2024 NEBRASKA MOSQUITO-BORNE DISEASE REPORT

NEBRASKA DEPARTMENT OF HEALTH AND HUMAN SERVICES (NDHHS)

VECTOR-BORNE DISEASE PROGRAM

MMWR WEEK 43

(Week Ending 10/26/2024)

All Data is Provisional

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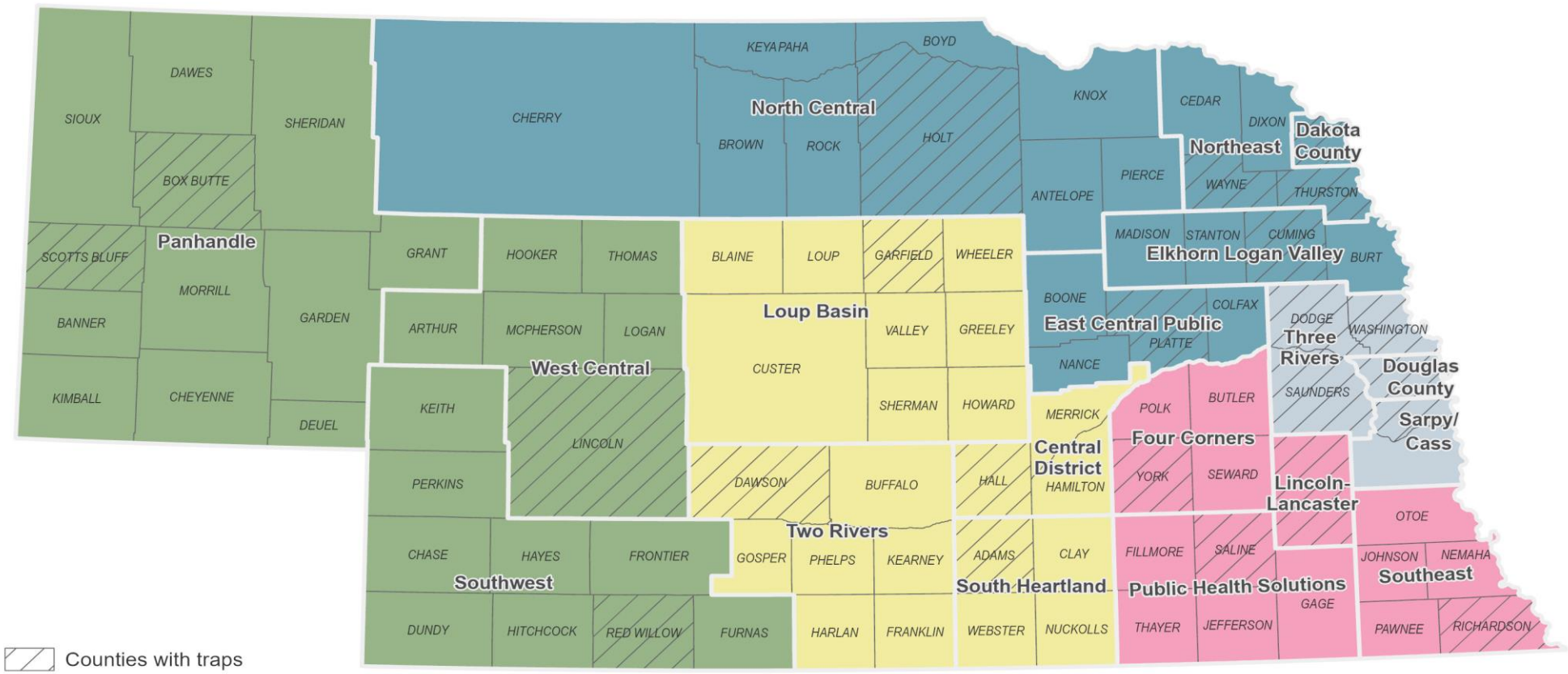
Report Highlights

Credit: CDC NCEZID-DVBD

- 2024 Mosquito-Borne Disease Cases
  - 89 West Nile virus (WNV) human disease cases reported.
  - 19 presumptive viremic WNV blood donors reported.
  - Two WNV associated deaths have been reported.
  - Two WNV cases reported in equines.
  - No WNV positive birds reported.
- 2024 Mosquito Surveillance and Testing
  - Routine and expanded mosquito surveillance and testing has ended for 2024.
  - 1,303 routine pools (containing 26,616 Culex mosquitoes) tested.
    - 94 WNV positive pools (7.2%) detected.
  - 696 expanded surveillance pools (containing 10,547 mosquitoes) tested.
    - Two Jamestown Canyon virus (JCV) positive mosquito pools detected.
    - One Cache Valley virus (CVV) positive mosquito pool has been detected.
- WNV Relative Risk
  - WNV risk has decreased for the season. Low risk may still be present in some areas that have not yet experienced a hard freeze. Individuals are encouraged to continue protecting themselves from mosquito bites until that occurs.

Remember LOW risk does not equal NO risk

2024 Mosquito Surveillance Trapping Regions



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JULY 2024

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Credit: CDC, NCEZID-DVBD

NEBRASKA HUMAN MOSQUTIO-BORNE DISEASE SURVEILLANCE

Human Mosquito-Borne Disease Surveillance

Nebraska Mosquito-Borne Disease Cases, 2024 & 2023

Condition	2024	2023
Chikungunya**	*	0
Dengue**	9	*
Jamestown Canyon	0	0
Malaria**	15	13
West Nile Clinical Cases	89	150
West Nile Blood Donors	19	42
Zika**	0	0

*Data suppressed due to low numbers (1 – 5 cases).

** Reported cases have all been acquired during overseas travel to endemic areas.

- 2024 statewide number of mosquito-borne disease cases reported to the Nebraska Department of Health and Human Services (NDHHS) through MMWR week #43 (week ending 10/26/2024).
  - All data is preliminary and subject to change as more information is gathered.
  - Reported cases only include confirmed and probable cases meeting CSTE/CDC case definition and approved by NDHHS.

Human West Nile Virus Disease Clinical Information

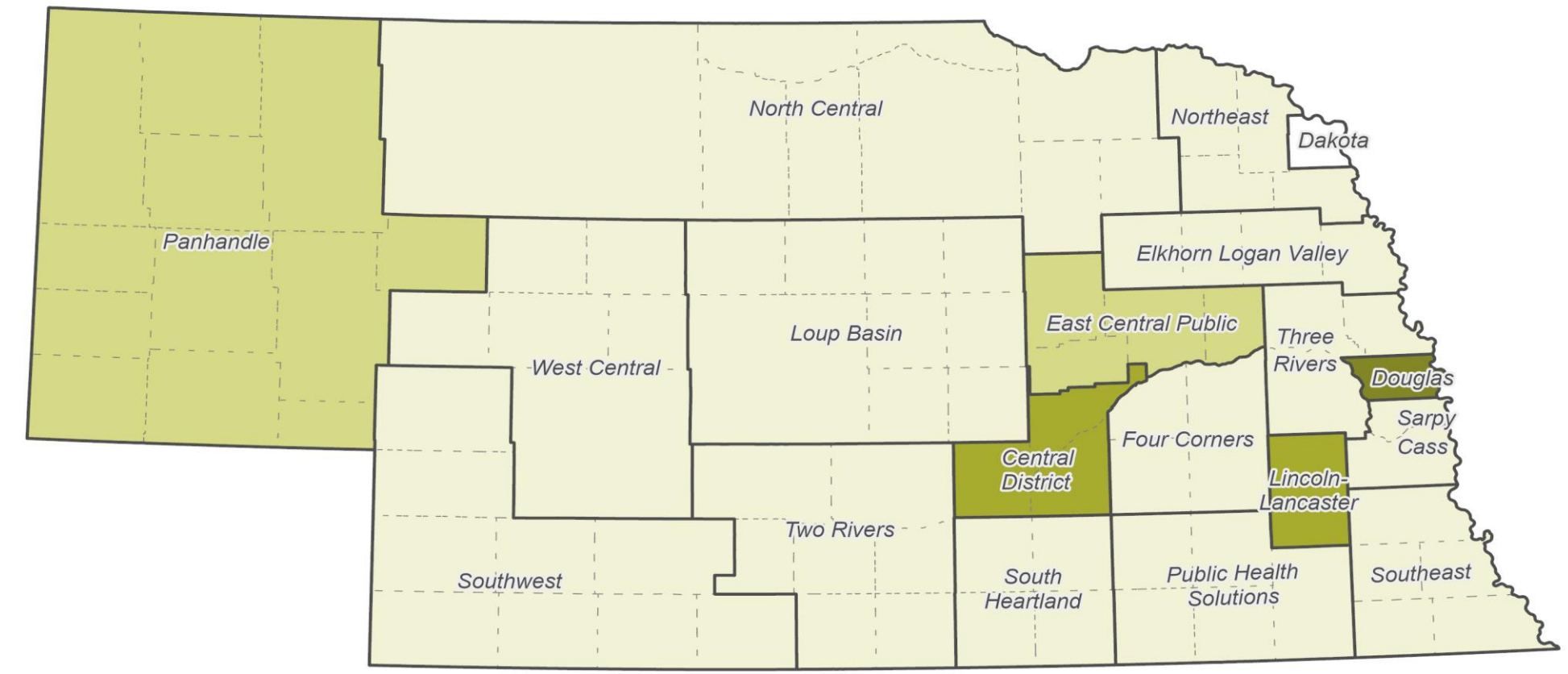
Nebraska West Nile Virus Disease Case Clinical Information, 2024

Age Range	#
0-13	*
14-25	*
26-50	29
51-64	15
65+	38
Sex	**#**
Male	54
Female	35
Diagnosis	**#**
WNV Neuroinvasive	48
WNV Non-Neuroinvasive	41
Hospitalized	45
Deaths	2

*Data suppressed due to low numbers (1 – 5 cases).

