NSW Arbovirus Surveillance and Mosquito Monitoring 2022-2023

Weekly Update: Week ending 25 February 2023

(Report Number 19)

NSW GOVERNMENT

Summary

Arbovirus Detections

- **Sentinel Chickens:** Murray Valley encephalitis virus antibodies were detected in blood samples collected at Deniliquin, Leeton and Forbes from chickens that previously tested negative indicating recent exposure to these viruses. Kunjin virus antibodies were similarly detected in blood samples collected at Leeton indicating recent exposure.

- **Mosquito Isolates:** Murray Valley encephalitis virus was detected in mosquitoes collected at Corowa and Deniliquin.

Mosquito Abundance

- **Inland:** LOW at Albury, Armidale, Balranald, Cootamundra, Forbes, Goulburn, Grong Grong, Leeton, Mathoura, Moama, Moree, Walgett, Yass and Young, MEDIUM at Deniliquin, Murrumbidgee, Narrabri, Narrandera and Wagga Wagga, HIGH at Corowa, Griffith, Temora and Wilcannia.

- **Coast:** LOW at Byron Bay, Kempsey, Kiama, Millbank, Murwillumbah, Nambucca, Port Macquarie, Shoalhaven, Wauchope, Wollongong and Wyong, HIGH at Ballina, Bega, Gosford, Lake Cathie, Newcastle and Tweed Heads.

- **Sydney:** LOW at Camden, Earlwood, Georges River and Hills Shire, MEDIUM at Bankstown, Canada Bay, Penrith and Sydney Olympic Park, HIGH at Liverpool, Northern Beaches and Parramatta.

Environmental Conditions

- **Climate:** In the week ending 25 February 2023, rainfall was moderate to high along the coast and generally low elsewhere in NSW. About average rainfall is predicted for NSW in March. Minimum temperatures are likely to be above average across most of NSW in March. Maximum temperatures are likely to be about average except for the southwest and northern inland areas where temperatures may be higher than average.

- **Tides:** High tides over 1.8 metres are predicted for 19-22 March, which could trigger hatching of *Aedes vigilax.*

Human Arboviral Disease Notifications

- **Ross River Virus:** 11 cases were notified in the week ending 28 January 2023.

- **Barmah Forest Virus:** 1 case was notified in the week ending 28 January 2023.

Comments and other findings of note

Mosquito numbers inland are decreasing however a high proportion of the mosquitoes collected 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 of MVEV over several weeks indicate the virus is likely to be widespread in inland NSW. The primary hosts of MVEV in natural transmission cycles are thought to be waterbirds. Only a small proportion of people infected with MVEV experience symptoms, which may include fever, headache, nausea, vomiting, loss of appetite, diarrhoea, and muscle aches. Severe MVEV 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.

SPHN (EH) 220867

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

Arbovirus Detections

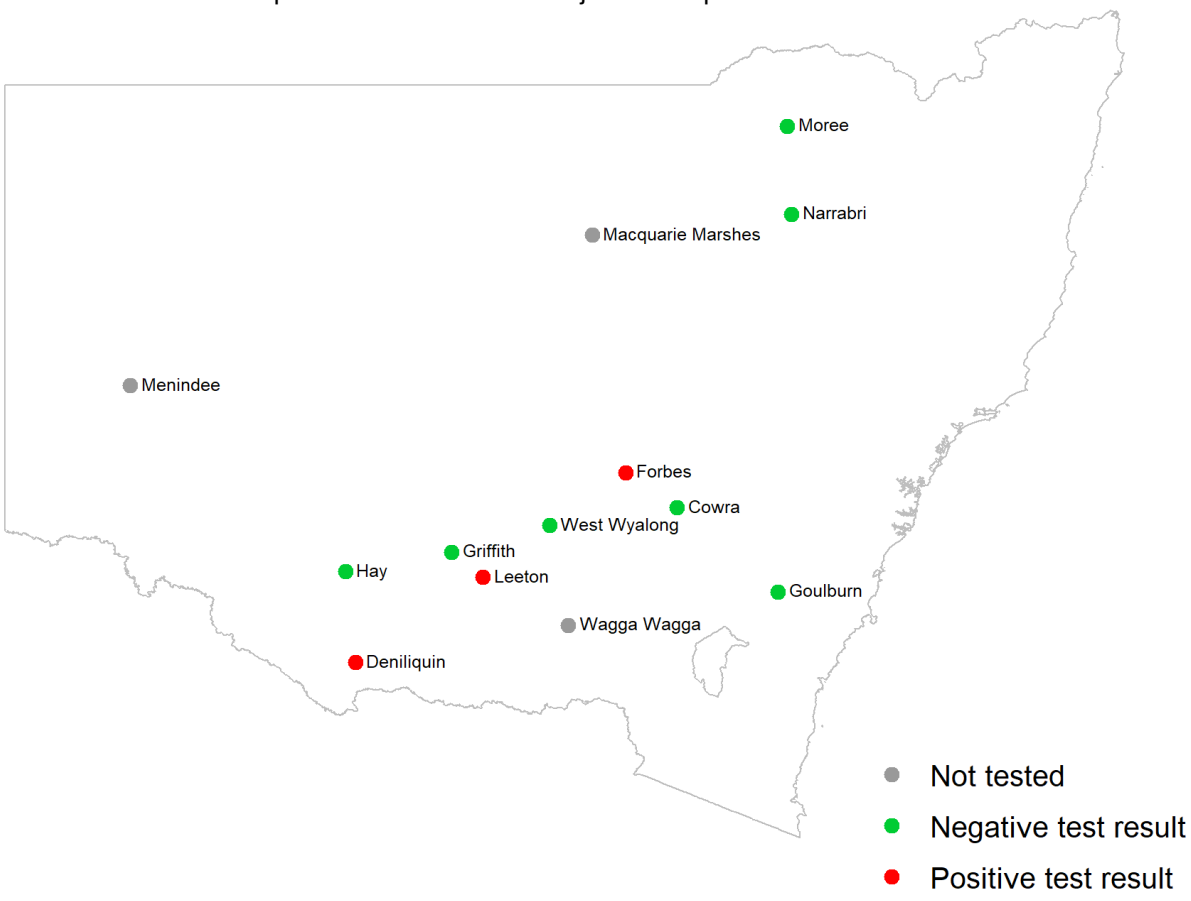
This section details detections of Murray Valley encephalitis virus, Kunjin virus, Ross River virus, Barmah Forest virus and Japanese encephalitis virus in the NSW Arbovirus Surveillance and Mosquito Monitoring Program.

