



2023 NEBRASKA MOSQUITO-BORNE DISEASE REPORT

NEBRASKA DEPARTMENT OF HEALTH
AND HUMAN SERVICES (NDHHS)

VECTOR-BORNE DISEASE PROGRAM

MMWR WEEK 31

(Week Ending 8/5/2023)

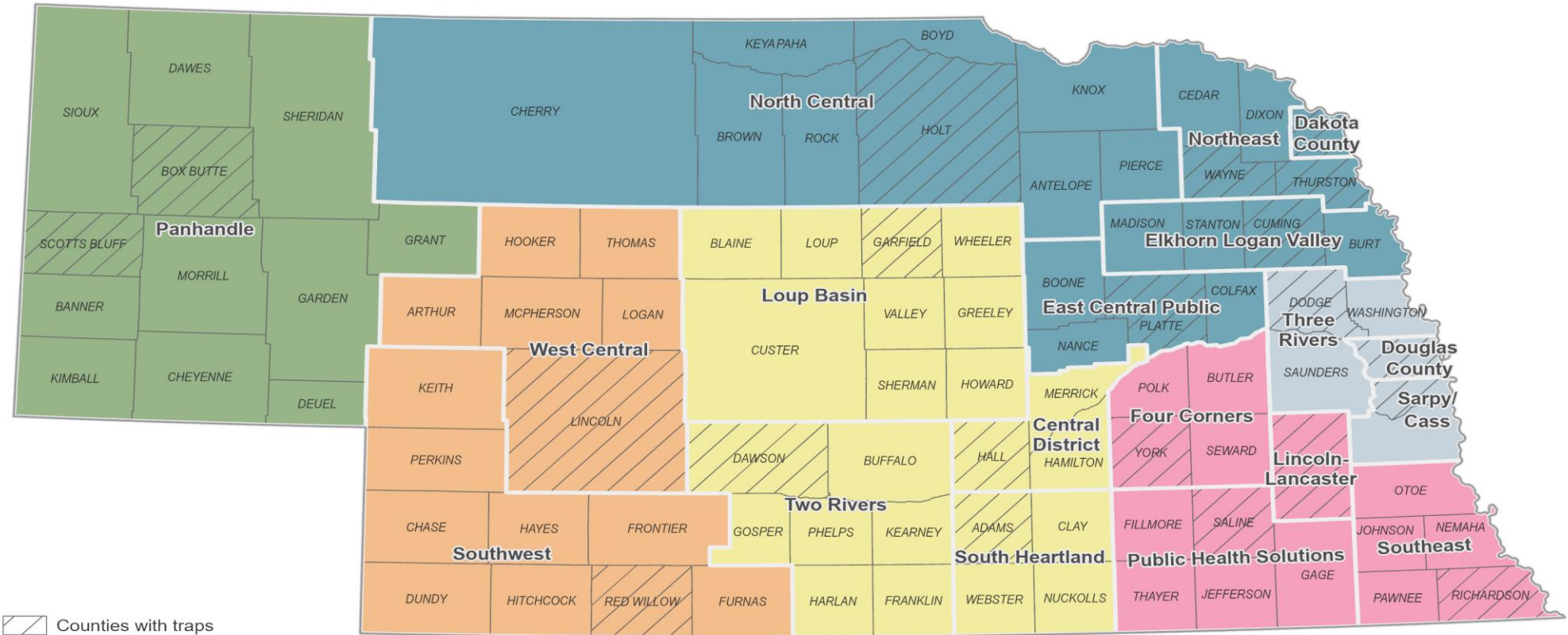
****All Data is Provisional****

Report Highlights

- Mosquito-Borne Disease Cases
 - 13 West Nile virus (WNV) human cases have been reported
 - 2 WNV human blood donors have been reported
 - 1 WNV equine case has been reported
- Mosquito Surveillance
 - 20,455 *Culex* mosquitoes (in 840 pools) have been tested.
 - 112 WNV positive (13.3%) mosquito pools have been detected.
 - 6 of 6 vector surveillance regions have reported at least 1 positive pool this season.
 - Average statewide WNV risk* is **HIGH** .
 - 1 region (Panhandle) is categorized as **VERY HIGH** WNV risk
 - 2 regions (West Central and Central) are categorized as **HIGH** WNV risk.
 - 1 region (Southeast) are categorized as **MODERATE** WNV risk
 - 2 regions are (Northeast and Metro) categorized as **LOW** WNV risk.
 - Remember LOW risk **does not equal** NO risk.