2024 West Nile Virus Human Clinical Cases

by Local Health Department, Updated 30 October 2024



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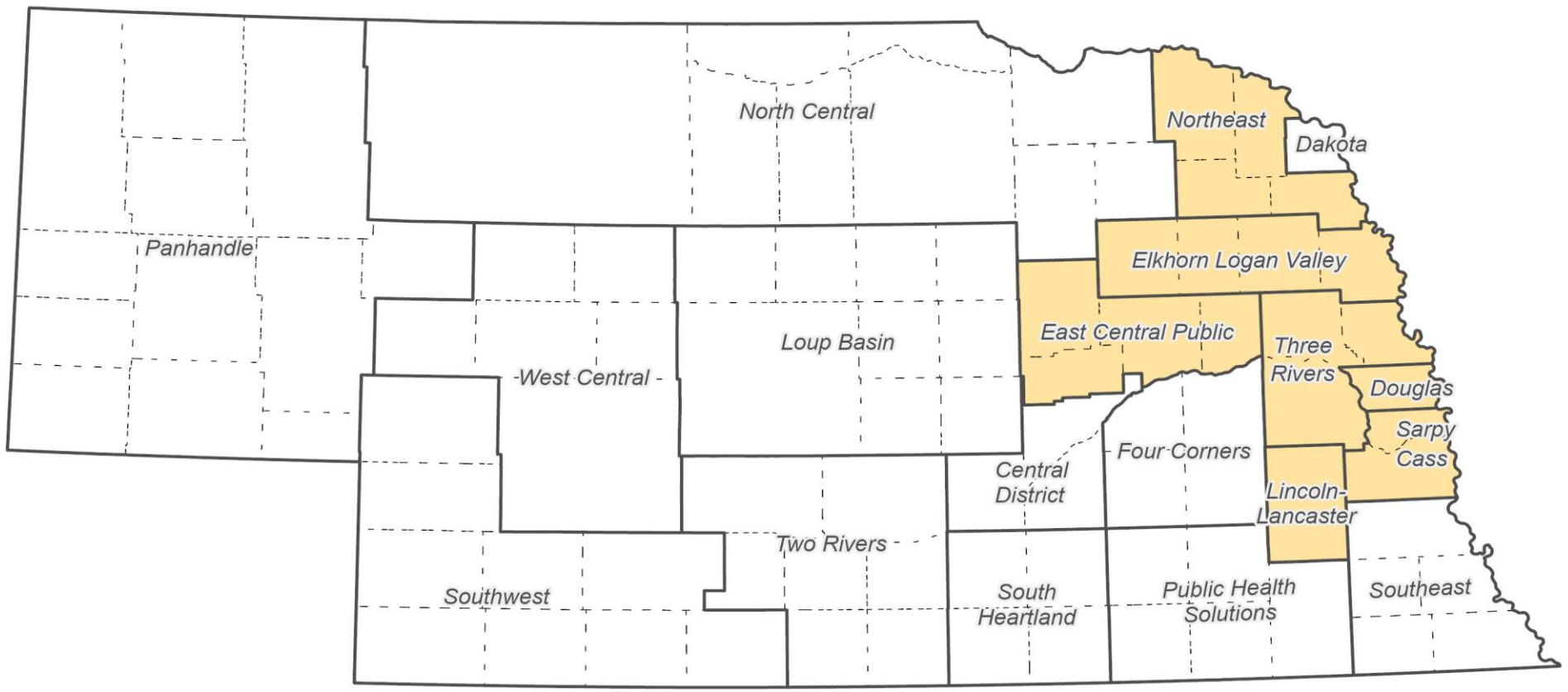
2024 West Nile Virus Blood Donation Cases

by Local Health Department, Updated 30 October 2024



Number of Human WNV Blood Donor Cases

- 0 Cases (12 LHD)
- 1 to 5 Cases (7 LHD)
- County Boundary
- Local Health Department Boundary

N

0 25 50 Miles

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Credit: Credit: CDC, NCEZID-DVBD