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 25 February 2023

There were positive test results for Murray Valley encephalitis virus for samples collected at Deniliquin, Leeton and Forbes. There was a positive test result for Kunjin 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
14 February 2023	Forbes	Murray Valley encephalitis

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

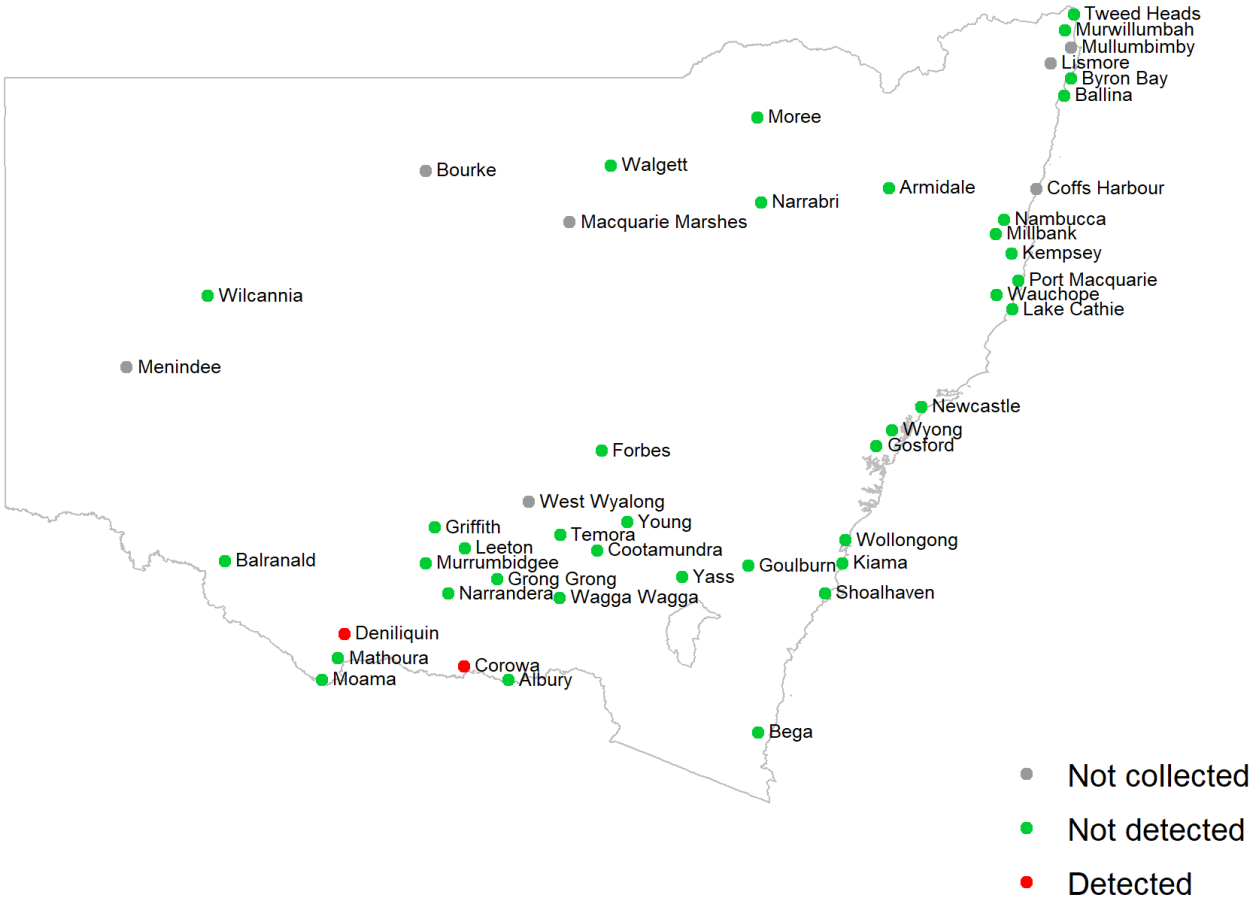
Mosquito isolates

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) for the season are detailed in the table.

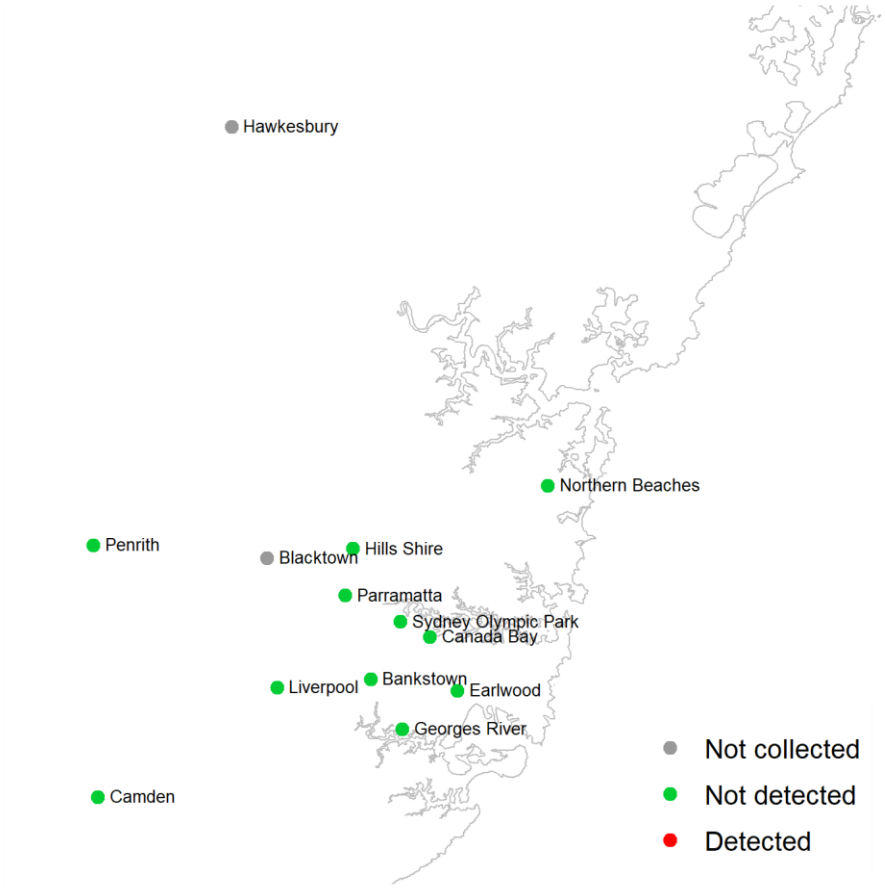
Test results for mosquito trapping sites reported in the week ending 25 February 2023

Murray Valley encephalitis virus was detected in mosquitoes collected at Corowa and Deniliquin.