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

2023 Mosquito Surveillance Trapping Regions



-  Counties with traps
-  Counties without traps
-  Local Health Department Boundary
-  Central Vector Surveillance Region
-  Metro Vector Surveillance Region
-  North Vector Surveillance Region
-  Panhandle Vector Surveillance Region
-  Southeast Vector Surveillance Region
-  West Central Vector Surveillance Region





Credit: CDC, NCEZID-DVBD

NEBRASKA HUMAN MOSQUITO-BORNE DISEASE SURVEILLANCE

Human Mosquito-Borne Disease Surveillance

Nebraska Mosquito-Borne Disease Cases, 2023 & 2022

Condition	2023	2022
Chikungunya*	0	0
Dengue*	2	4
Malaria*	5	12
West Nile Clinical Cases	13	64
West Nile Blood Donors	2	24
Zika*	0	0
Total	22	104

- 2023 statewide number of mosquito-borne disease cases reported to the Nebraska Department of Health and Human Services (NDHHS) through MMWR week #28 (week ending 7/25/2023).
 - 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.

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

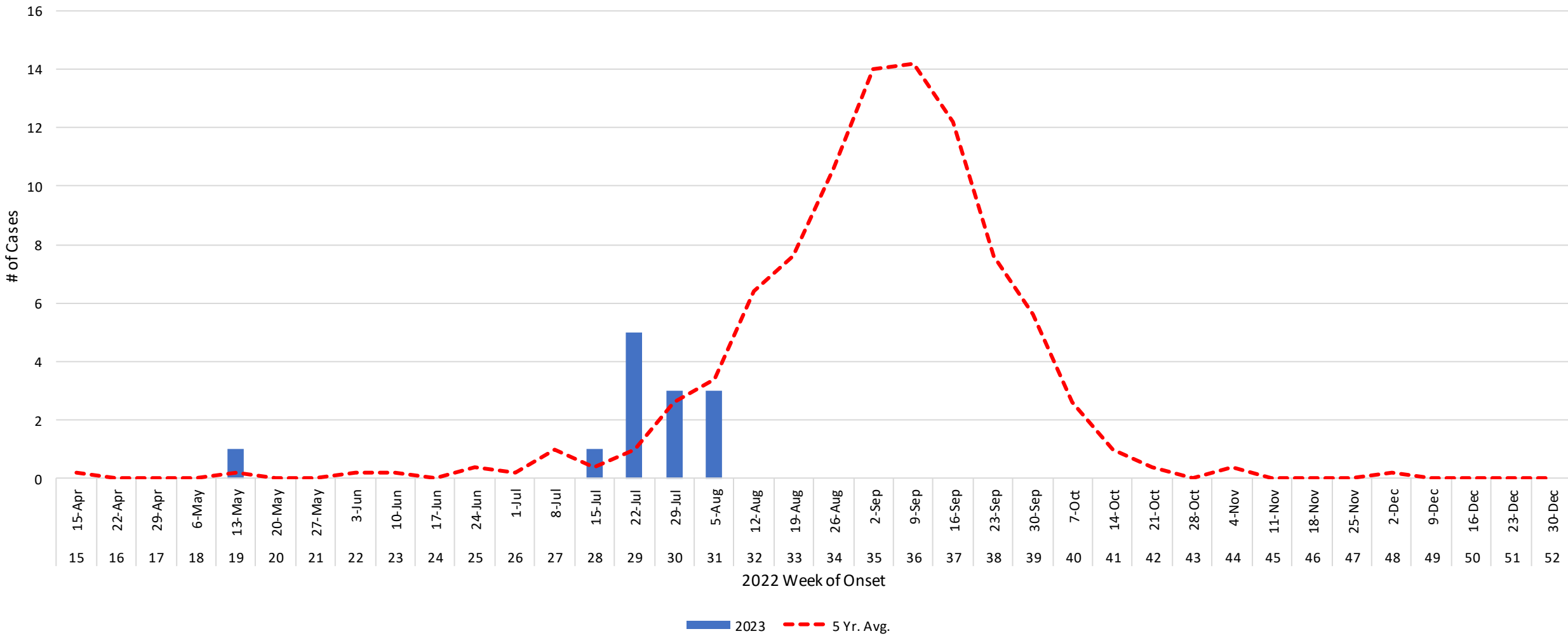
Human West Nile Virus Disease Clinical Information