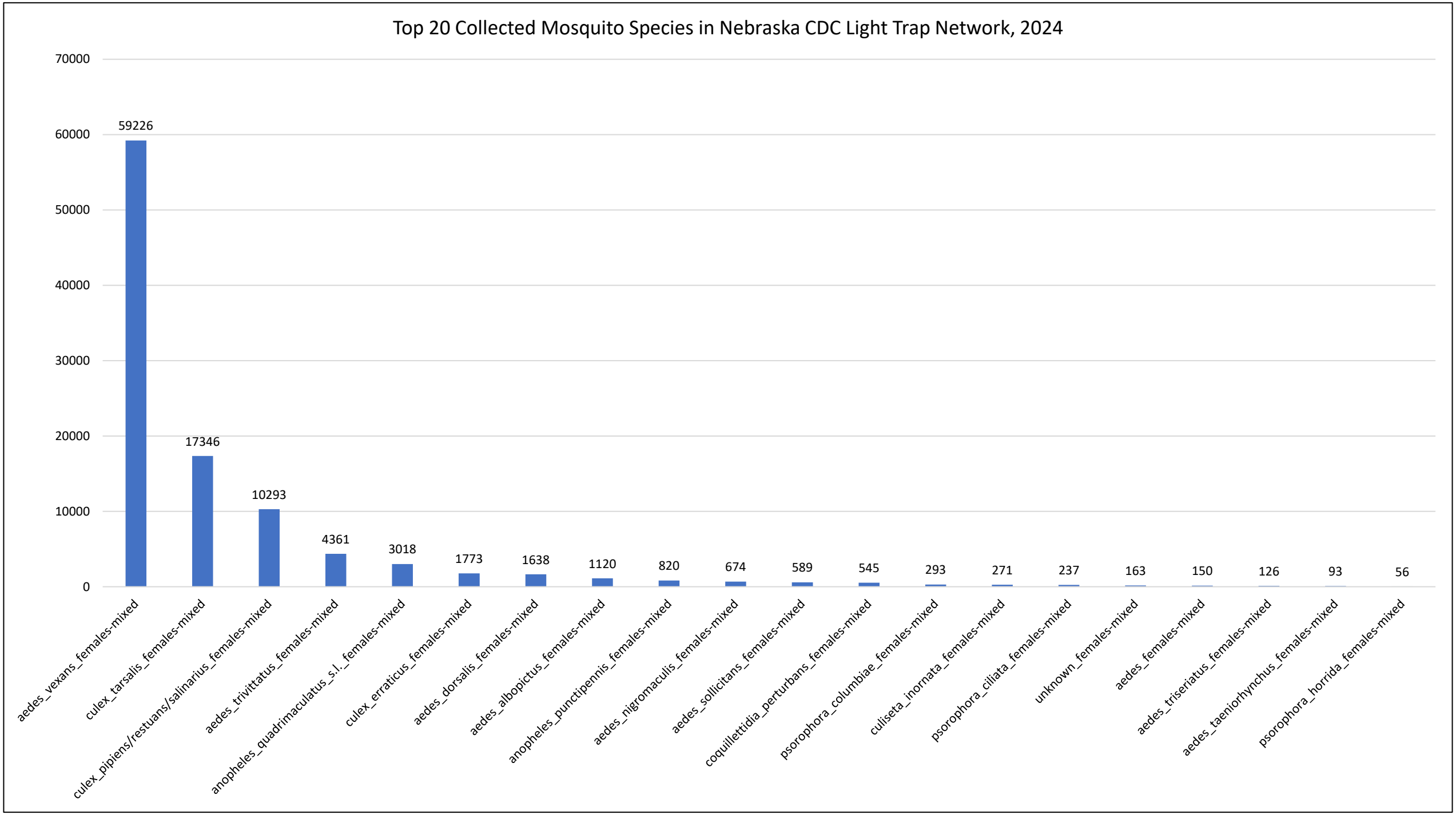
NEBRASKA MOSQUITO SURVEILLANCE AND PATHOGEN TESTING PROGRAM

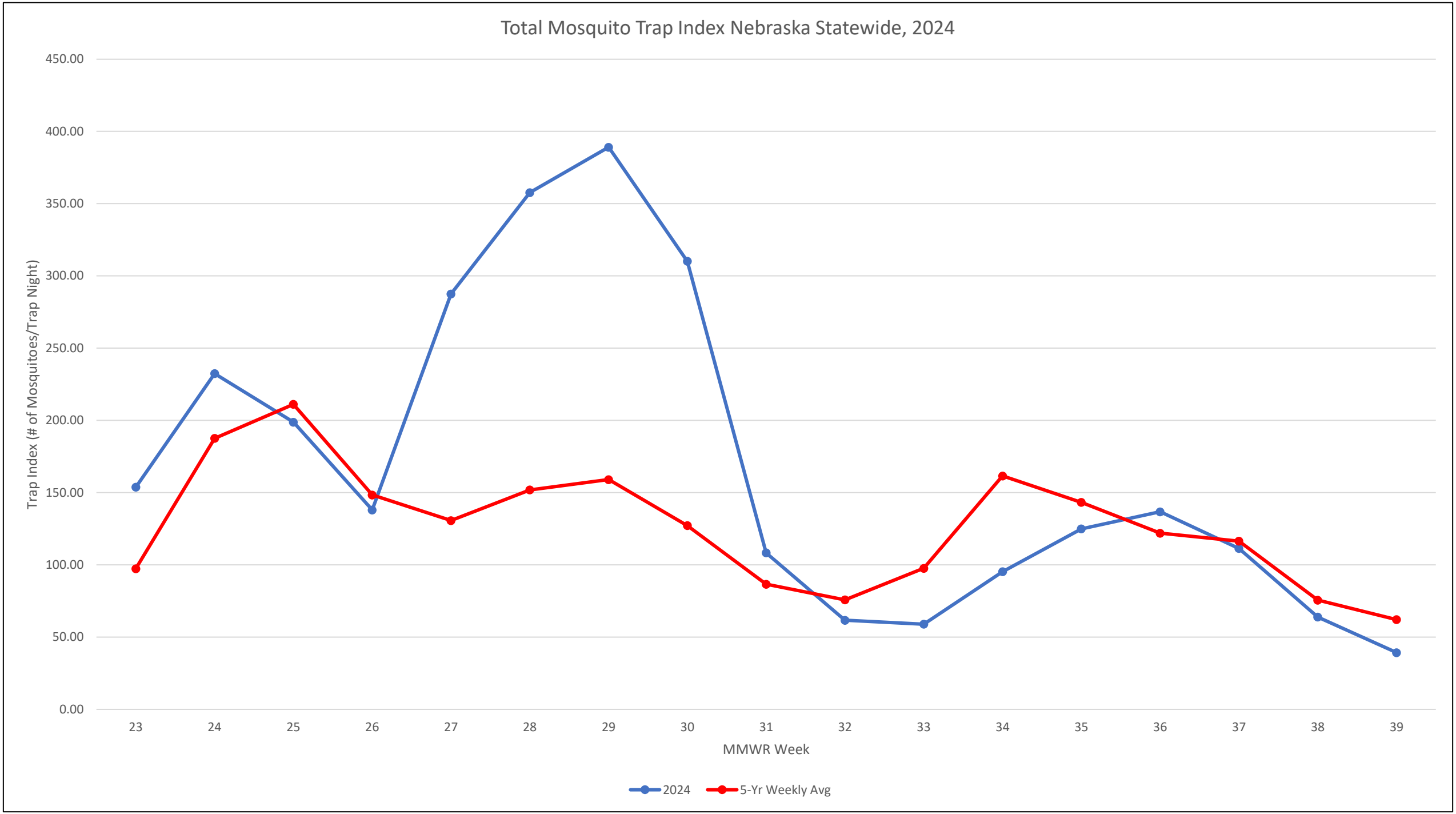
Routine Mosquito Surveillance and Testing

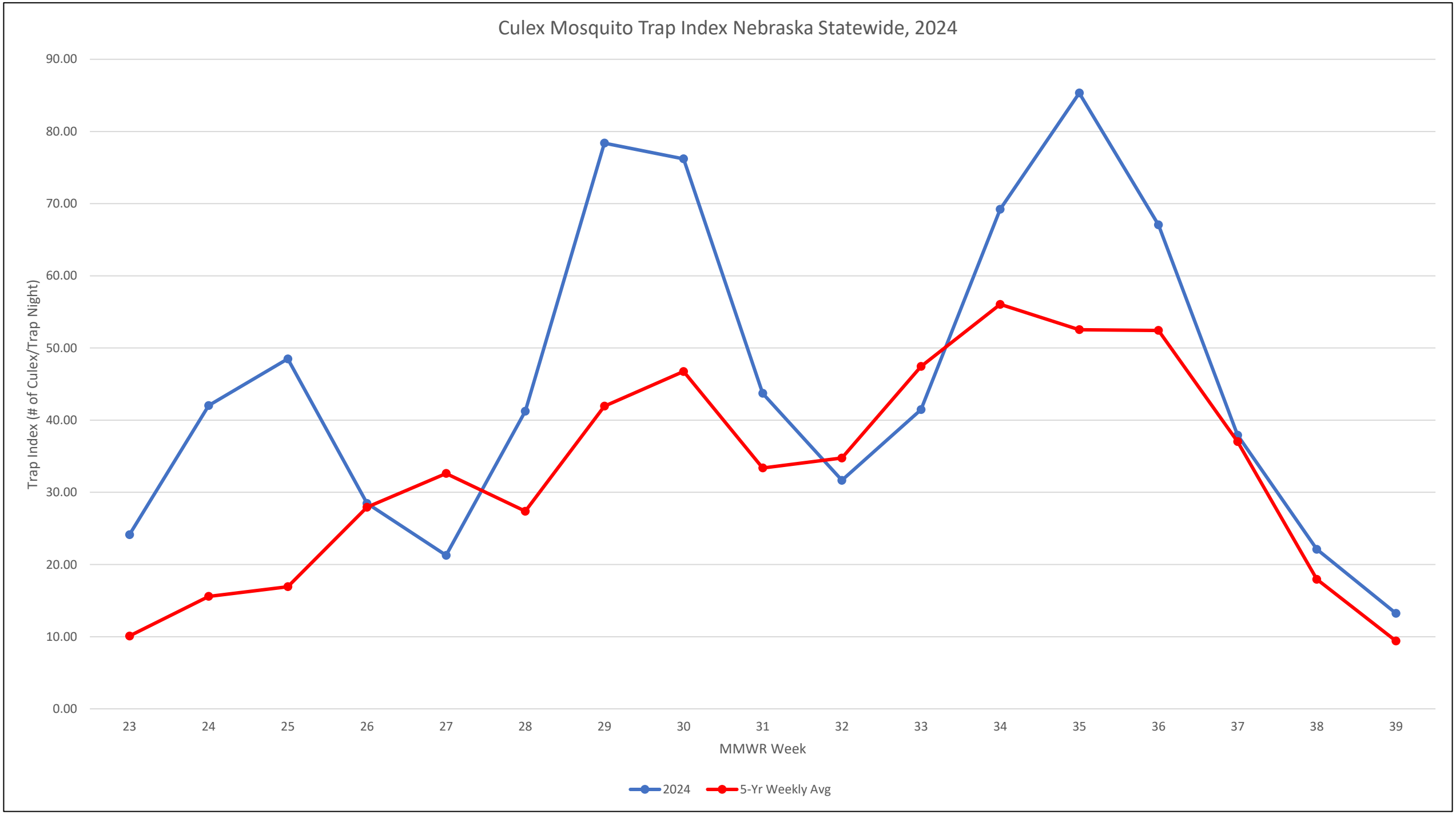
- NDHHS uses routine mosquito surveillance and pathogen testing of mosquitoes to help determine WNV risk in the state.
  - Mosquitoes are collected from across the state through partnerships with the local public health departments.
  - Collected mosquito samples are sent to the NDHHS Medical Entomology Lab located at the Environmental Public Health Laboratory in Lincoln.
  - At the lab, mosquito samples are identified, counted, and *Culex* species mosquitoes (primary WNV vectors) are pooled for pathogen testing.
  - Pooled *Culex* mosquito samples are tested by the Nebraska Public Health Laboratory (NPHL) for three viruses
    - West Nile Virus (WNV)
    - St. Louis Encephalitis Virus (SLE)
    - Western Equine Encephalitis Virus (WEE)

