NSW Arbovirus Surveillance and Mosquito Monitoring 2022-2023

Weekly Update: Week ending 1 April 2023

(Report Number 24)

NSW GOVERNMENT

Summary

Arbovirus Detections

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

- **Mosquito Isolates:** Barmah Forest virus was detected in mosquitoes collected at Gosford.

Mosquito Abundance

- **Inland:** LOW at Albury, Balranald, Bourke, Corowa, Deniliquin, Forbes, Goulburn, Griffith, Grong Grong, Leeton, Mathoura, Moama, Moree, Murrumbidgee, Narrandera, Wagga Wagga and Yass, MEDIUM at Cootamundra and Macquaire Marshes, HIGH at Wilcannia.

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

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

Environmental Conditions

- **Climate:** In the week ending 1 April 2023, there were moderate to high rainfall totals across eastern NSW and low totals in the west. About average rainfall is predicted along the NSW coast and below average rainfall in central and 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 along the north coast and the north-west of 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:** 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 minima 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.

SPHN (EH) 220867

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

Arbovirus Detections

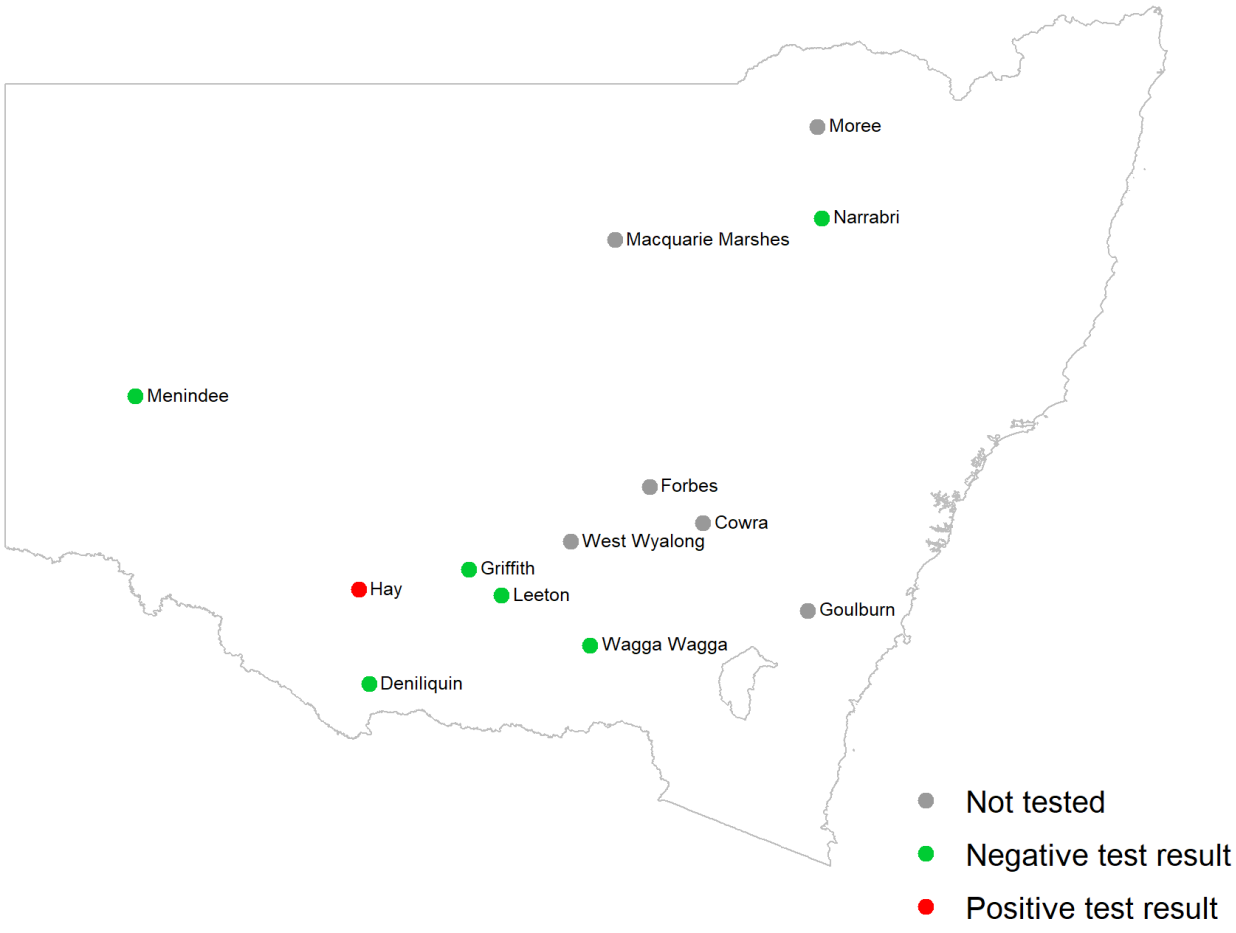
This section details detections of Murray Valley encephalitis virus, Kunjin virus, Ross River virus, Barmah Forest virus and Japanese encephalitis virus in the NSW Arbovirus Surveillance and Mosquito Monitoring Program.

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 1 April 2023

There were positive test results for Murray Valley encephalitis virus and Kunjin virus for samples collected at Hay.