Nebraska West Nile Virus Disease Case Clinical Information, 2023

Age Range	#
0-13	0
14-25	1
26-50	2
51-64	2
65+	8
Sex	#
Male	9
Female	4
Diagnosis	#
WNV Neuroinvasive	6
WNV Non-Neuroinvasive	7
Hospitalized	5
Death	0

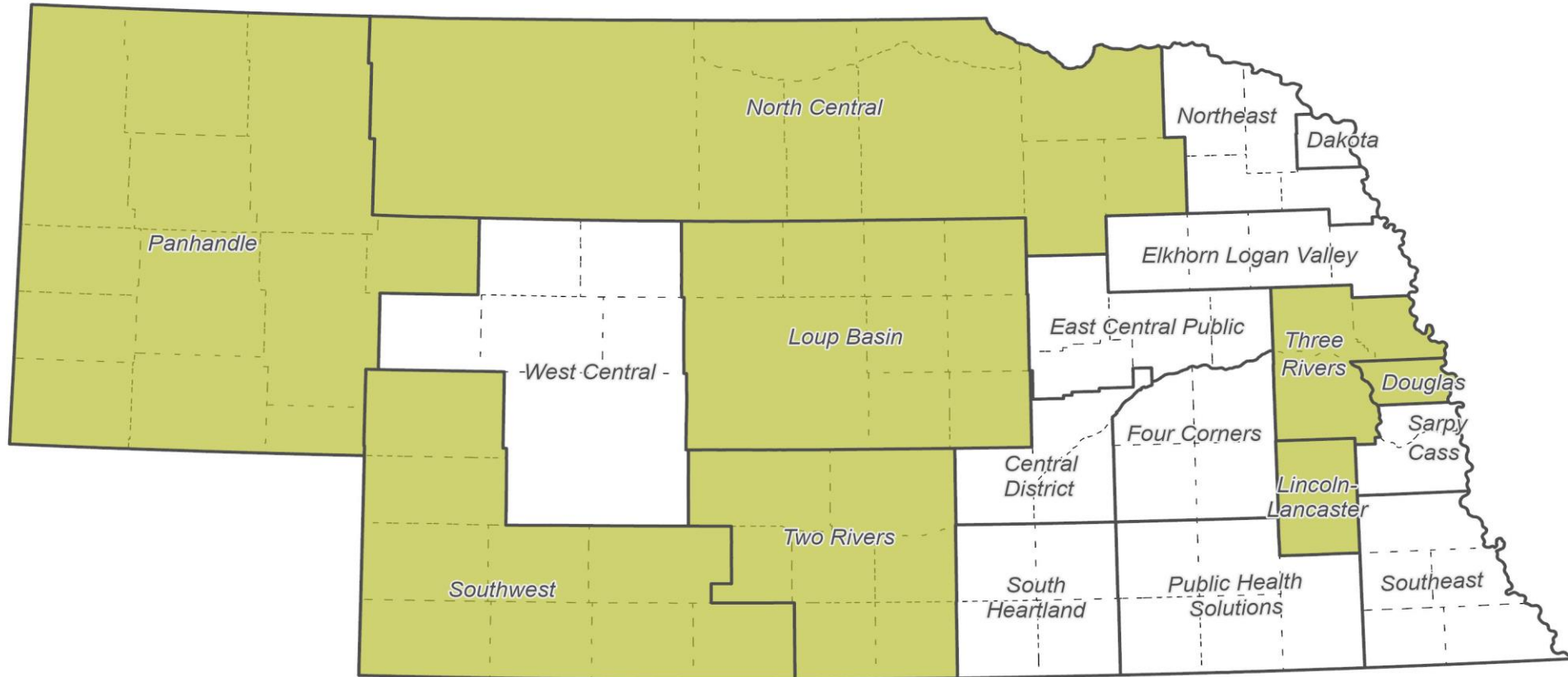
2023 Human West Nile Virus Disease Cases Week of Onset