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

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

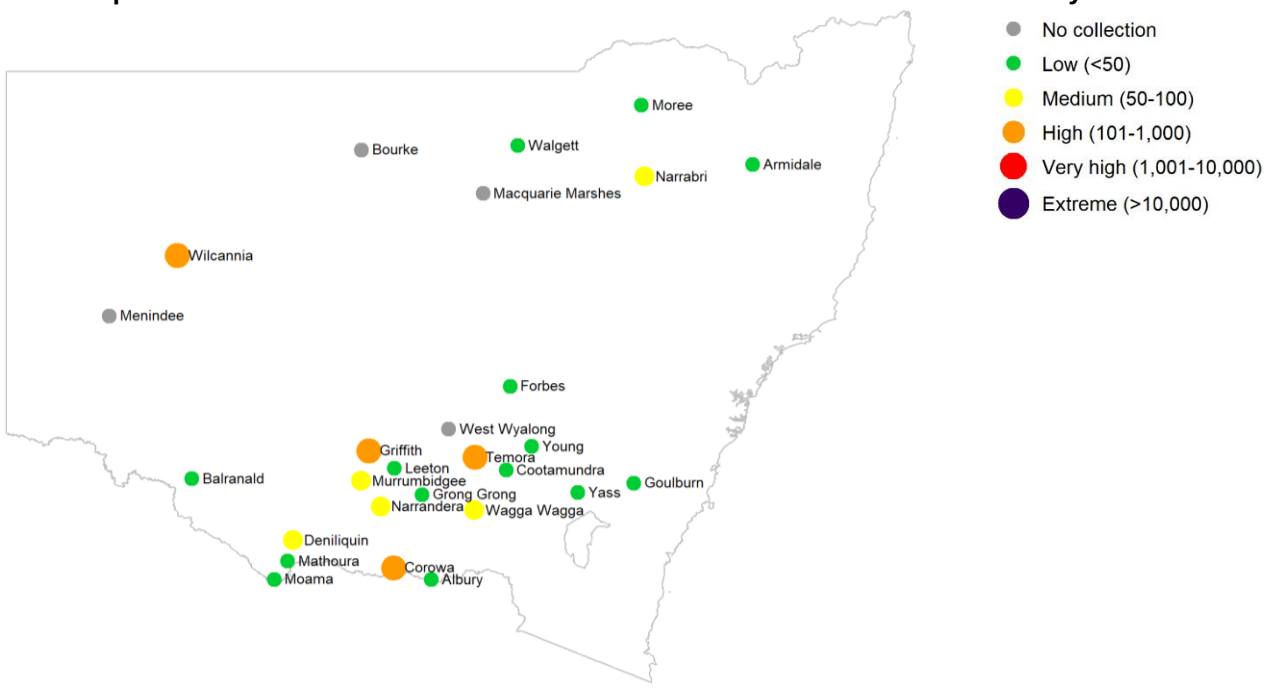
This section details counts of mosquitoes in the NSW Arbovirus Surveillance and Mosquito Monitoring Program. Each location represents the count average for all trapping sites at that location for the most recent week that collections were provided prior to preparation of this report.

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.

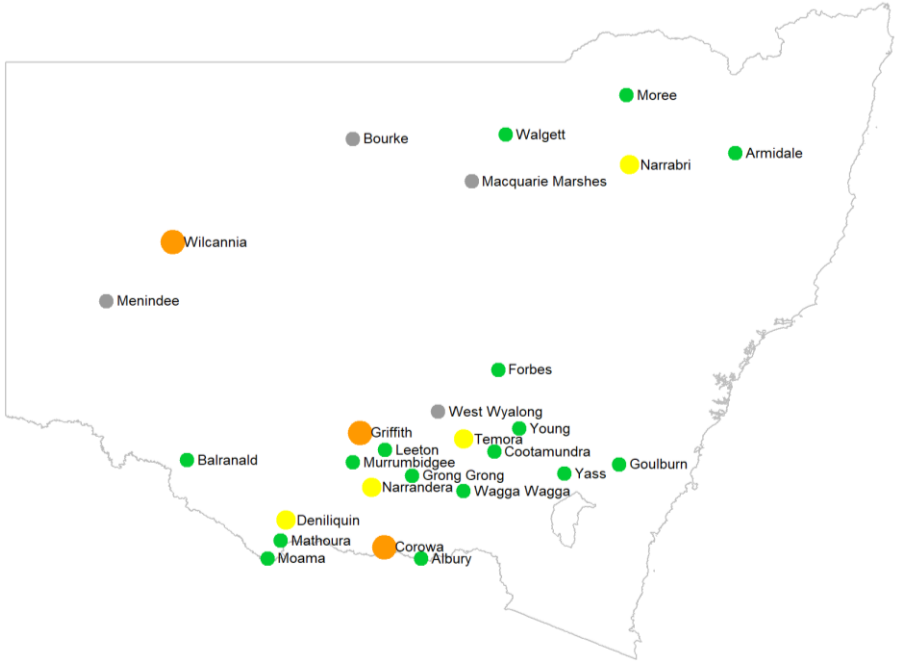
Mosquito counts (average per trap per location) for mosquito trapping sites reported in the week ending 25 February 2023