2024 Statewide Routine Mosquito Surveillance and Testing Summary

- 2024 Mosquito Surveillance
  - Routine mosquito surveillance has ended for the season.
  - 102,933 total mosquitoes (34 different species) collected during the season.
    - This is 14% more mosquitoes collected than in 2023 (n = 90,233).
  - 27,639 total Culex mosquitoes (primary WNV vectors) collected during the season.
    - This is 23% fewer Culex mosquitoes collected than in 2023 (n = 35,706).
- 2024 Routine Mosquito Testing
  - 26,615 *Culex* tested (in 1,303 pools) during the season.
  - 94 positive WNV positive pools detected.
    - This is 58% fewer positive WNV pools than in 2023 (n = 224).
  - 7.2% of pools positive for WNV.
    - This is lower than in 2023 (14.3%).
  - Statewide cumulative WNV Mosquito Infection Rate (MIR) of 3.8 per 1,000 mosquitoes.
    - This is lower than in 2023 (6.7 per 1,000 mosquitoes).
  - No positive SLE or WEE positive pools were detected during the season.

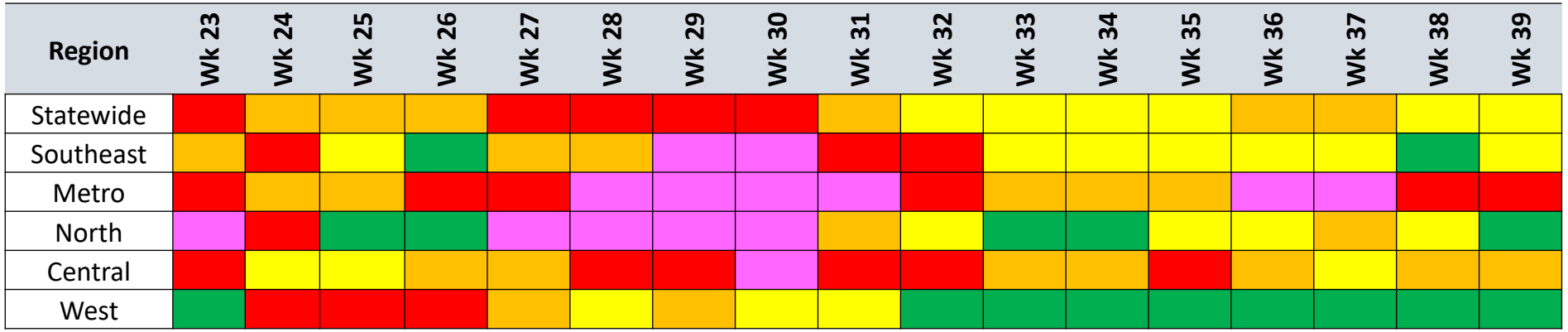

Top 20 Collected Mosquito Species in Nebraska CDC Light Trap Network, 2024
70000
60000
50000
40000
30000
20000
10000
0
59226
17346
10293
4361
3018
1773
1638
1120
820
674
589
545
293
271
237
163
150
126
93
56
aedes_vexans_females-mixed
culex_tarsalis_females-mixed
culex_pipiens/restuans/salinarius_females-mixed
aedes_trivittatus_females-mixed
anopheles_quadrimaculatus_s.l._females-mixed
culex_erraticus_females-mixed
aedes_dorsalis_females-mixed
aedes_albopictus_females-mixed
anopheles_punctipennis_females-mixed
aedes_nigromaculis_females-mixed
aedes_sollicitans_females-mixed
coquillettidia_perturbans_females-mixed
psorophora_columbiae_females-mixed
culiseta_inornata_females-mixed
psorophora_ciliata_females-mixed
unknown_females-mixed
aedes_females-mixed
aedes_triseriatus_females-mixed
aedes_taeniorhynchus_females-mixed
psorophora_horrida_females-mixed


Total Mosquito Trap Index Nebraska Statewide, 2024
Trap Index (# of Mosquitoes/Trap Night)
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
MMWR Week
2024
5-Yr Weekly Avg

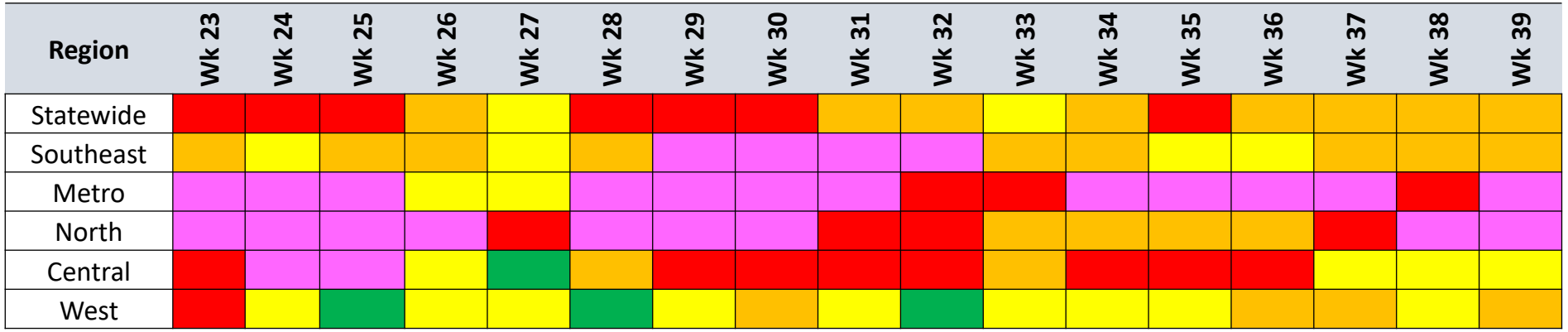

Culex Mosquito Trap Index Nebraska Statewide, 2024
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Trap Index (# of Culex/Trap Night)
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
MMWR Week
2024
5-Yr Weekly Avg

2024 Mosquito Abundance Results

Nebraska Total Mosquito Trap Indexes*



Nebraska *Culex* Mosquito Trap Indexes*



- Vector abundance well below avg (≤ 50%)
- Vector abundance below avg (51-90%)
- Vector abundance near avg (91-150%)
- Vector abundance above avg (151-300%)
- Vector abundance well above avg (> 300%)

***Abundance levels are described in relative terms based on historical data from at most the previous 5 years.**

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West Nile Virus Mosquito Infection Rate

Nebraska *Culex* Mosquito Infection Rate (MIR)*

Region	Wk 23	Wk 24	Wk 25	Wk 26	Wk 27	Wk 28	Wk 29	Wk 30	Wk 31	Wk 32	Wk 33	Wk 34	Wk 35	Wk 36	Wk 37	Wk 38	Wk 39
Statewide																	
Southeast																	
Metro																	
North																	
Central																	
West																	