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

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

Mosquito isolates

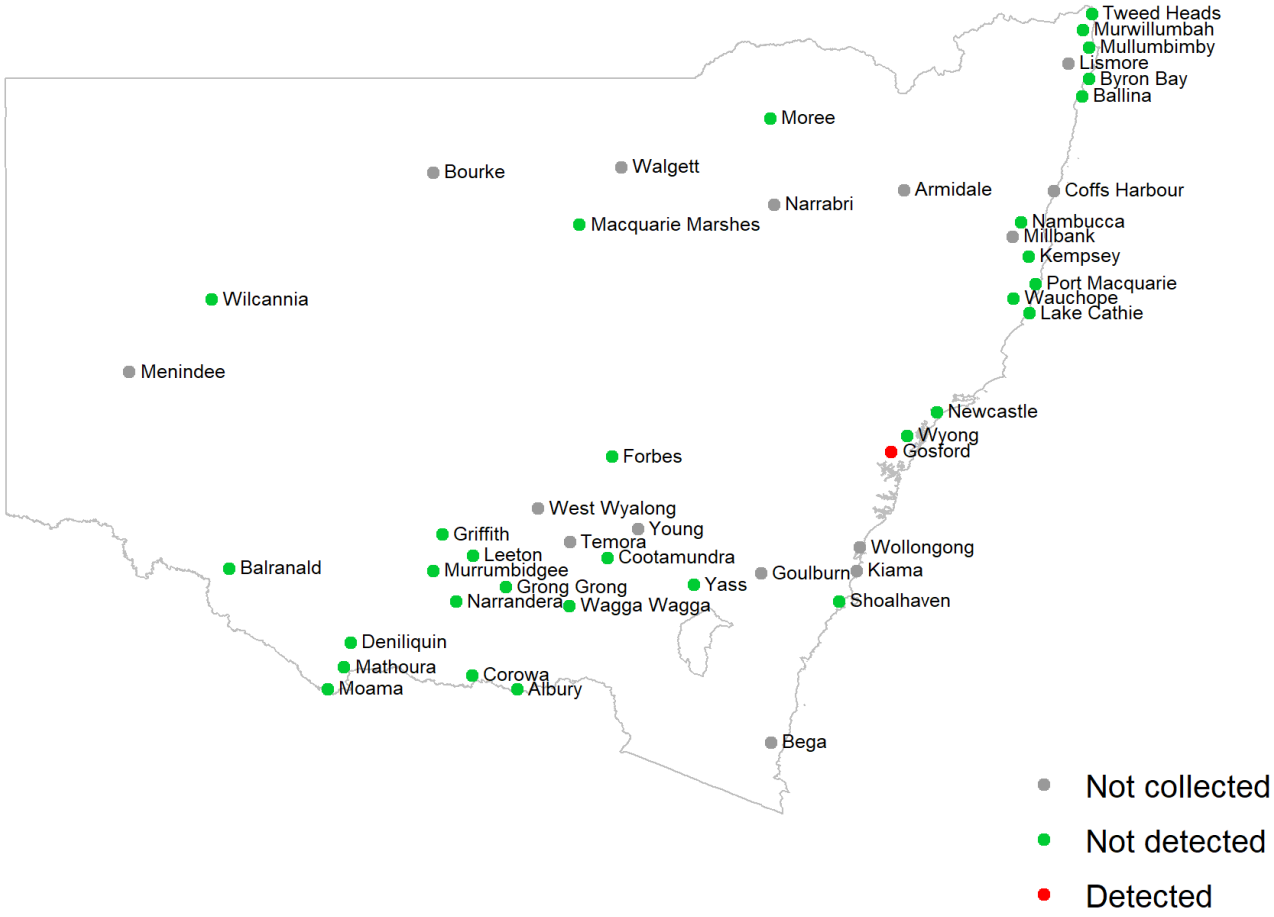
Whole grinds of collected mosquitoes are tested for arbovirus nucleic acids to determine the presence of arboviruses in mosquitoes. Test results for detections of Ross River virus, Barmah Forest virus, Murray Valley encephalitis virus, Kunjin virus and Japanese encephalitis virus for the past week are 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 1 April 2023

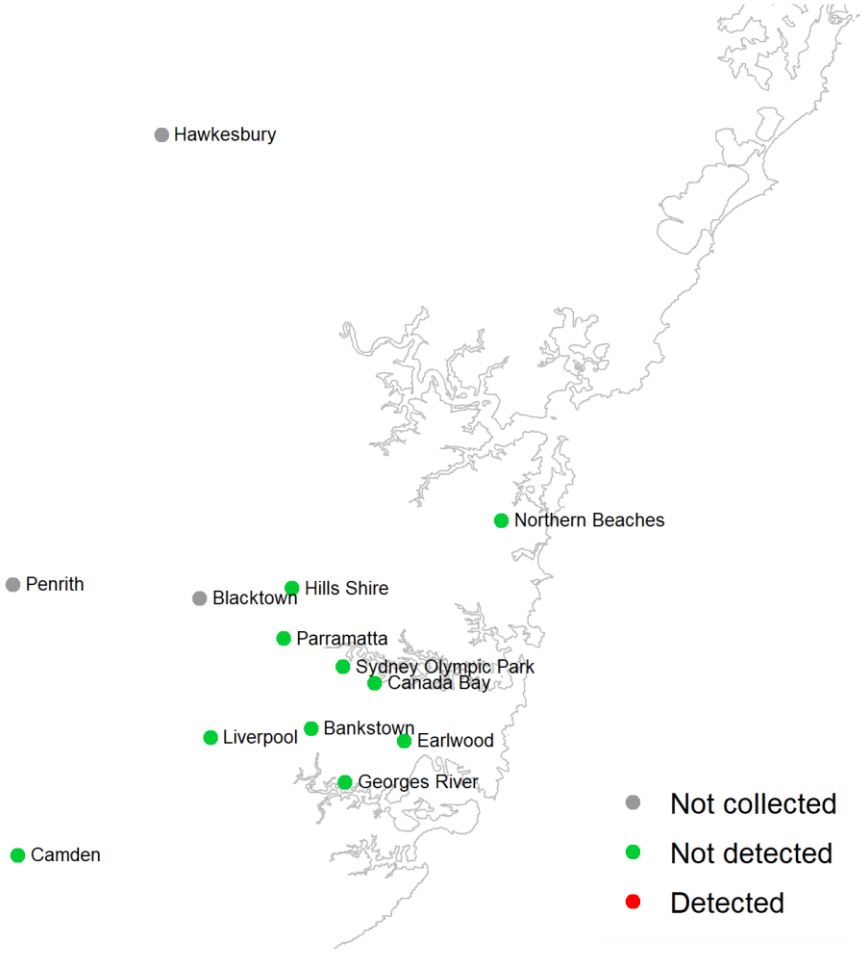
Barmah Forest virus was detected in mosquitoes collected at Gosford.