Human Clinical Cases (n = 13) by Week of Onset in Nebraska, 2023



2023 West Nile Virus Human Clinical Cases

by Local Health Department, Updated 09 August 2023



Number of Human WNV Clinical Cases

0 cases

≤ 5 cases

County Boundary

Local Health Department Boundary



0 25 50 Miles

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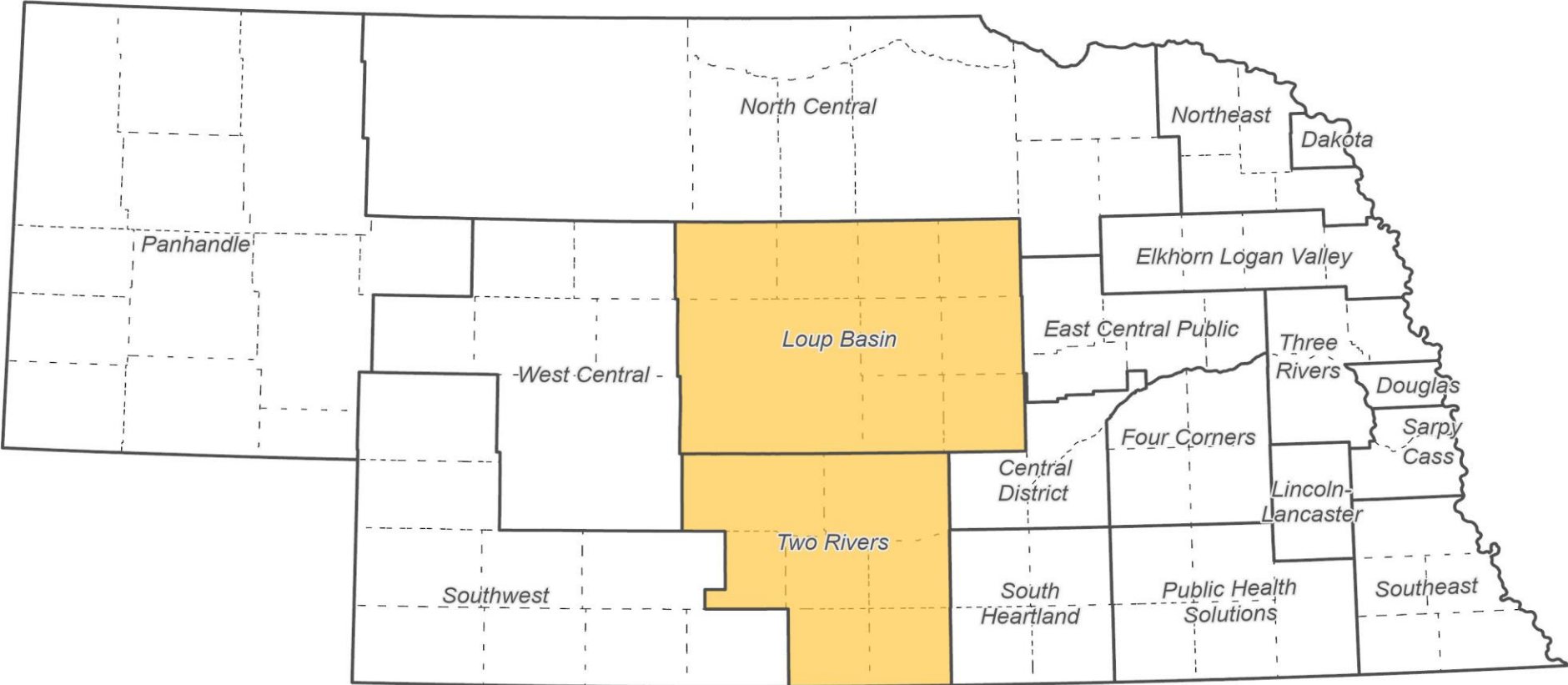
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2023 West Nile Virus Blood Donation Cases