MIR No Positives = 0

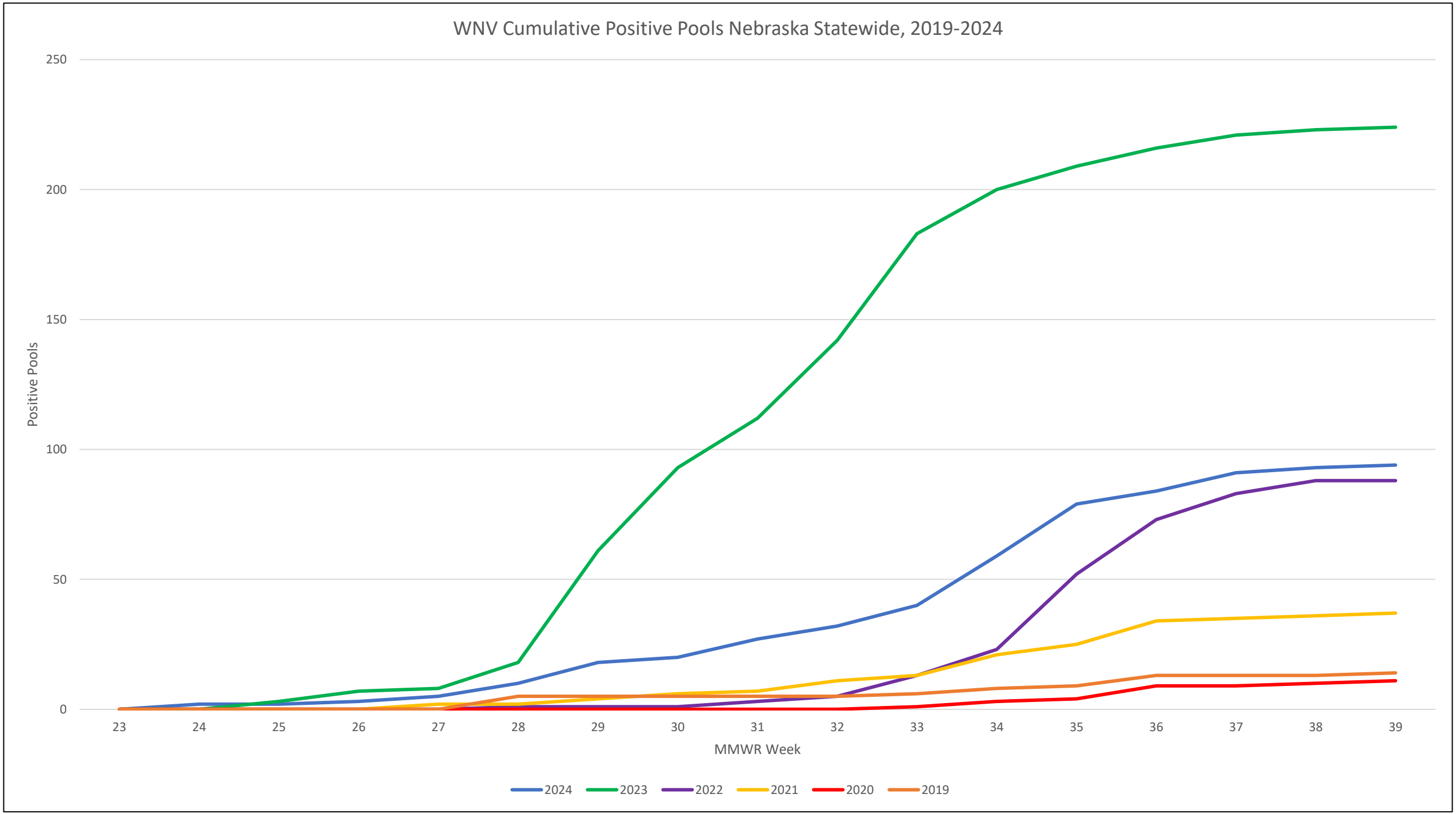
MIR Low = 0.1-1.0

MIR Moderate = 1.1-2.0

MIR High = 2.1-5.0

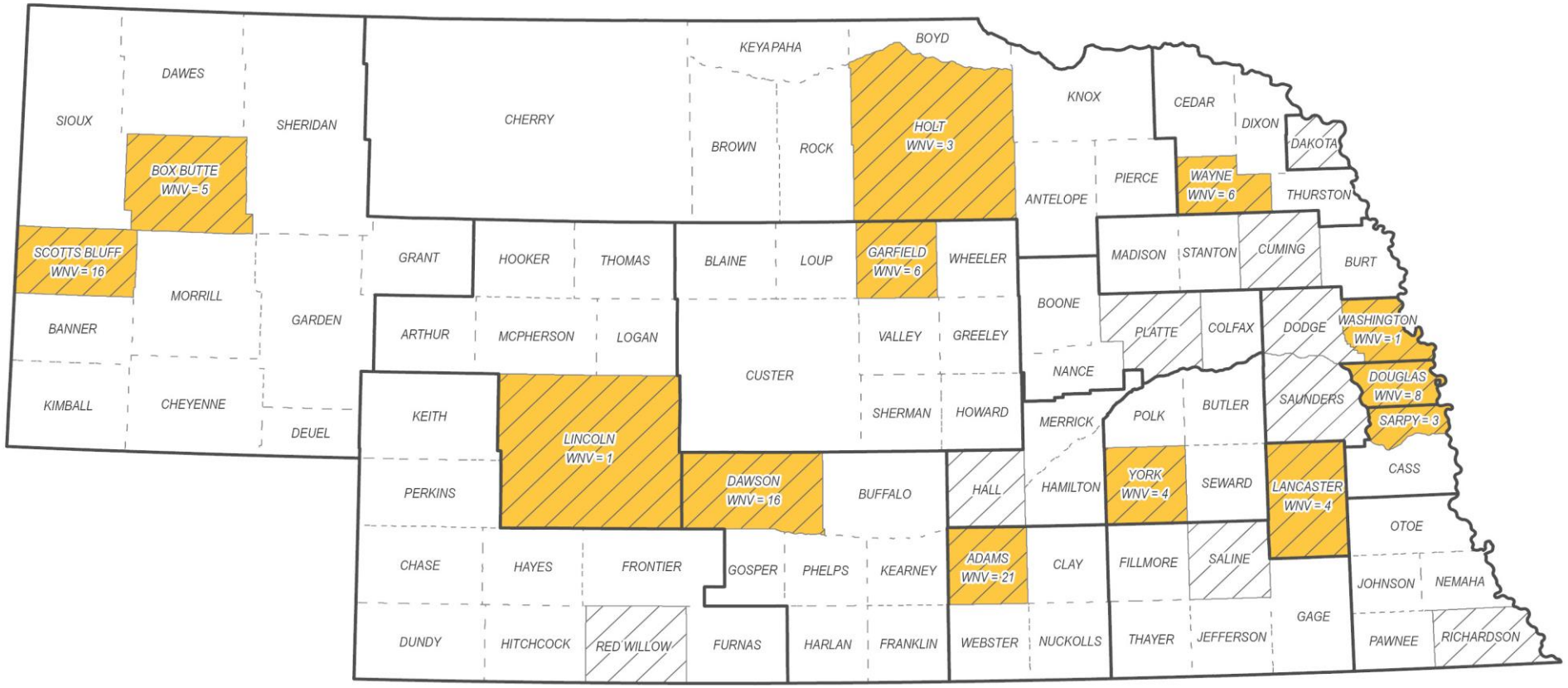
MIR Very High = > 5.0

*MIR is the estimated infection rate of tested mosquito samples and is reported as the rate per 1,000 mosquitoes tested.


WNV Cumulative Positive Pools Nebraska Statewide, 2019-2024
250
200
150
100
50
0
Positive Pools
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
MMWR Week
2024
2023
2022
2021
2020
2019

2024 CDC Light Trap Mosquito Surveillance

Updated 9 October 2024; Final 2024 Map Update



Total Pools Tested: 1303

Positive WNV Pool

Counties with Traps

Counties without Traps

Local Health Department Boundary

There are 22 counties with mosquito surveillance traps in 2024.

West Nile Virus (WNV)
Positive Pools: 94
Counties with Positive Pools: 13

N

0 25 50 Miles

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West Nile Virus Risk

- The WNV risk is calculated for each vector surveillance region (VSR). Risk assessments are calculated using the previous 2 weeks average temperature, *Culex* mosquito abundance, and WNV infection rates. Please note that risk calculations are used to get an estimate of WNV risk at a high-level view and may be different at more local levels.

Risk	What it Means	What You Can Do
None (Off Season)	1. Infection with WNV is unlikely due to unfavorable mosquito conditions (e.g. late fall, winter, and early spring months)	Prepare for the upcoming mosquito season: 1. Eliminate objects and debris that hold water from your yard 2. Trim vegetation in your yard 3. Clean out gutters and repair torn or broken window and door screens
Low	1. Below average risk of infection with WNV for the time of year	To Prepare: 1. Prepare for the upcoming mosquito season as above if not already done 2. Be aware of standing water in your yard and fill in low lying areas or treat with mosquito larvicide To Prevent: 1. Wear mosquito repellent when out between dusk and dawn 2. Wear long sleeves and long pants when out between dusk and dawn
Moderate	1. Average risk of infection with WNV for the time of year 2. For Nebraska this means infection with WNV is likely or has already occurred	To Prevent – same as above plus: 1. Wear mosquito repellent 2. Wear long sleeves and long pants when possible 3. Dump standing water twice weekly
High	1. Above average risk of infection with WNV for the time of year 2. More people may get infected with WNV in your area	To Prevent – same as above plus: 1. People over 50 or those who are immunocompromised should adjust outdoor activity to avoid peak mosquito hours (between dusk and dawn) where possible
Very High	1. Unusually high risk for infection with WNV exists!	To Prevent – same as above plus: 1. People of all ages should adjust outdoor activity to avoid peak mosquito hours (between dusk and dawn) where possible