Note, a detection of Stratford virus is 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	Wyong	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

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

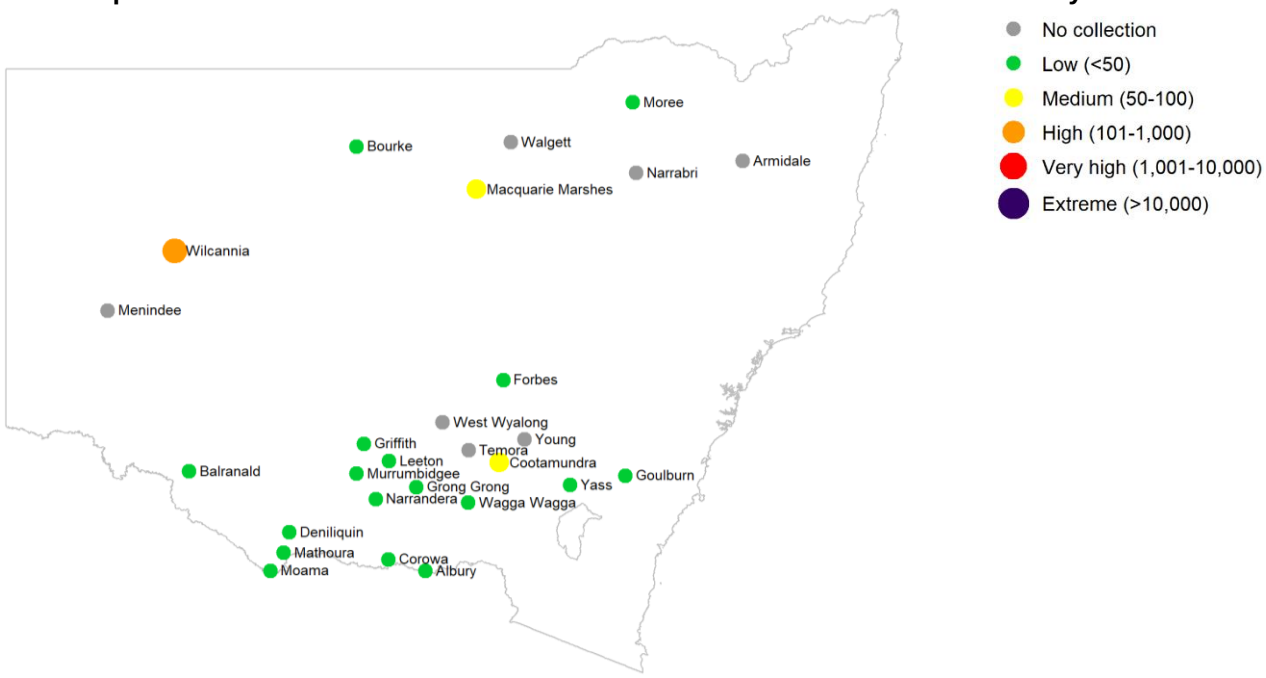
This section details counts of mosquitoes in the NSW Arbovirus Surveillance and Mosquito Monitoring Program. Each location represents the count average for all trapping sites at that location for the most recent week that collections were provided prior to preparation of this report.

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.