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

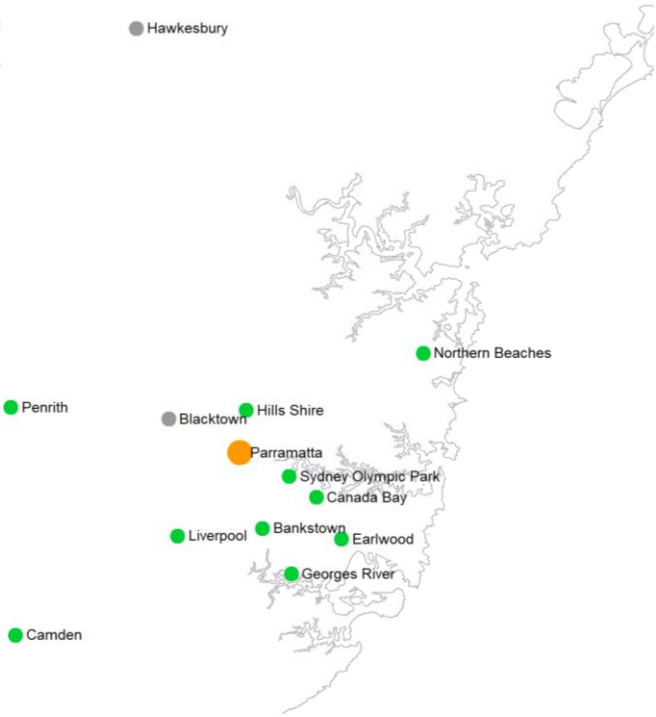
Sydney sites
Total mosquito counts

Key:

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

Culex annulirostris counts

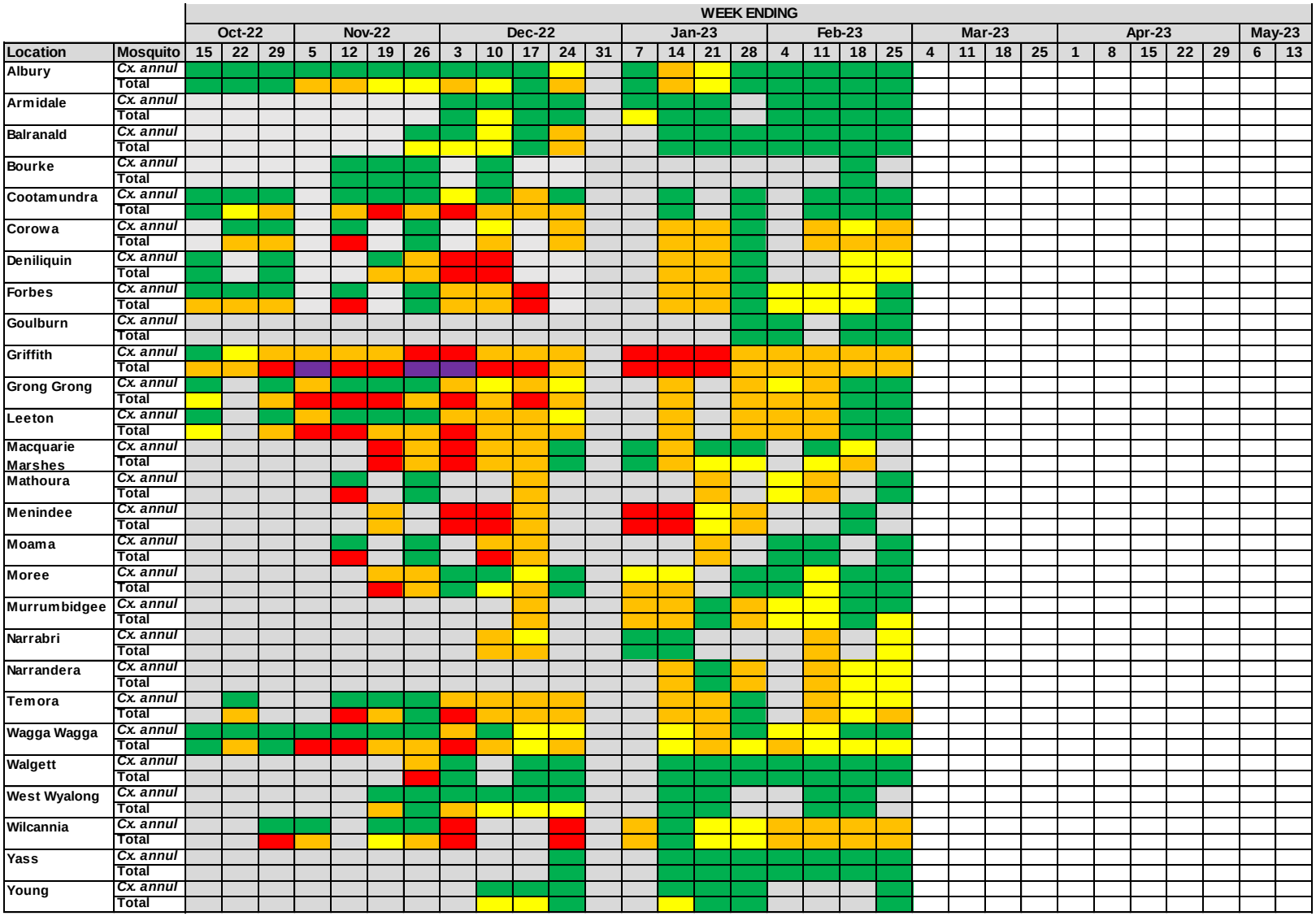
Aedes vigilax counts



Mosquito counts for the 2022-23 surveillance season

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

Inland