West Nile Virus Risk

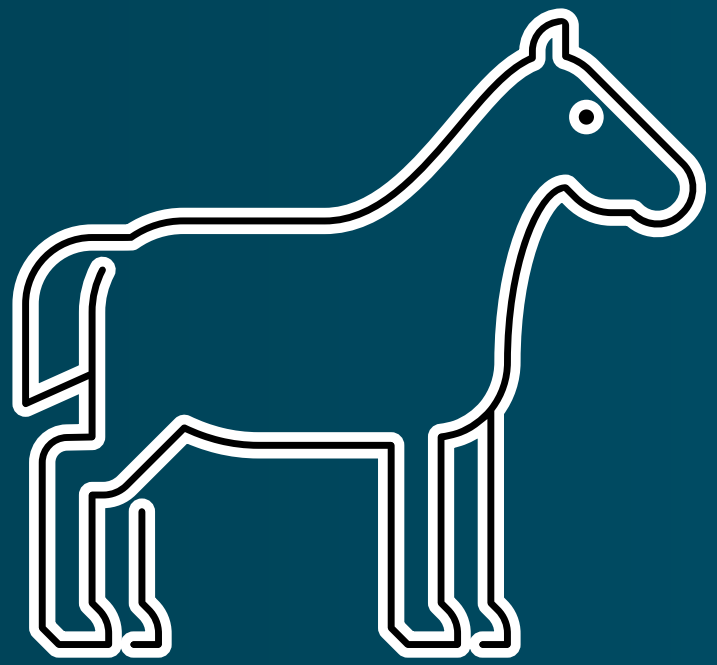
Nebraska WNV Relative Risk*

Region	Wk 23	Wk 24	Wk 25	Wk 26	Wk 27	Wk 28	Wk 29	Wk 30	Wk 31	Wk 32	Wk 33	Wk 34	Wk 35	Wk 36	Wk 37	Wk 38	Wk 39
Statewide																	
Southeast																	
Metro																	
North																	
Central																	
West																	

None (Off season)
Low
Moderate
High
Very High

*WNV risk assessment is calculated using the previous 2 weeks average temperature data, Culex mosquito abundance data, and WNV mosquito infection rates.

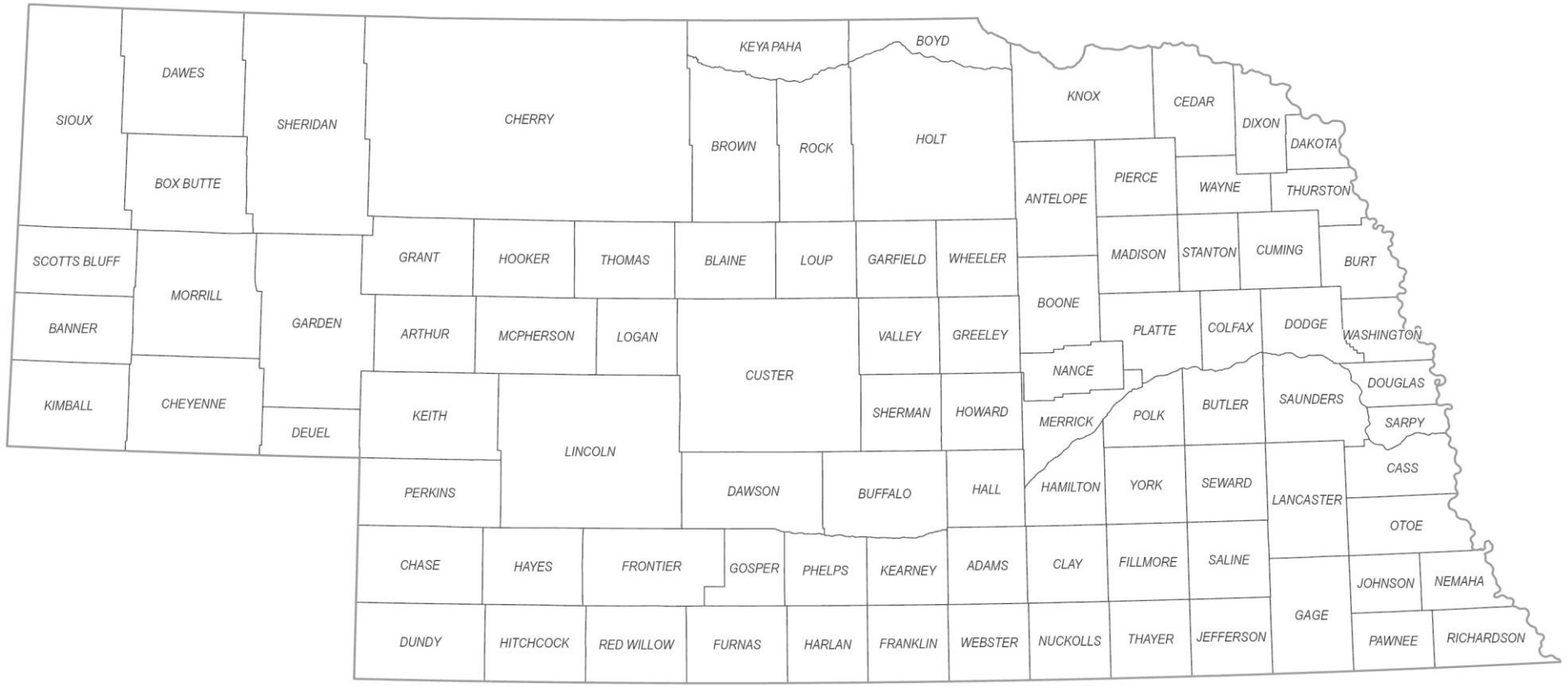
Remember LOW risk does not equal NO risk.



BIRD AND EQUINE WNV POSITIVE REPORTS

2024 Bird West Nile Virus Surveillance

Updated 30 October 2024



There have been no cases reported to date.

County Boundary

N 0 25 50 Miles

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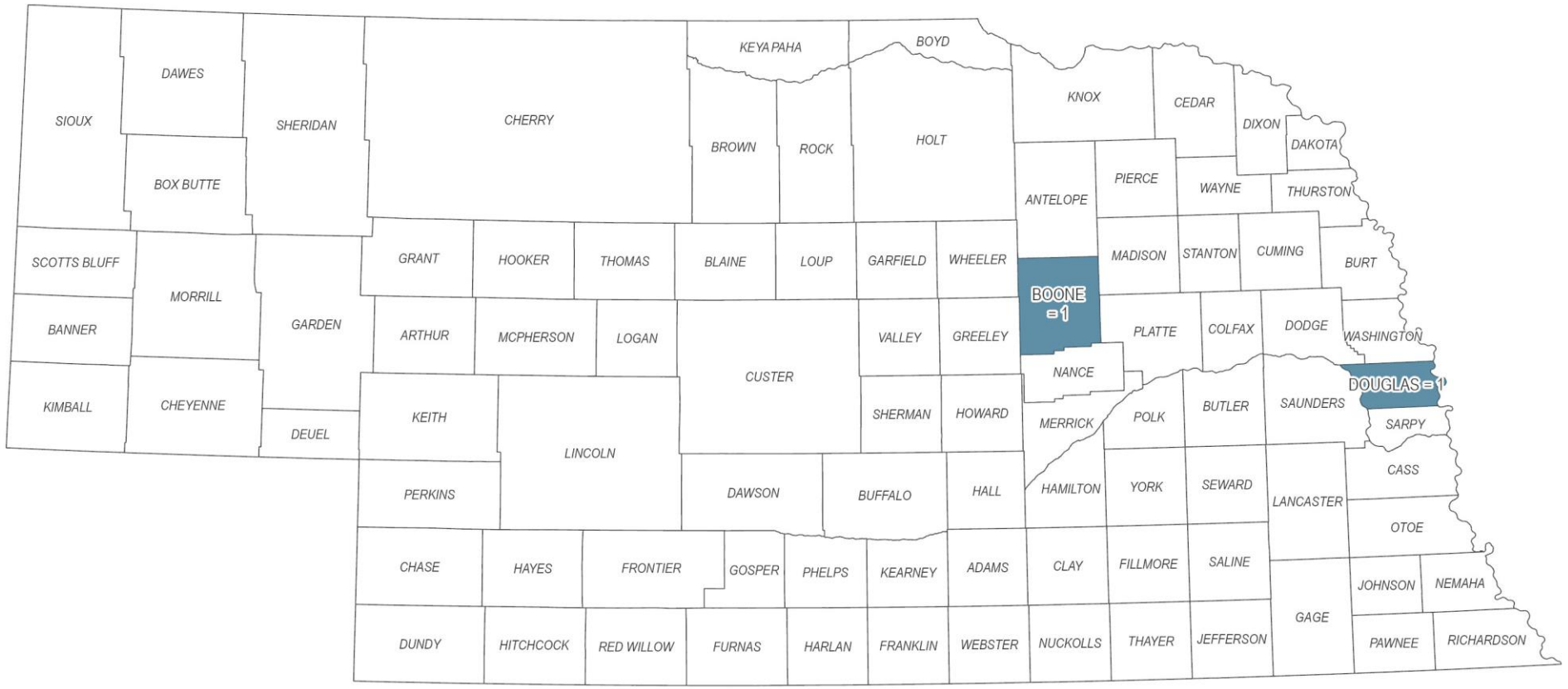
2024 Equine West Nile Virus Surveillance