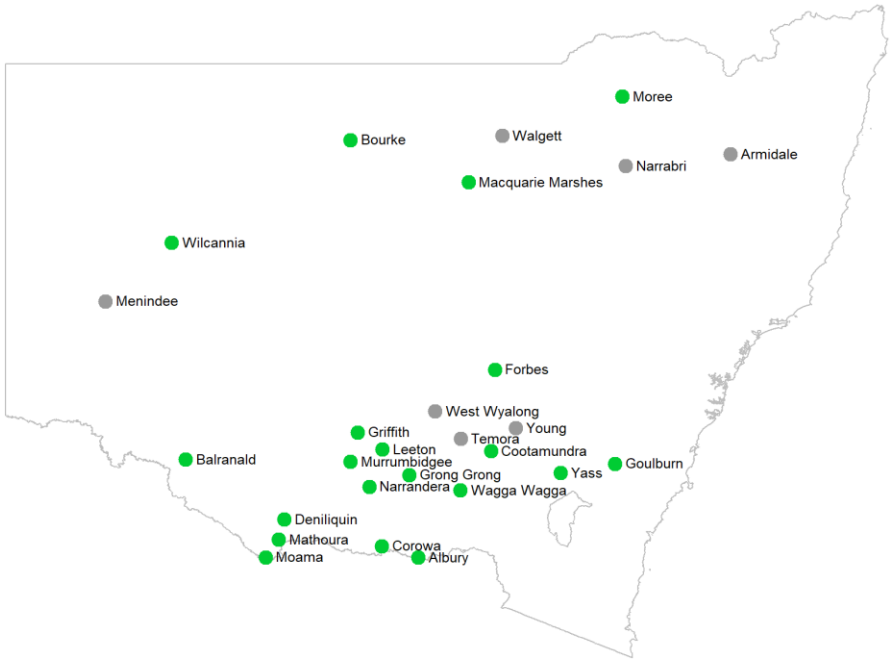
Mosquito counts (average per trap per location) for mosquito trapping sites reported in the week ending 1 April 2023

Inland sites

Total mosquito counts



***Culex annulirostris* counts**



Coastal sites

Total mosquito counts

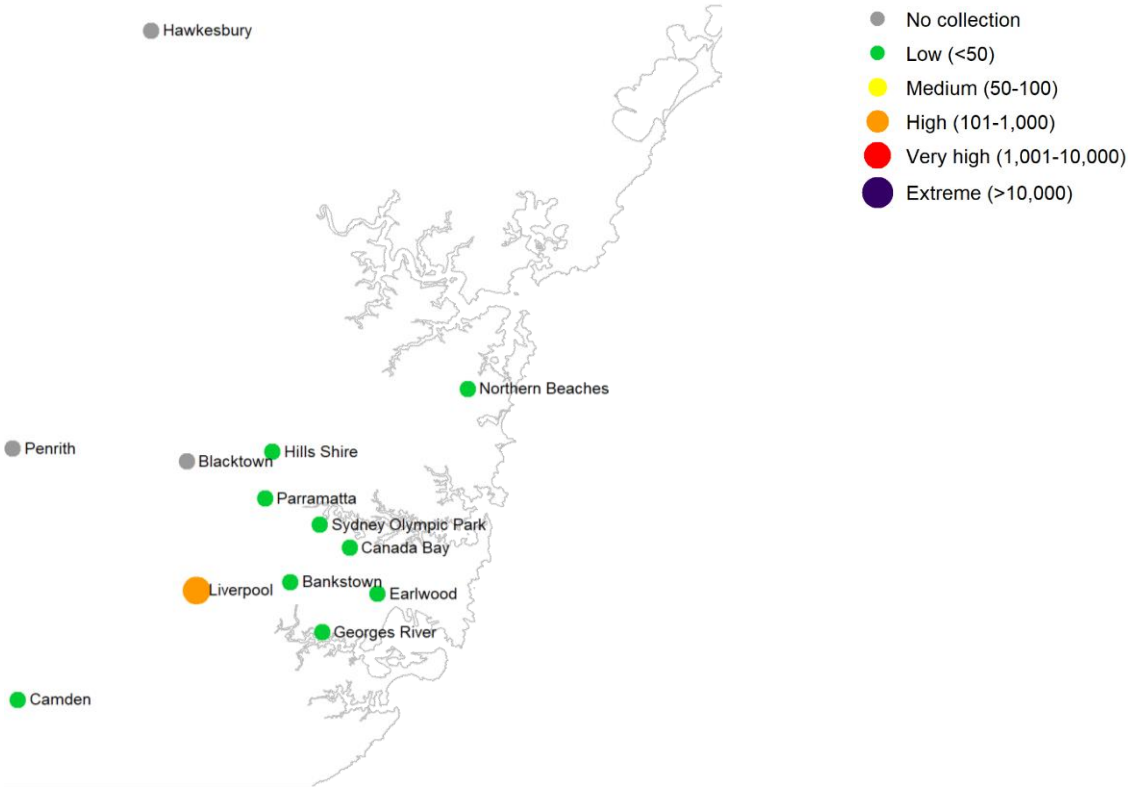
Key:

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

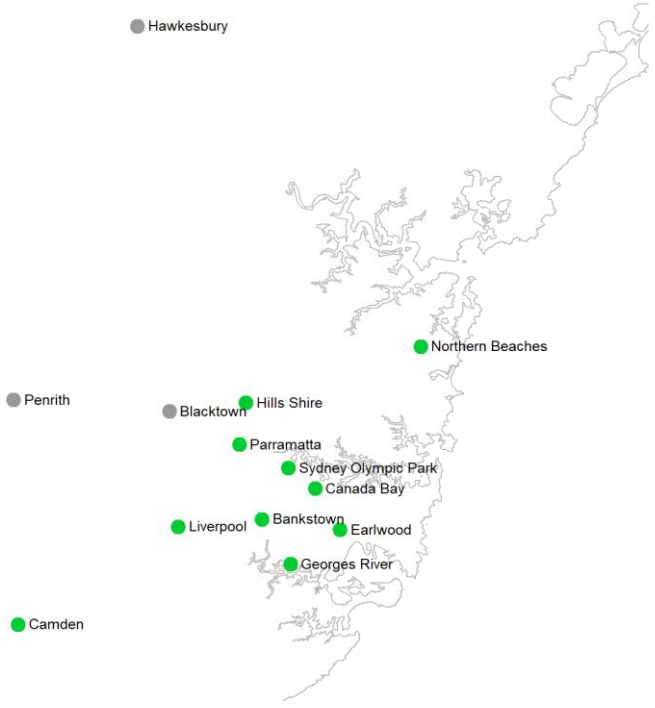
Culex annulirostris counts

Aedes vigilax counts

Sydney sites
Total mosquito counts



Culex annulirostris counts

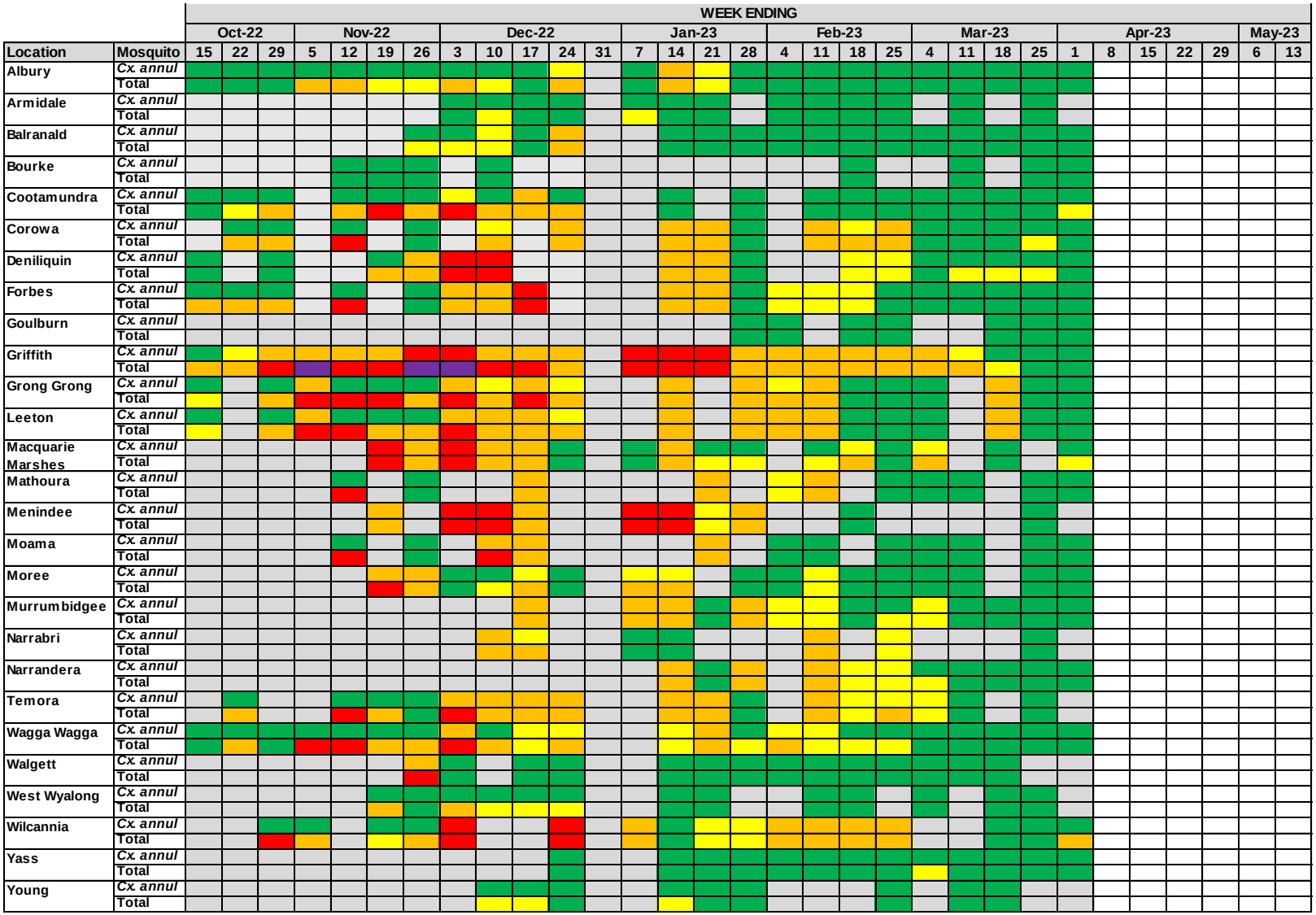