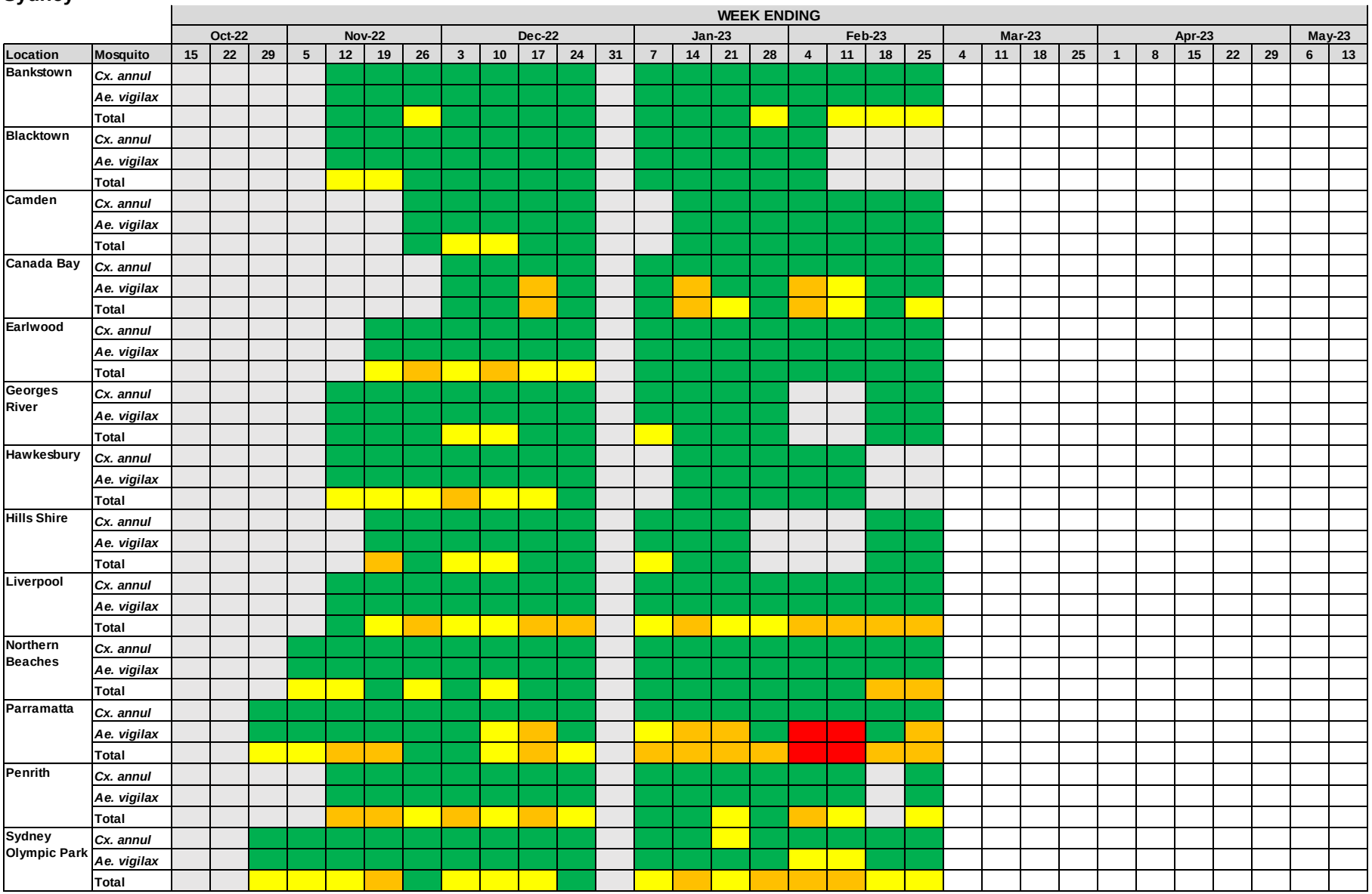
Key:

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

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																															
	Total																															
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