by Local Health Department, Updated 09 August 2023

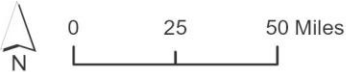


Number of Human WNV Blood Donor Cases

- 0 cases
- ≤ 5 cases

County Boundary

Local Health Department Boundary





NEBRASKA MOSQUITO SURVEILLANCE AND PATHOGEN TESTING PROGRAM

Credit: Credit: CDC, NCEZID-DVBD

Mosquito Surveillance and Testing



- NDHHS uses 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 3 viruses
 - West Nile Virus (WNV)
 - St. Louis Encephalitis Virus (SLE)
 - Western Equine Encephalitis Virus (WEE)



2023 Mosquito Surveillance and Testing Summary



- Mosquito Surveillance
 - 47,546 total mosquitoes collected this season.
 - This is more mosquitoes collected than in all of 2022!
 - 43.0% (n = 20,455) of the collections have been *Culex* vector mosquitoes.
 - Current Statewide Total Mosquito Trap Index (mosquitoes collected per trap night).
 - **Near average** for this time of the season.
 - **Mild decrease** compared to last week.
 - Current Statewide *Culex* Trap Index.
 - **Near average** for this time of the season.
 - **Mild decrease** compared to last week.
- Mosquito Testing
 - 20,455 *Culex* tested (in 840 pools) on the season.
 - 112 positive (13.3%) WNV positive pools detected.
 - 6 of 6 vector surveillance regions have detected ≥ 1 positive pool.
 - Current Statewide WNV Mosquito Infection Rate (MIR) Index
 - **High** WNV activity detected in submitted samples

Mosquito Trap Index Tables

Nebraska Total Mosquito Trap Indexes

Region	*Current Trap Index	**Activity	***Trend
Statewide	188.17	3	-1
Southeast	21.88	2	-1
Metro	17.00	1	-1
North	118.38	3	0
South Central	61.50	4	1
West Central	79.00	3	-1
Panhandle	1314.50	3	-1