Aedes vigilax counts

Mosquito counts for the 2022-23 surveillance season

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

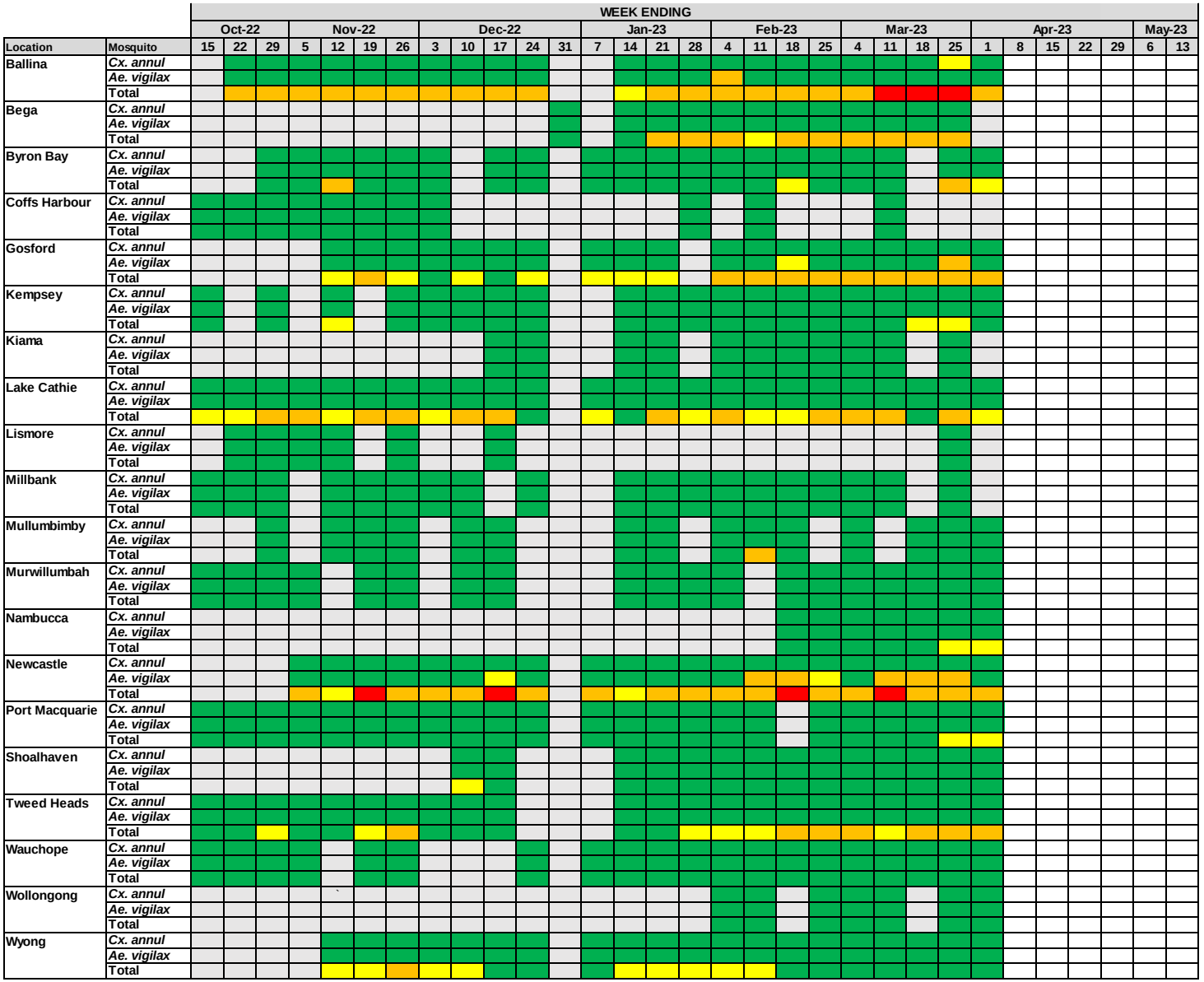
Inland



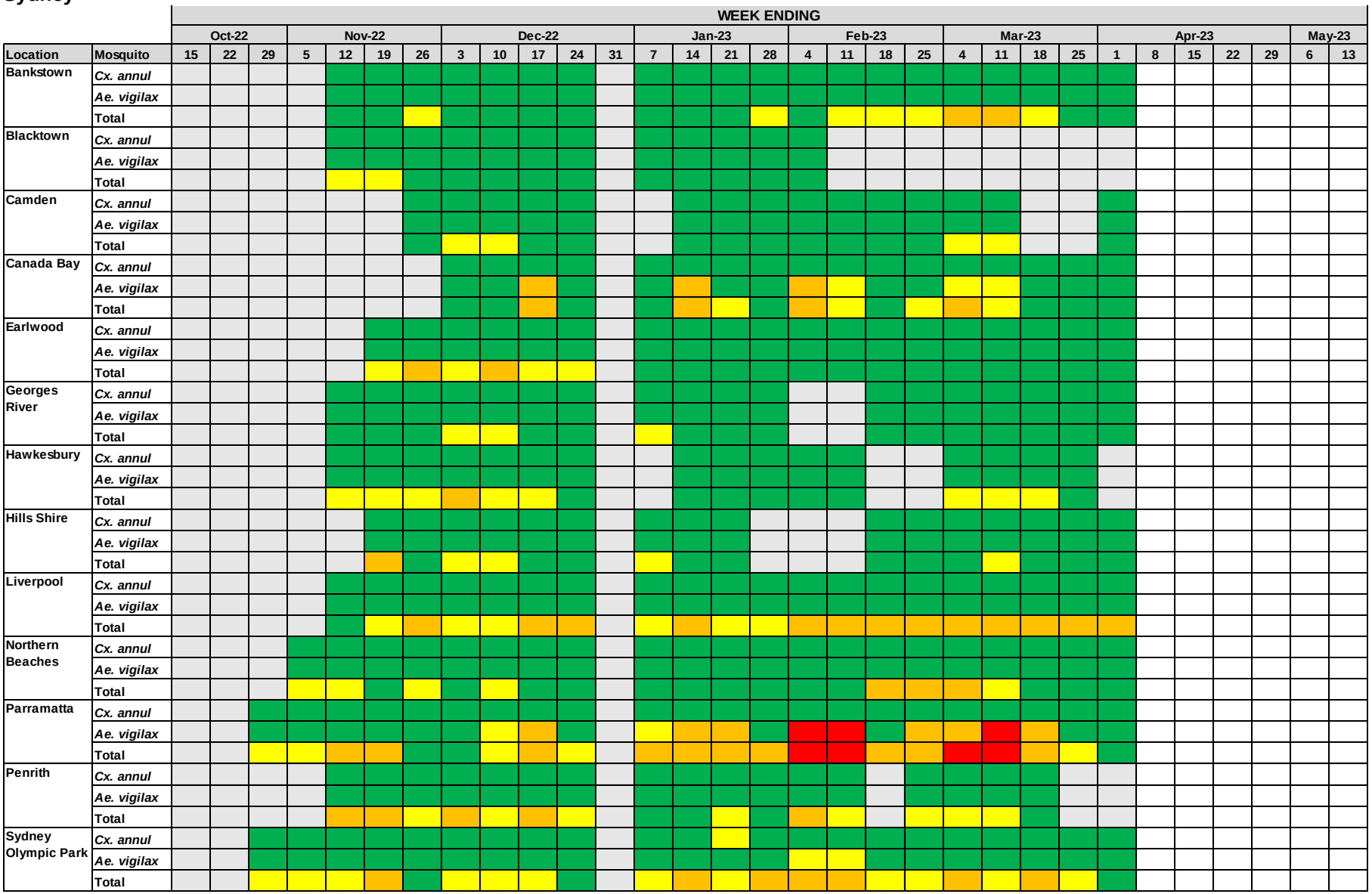
Key:

- 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
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
Location
Mosquito
Ballina
Bega
Byron Bay
Coffs Harbour
Gosford
Kempsey
Kiama
Lake Cathie
Lismore
Millbank
Mullumbimby
Murwillumbah
Nambucca
Newcastle
Port Macquarie
Shoalhaven
Tweed Heads
Wauchope
Wollongong
Wyong
Cx. annul
Ae. vigilax
Total

Sydney

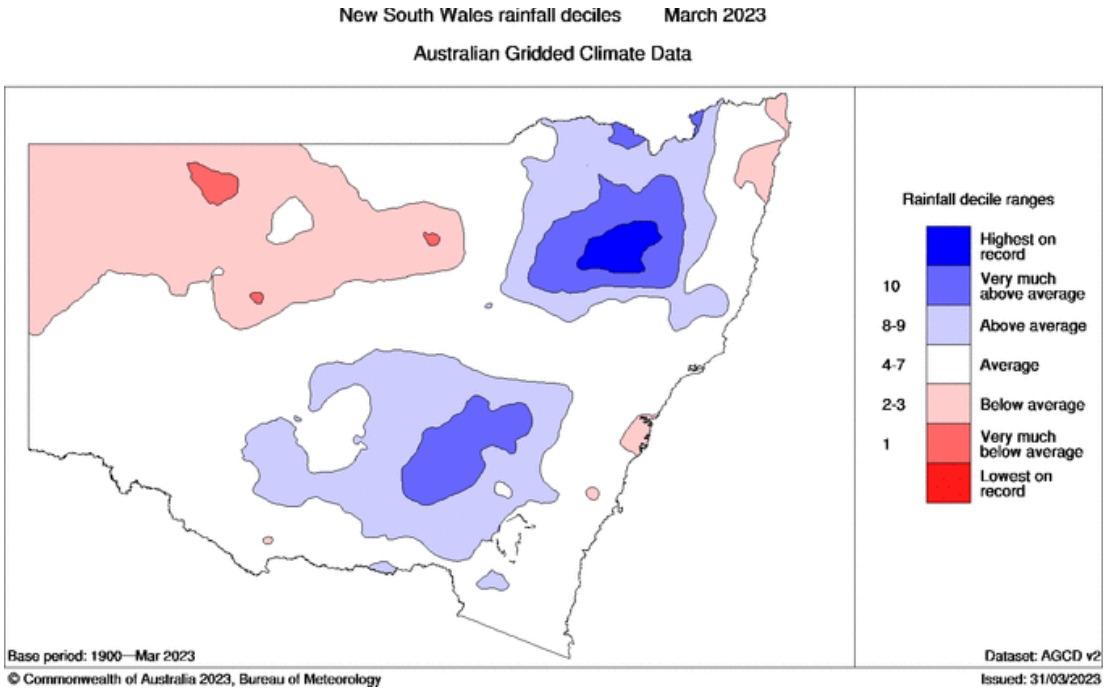

WEEK ENDING
Oct-22
Nov-22
Dec-22
Jan-23
Feb-23
Mar-23
Apr-23
May-23
Location
Mosquito
15 22 29 5 12 19 26 3 10 17 24 31 7 14 21 28 4 11 18 25 4 11 18 25 1 8 15 22 29 6 13
Bankstown
Cx. annul
Ae. vigilax
Total
Blacktown
Cx. annul
Ae. vigilax
Total
Camden
Cx. annul
Ae. vigilax
Total
Canada Bay
Cx. annul
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