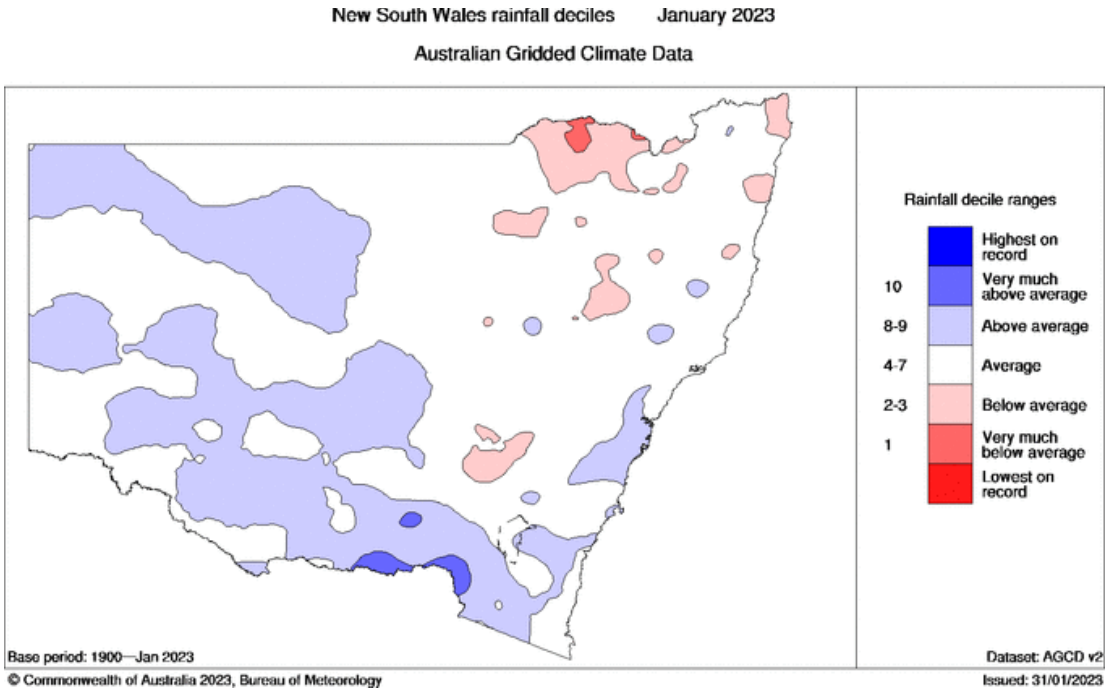

WEEK ENDING
Oct-22
Nov-22
Dec-22
Jan-23
Feb-23
Mar-23
Apr-23
May-23
Location
Mosquito
15 22 29 5 12 19 26 3 10 17 24 31 7 14 21 28 4 11 18 25 4 11 18 25 1 8 15 22 29 6 13
Bankstown
Cx. annul
Ae. vigilax
Total
Blacktown
Cx. annul
Ae. vigilax
Total
Camden
Cx. annul
Ae. vigilax
Total
Canada Bay
Cx. annul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