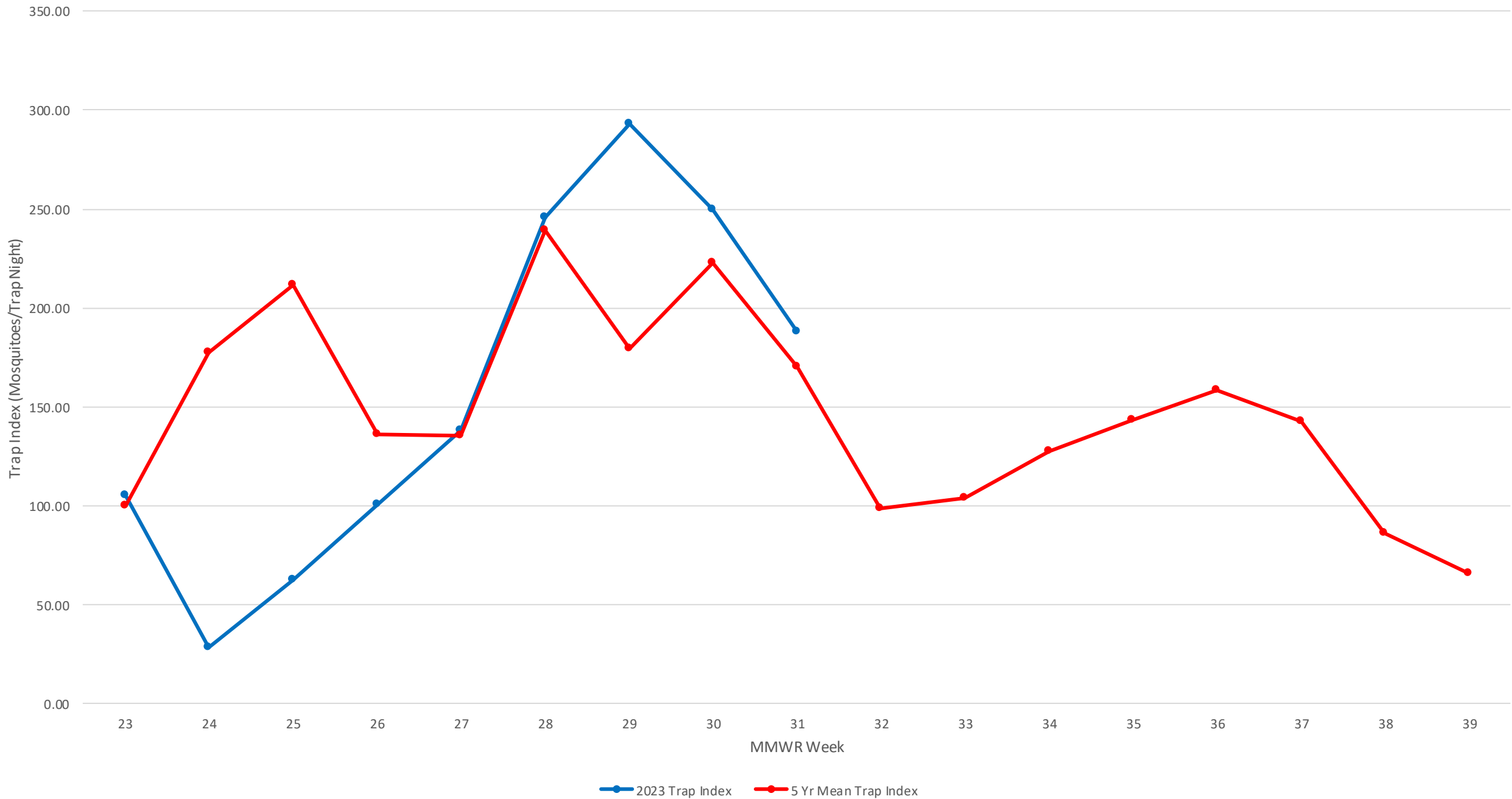
Nebraska *Culex* Mosquito Trap Indexes

Region	*Current Trap Index	**Activity	***Trend
Statewide	121.10	3	-1
Southeast	15.63	3	2
Metro	7.39	1	-1
North	24.11	1	0
South Central	37.46	5	2
West Central	12.00	3	-1
Panhandle	1032.00	4	-1

