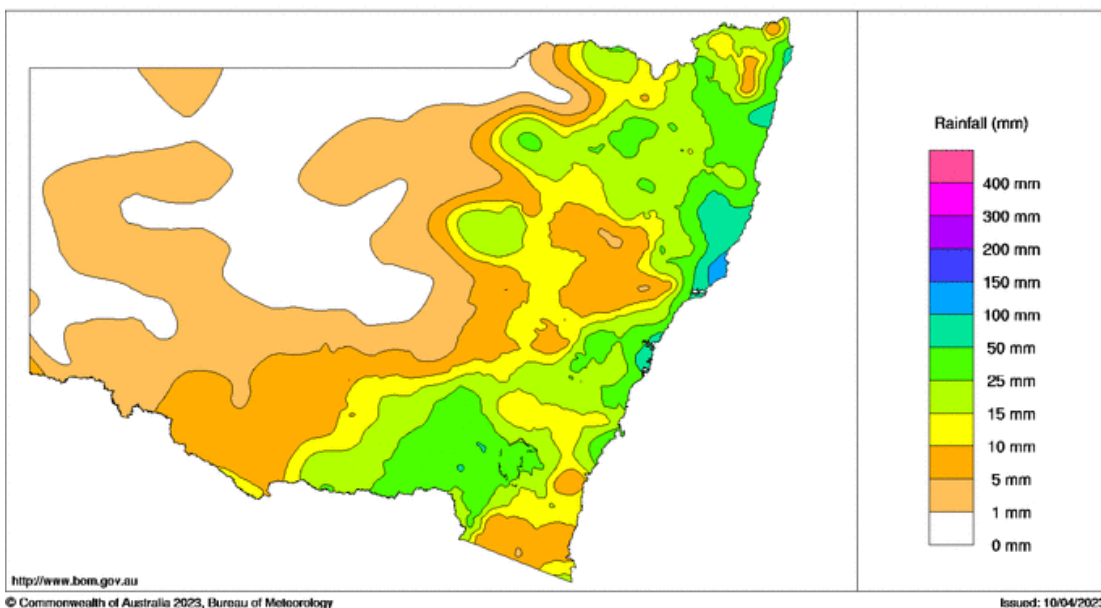
Rainfall

In March, rainfall was generally about average in NSW with isolated areas west of the Great Dividing Range having above average rainfall and the northwest of the state below average. In the week ending 8 April 2023, there was moderate rainfall across eastern NSW and low rainfall in the west.

New South Wales rainfall deciles March 2023
Australian Gridded Climate Data



New South Wales Rainfall Totals (mm) Week Ending 8th April 2023
Australian Bureau of Meteorology



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

Next month's rainfall and temperature outlook

The Bureau of Meteorology's rainfall outlook predicts that in May, there is likely to be below average rainfall across most of NSW and about average rainfall along the south coast.

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 south coast and Victorian border in May.

Maximum temperatures are likely to be about average along the coast between Sydney and Port Macquarie and above average elsewhere in May.

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.

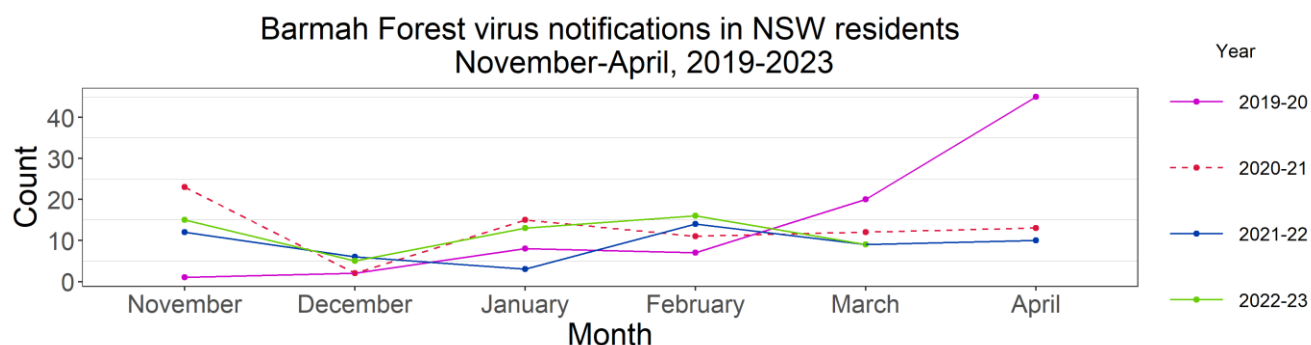
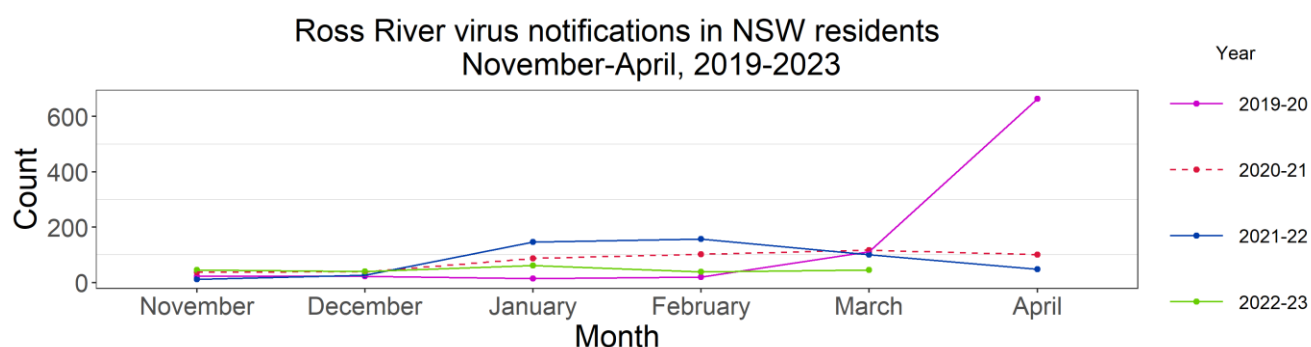
Recent notifications of Ross River virus and Barmah Forest virus infections in humans

(by date of case report received)

	Week		
	Latest week (19-25 Mar 2023)	1-week prior (12-18 Mar 2023)	2-weeks prior (5-11 Mar 2023)
Ross River virus	9	6	12
Barmah Forest virus	2	1	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 11 April 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.