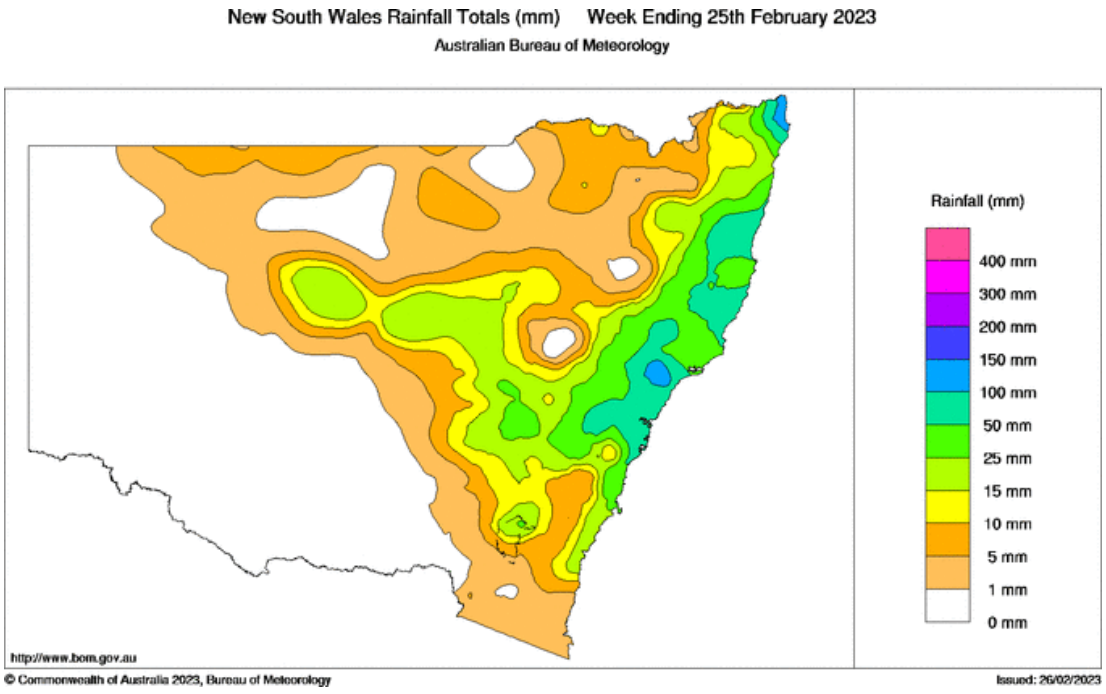
Environmental Conditions

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 NSW and parts of western NSW and average for most other areas of the state. In the week ending 25 February 2023, rainfall totals were moderate to high along the coast and generally low elsewhere in NSW.





Source: Australian Government, Bureau of Meteorology: s

Next month's rainfall and temperature outlook

The Bureau of Meteorology's rainfall outlook predicts that NSW is likely to receive about average rainfall for March.
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 above average across most of NSW in March. Maximum temperatures are likely to be about average across NSW except for the southwest and northern inland where temperatures may be higher than average for March.
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)

- 19-22 March 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.

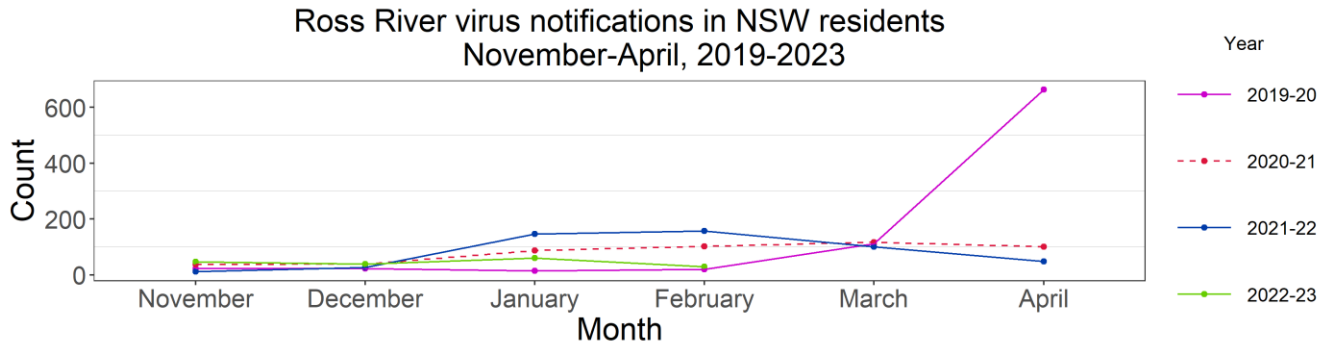
The data for Ross River virus and Barmah Forest virus from the CDWR for the latest reported 3 weeks are below.

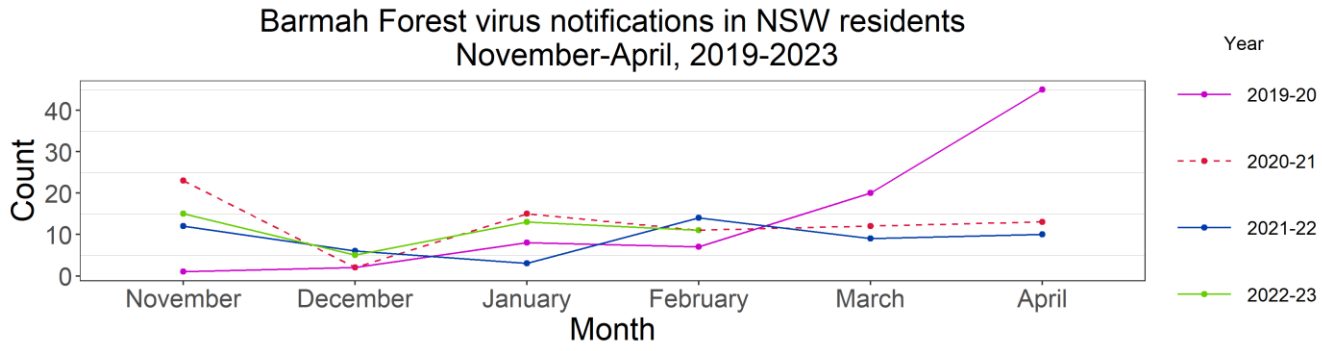
Recent notifications of Ross River virus and Barmah Forest virus infections in humans
(by date of case report received)

	Week		
	Latest week (22 – 28 Jan 2023)	**1-week prior (15 – 21 Jan 2023)**	**2-weeks prior (8 – 14 Jan 2023)**
Ross River virus	11	15	19
Barmah Forest virus	1	4	5

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 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.