Updated 30 October 2024, n = 2



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EXPANDED NEBRASKA MOSQUITO SURVEILLANCE AND PATHOGEN TESTING PROGRAM

Expanded Mosquito Surveillance and Testing

- Starting in 2024 NDHHS began limited, expanded surveillance and testing for additional pathogens found in mosquitoes. Similar to routine mosquito surveillance and testing:
  - Mosquitoes are collected from across the state through partnerships with the local public health departments.
  - Collected mosquito samples are sent to the NDHHS Medical Entomology Lab located at the Environmental Public Health Laboratory in Lincoln.
  - At the lab, mosquito samples are identified, counted, and potential vector mosquito species are pooled for pathogen testing.
  - Pooled mosquito samples are tested by the Nebraska Public Health Laboratory (NPHL) for three additional viruses
    - Cache Valley virus (CVV)
    - Jamestown Canyon virus (JCV)
    - LaCrosse Encephalitis virus (LACV)

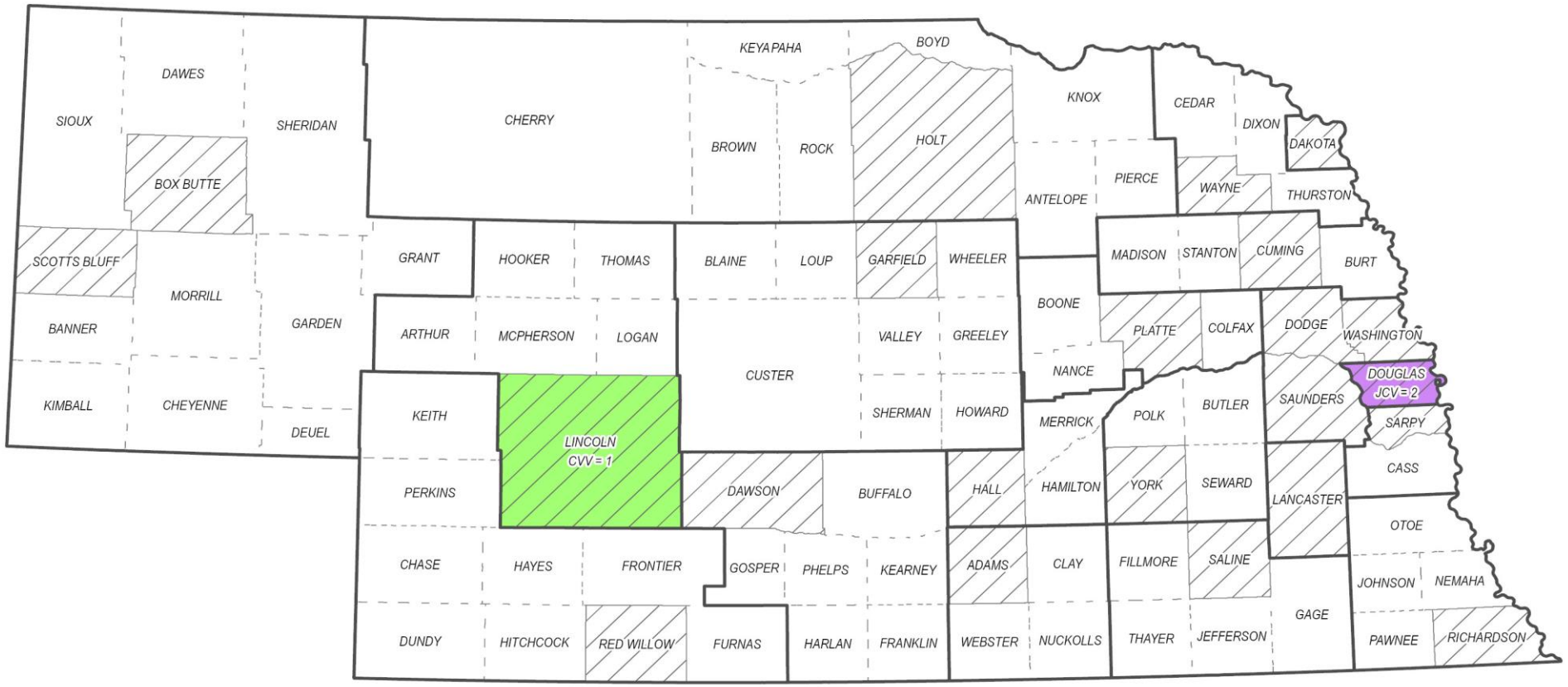
2024 Statewide Expanded Mosquito Surveillance and Testing Summary

Anopheles punctipennis. Credit: Bugguide.net

- 10,547 mosquitoes tested (in 696 pools) in 2024.
  - 11 different species tested:
    - *Aedes albopictus*
    - *Aedes dorsalis*
    - *Aedes hendersoni*
    - *Aedes sollicitans*
    - *Aedes triseriatus*
    - *Aedes trivittatus*
    - *Aedes vexans*
    - *Anopheles punctipennis*
    - *Anopheles quadrimaculatus*
    - *Coquillettidia perturbans*
    - *Culiseta inornata*
  - 2 positive JCV *Anopheles punctipennis* pools detected.
  - 1 positive CVV *Anopheles quadrimaculatus* pool detected.
  - No positive LACV pools detected.

2024 CDC Light Trap Mosquito Surveillance

Updated 9 October 2024; Final 2024 Map Update



Total Pools Tested: 696

- Positive JCV Pool
- Positive CVV Pool
- Counties with Traps
- Counties without Traps
- Local Health Department Boundary

There are 22 counties with mosquito surveillance traps in 2024.