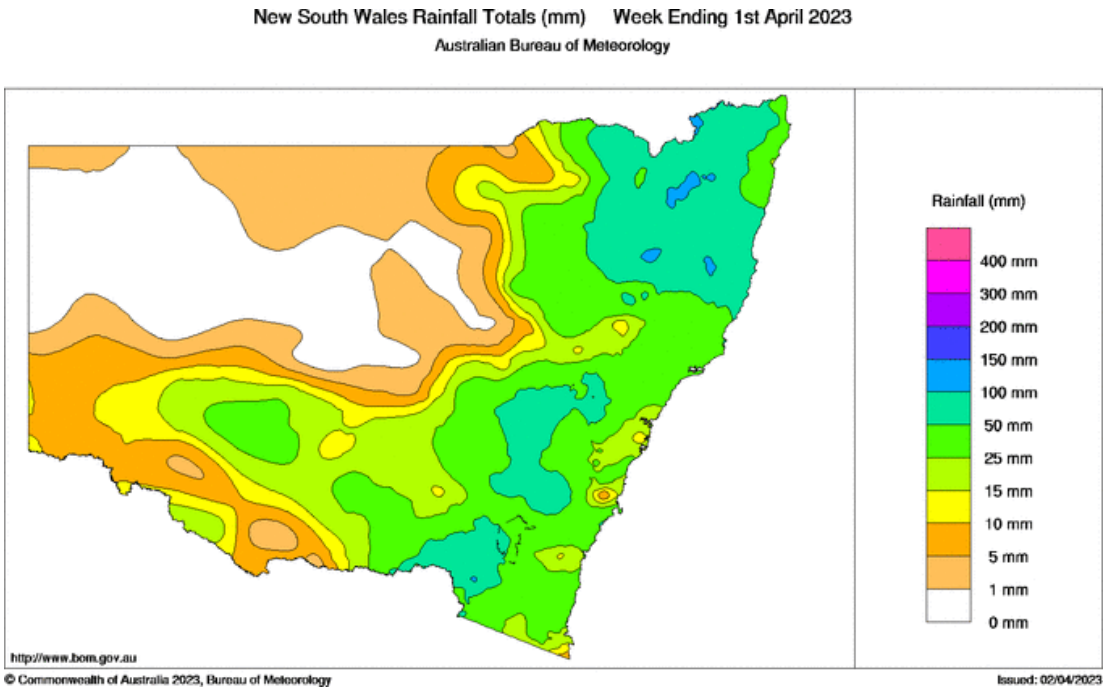
Environmental Conditions

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 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 1 April 2023, there were moderate to high rainfall totals across eastern NSW and low totals in the west.





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 in April, NSW is likely to receive about average rainfall along the coast and below average rainfall in central and 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 along the north coast and the north-west 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.

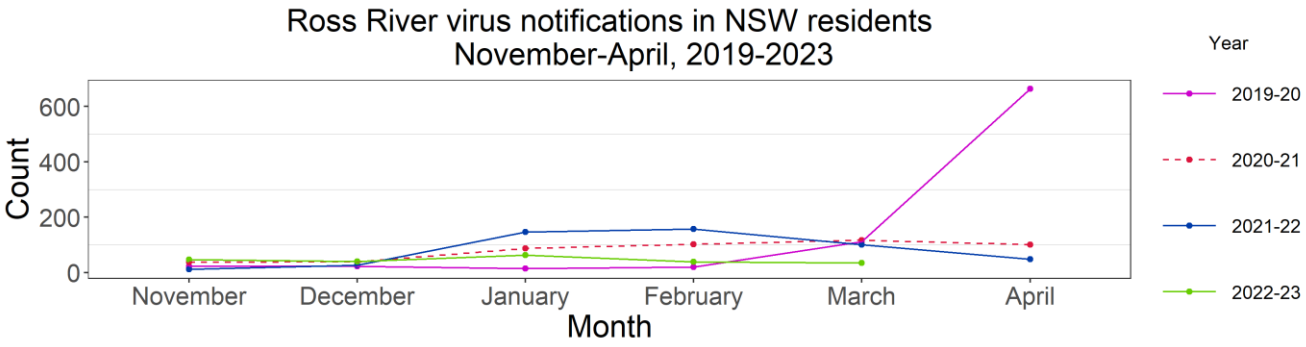
The data for Ross River virus and Barmah Forest virus from the CDWR for the latest reported 3 weeks are below.

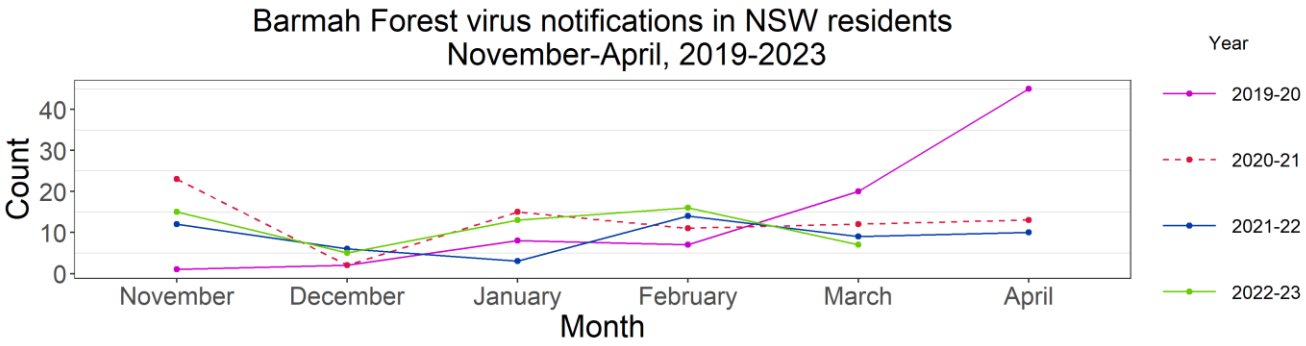
Recent notifications of Ross River virus and Barmah Forest virus infections in humans
(by date of case report received)

	Week		
	Latest week (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 31 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.