Jamestown Canyon Virus (JCV)
Positive Pools: 2
Counties with Positive Pools: 1

Cache Valley Virus (CVV)
Positive Pools: 1
Counties with Positive Pools: 1

N

0 25 50 Miles

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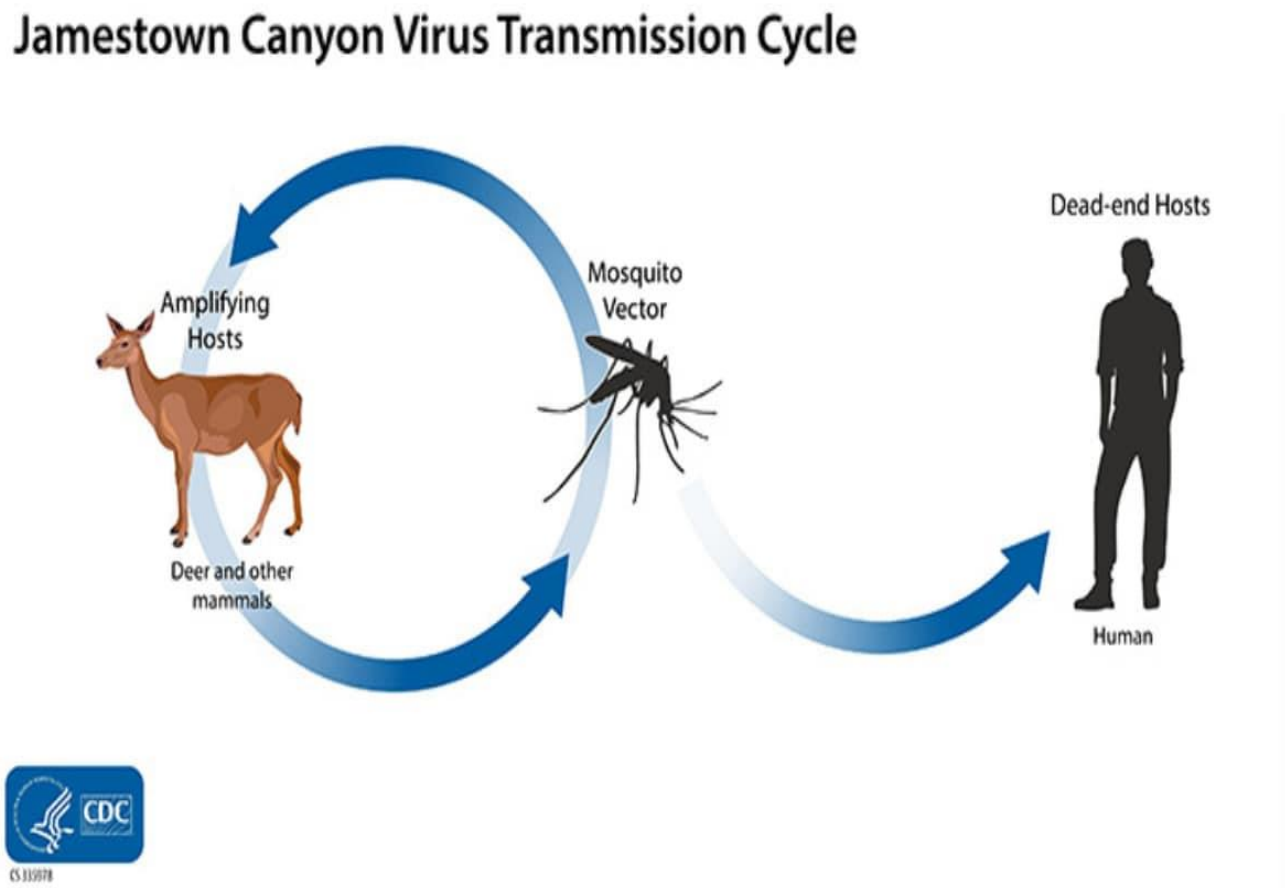
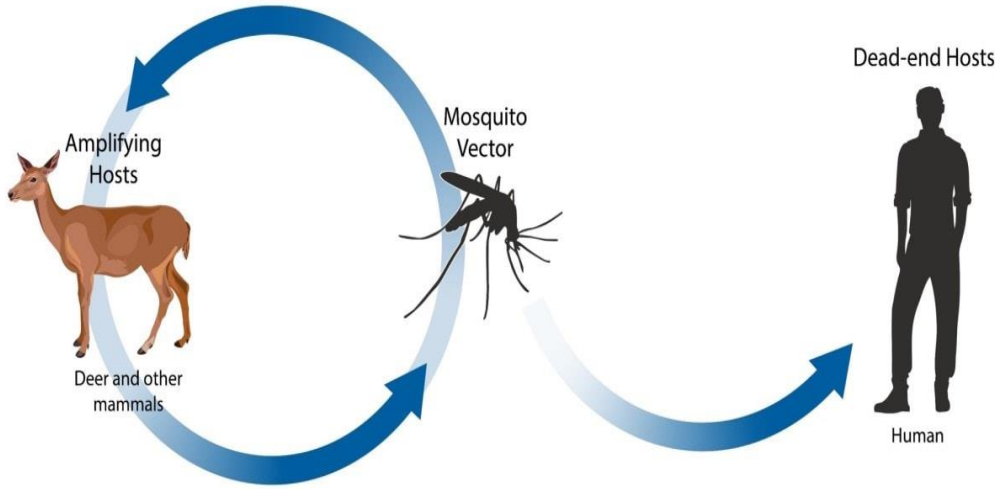
About Jamestown Canyon Virus



- Mosquito-borne *Orthobunyavirus* found throughout much of the United States.
- First isolated in 1961 from mosquitoes in Colorado.
- Human cases are comparatively rare in the U.S. compared to WNV cases.
- Can cause acute febrile illness, meningitis, or meningoencephalitis.
- White-tailed deer recognized as the principal amplification host.
- Detected in >20 mosquito species.
- Can be vertically transmitted from female mosquito to eggs.

About Cache Valley Virus



- Mosquito-borne *Orthobunyavirus* found throughout much of the United States.
- First isolated in 1956 from mosquitoes in Utah.
- Human cases are rare in the U.S. (<10 cases ever reported).
- Can cause meningitis or meningoencephalitis.
- Like JCV, white-tailed deer are thought to be the likely amplifying host. However, other mammalian species may also play a role in the transmission cycle.
- Detected in >40 mosquito species. It is currently unknown which species are the primary vectors.

CS 335978

2024 EPI WEEK CALENDAR

Months shown in RED are potential "Vector" months

JANUARY

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
1		1	2	3	4	5	6
2	7	8	9	10	11	12	13
3	14	15	16	17	18	19	20
4	21	22	23	24	25	26	27
5	28	29	30	31			

FEBRUARY

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
5					1	2	3
6	4	5	6	7	8	9	10
7	11	12	13	14	15	16	17
8	18	19	20	21	22	23	24
9	25	26	27	28	29		

MARCH

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
9						1	2
10	3	4	5	6	7	8	9
11	10	11	12	13	14	15	16
12	17	18	19	20	21	22	23
13	24	25	26	27	28	29	30
14	31						

APRIL

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
14		1	2	3	4	5	6
15	7	8	9	10	11	12	13
16	14	15	16	17	18	19	20
17	21	22	23	24	25	26	27
18	28	29	30				

MAY

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
18				1	2	3	4
19	5	6	7	8	9	10	11
20	12	13	14	15	16	17	18
21	19	20	21	22	23	24	25
22	26	27	28	29	30	31	

JUNE

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
22							1
23	2	3	4	5	6	7	8
24	9	10	11	12	13	14	15
25	16	17	18	19	20	21	22
26	23	24	25	26	27	28	29
27	30						

JULY

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
27		1	2	3	4	5	6
28	7	8	9	10	11	12	13
29	14	15	16	17	18	19	20
30	21	22	23	24	25	26	27
31	28	29	30	31			

AUGUST

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
31					1	2	3
32	4	5	6	7	8	9	10
33	11	12	13	14	15	16	17
34	18	19	20	21	22	23	24
35	25	26	27	28	29	30	31

SEPTEMBER

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
36	1	2	3	4	5	6	7
37	8	9	10	11	12	13	14
38	15	16	17	18	19	20	21
39	22	23	24	25	26	27	28
40	29	30					

OCTOBER

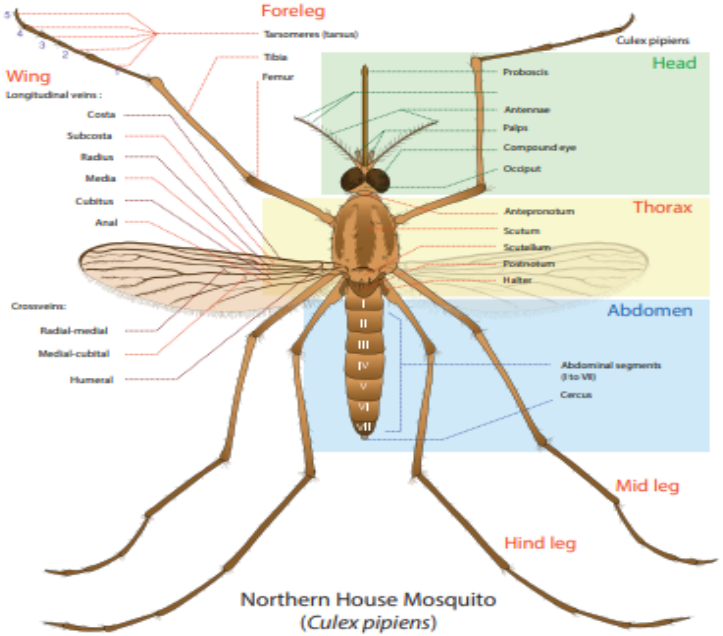
EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
40			1	2	3	4	5
41	6	7	8	9	10	11	12
42	13	14	15	16	17	18	19
43	20	21	22	23	24	25	26
44	27	28	29	30	31		

NOVEMBER

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
44						1	2
45	3	4	5	6	7	8	9
46	10	11	12	13	14	15	16
47	17	18	19	20	21	22	23
48	24	25	26	27	28	29	30

DECEMBER

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
49	1	2	3	4	5	6	7
50	8	9	10	11	12	13	14
51	15	16	17	18	19	20	21
52	22	23	24	25	26	27	28
1	29	30	31				



Credit: Central Massachusetts Mosquito Control Project: https://www.cmmcp.org/

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Resources

- CDC Prevent Mosquito Bites Page: https://www.cdc.gov/mosquitoes/prevention/index.html
- CDC West Nile Virus Page: https://www.cdc.gov/west-nile-virus/index.html
- CDC Cache Valley Virus: https://www.cdc.gov/cache-valley/about/index.html
- CDC Jamestown Canyon Virus: https://www.cdc.gov/jamestown-canyon/about/index.html
- Nebraska Department of Agriculture WNV Page: https://nda.nebraska.gov/animal/diseases/westnile/index.html
- U.S. EPA Insect Repellent Page: https://www.epa.gov/insect-repellents
- Nebraska Mosquito and Vector Control Association: https://www.nemosquito.org/
- Nebraska Department of Health and Human Services Vector-Borne Disease Page: https://dhhs.ne.gov/Pages/Vector-borne-Disease.aspx

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