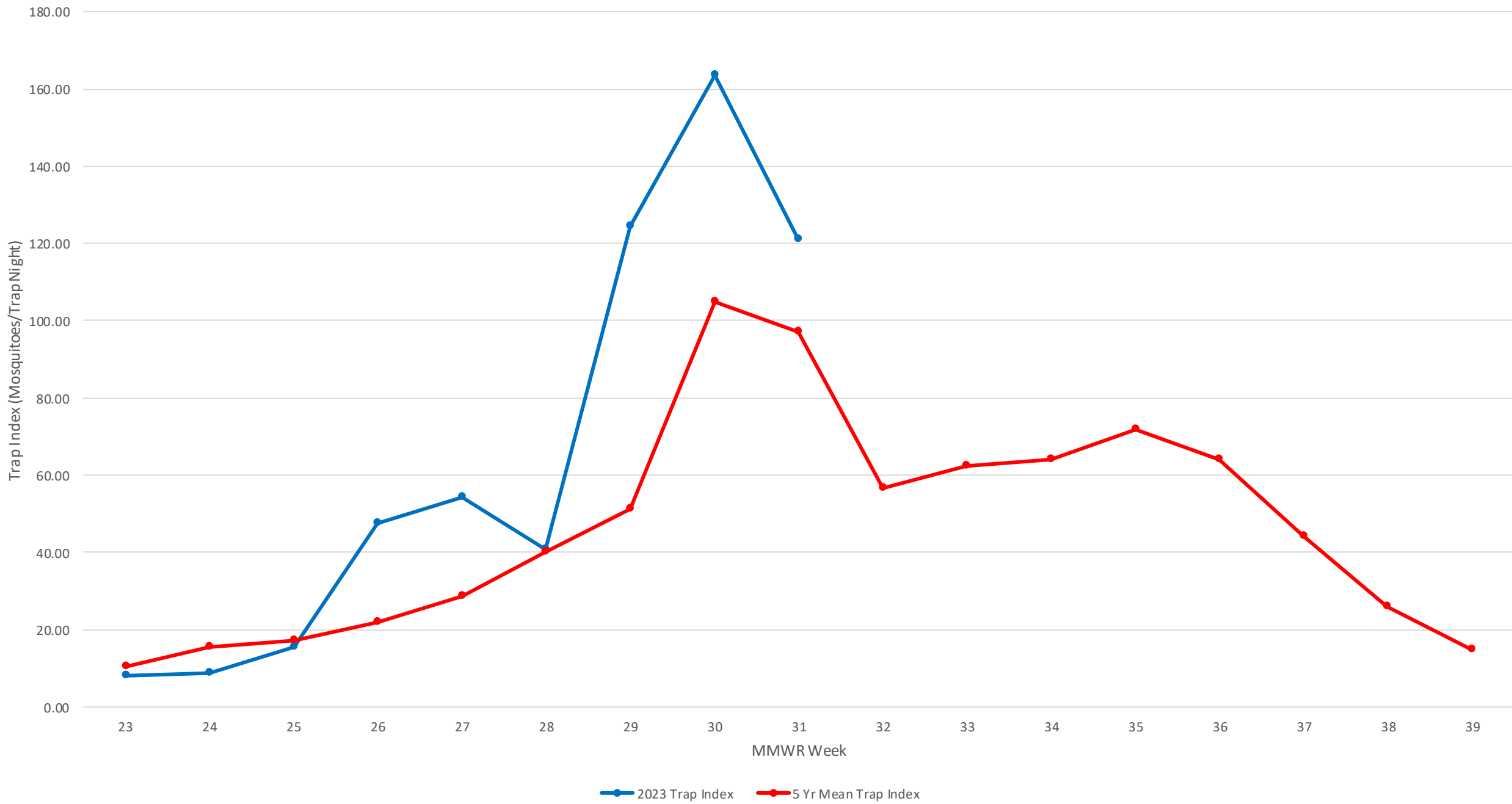
*Activity levels are described in relative terms based on historical data from at most the previous 5 years. Activity levels correspond to: **0 = no data**, **1 = well below average ($\leq 50\%$ of avg.)**, **2 = below average (51-90% of avg.)**, **3 = near average (91-150% of avg.)**, **4 = above average (151-300% of avg.)**, **5 = well above average ($> 300\%$ of avg.)**.

** Trend levels are calculated by looking at the percent change of the trap index from the recent sampling period compared to the previous period. Trend levels correspond to: **-4 = significant decrease ($< -150\%$)**, **-3 = large decrease (-100 to -150%)**, **-2 = moderate decrease (-50 to -100%)**, **-1 = mild decrease (-10 to -150%)**, **0 = stable (-10 to 10%)**, **1 = mild increase (10 to 50%)**, **2 = moderate (50 to 100%)**, **3 = large increase (100 to 150%)**, **4 = significant increase ($> 150\%$)**.

Total Mosquito Trap Index Nebraska Statewide, 2023



Culex Mosquito Trap Index Nebraska Statewide, 2023



West Nile Virus Mosquito Infection Rate Table

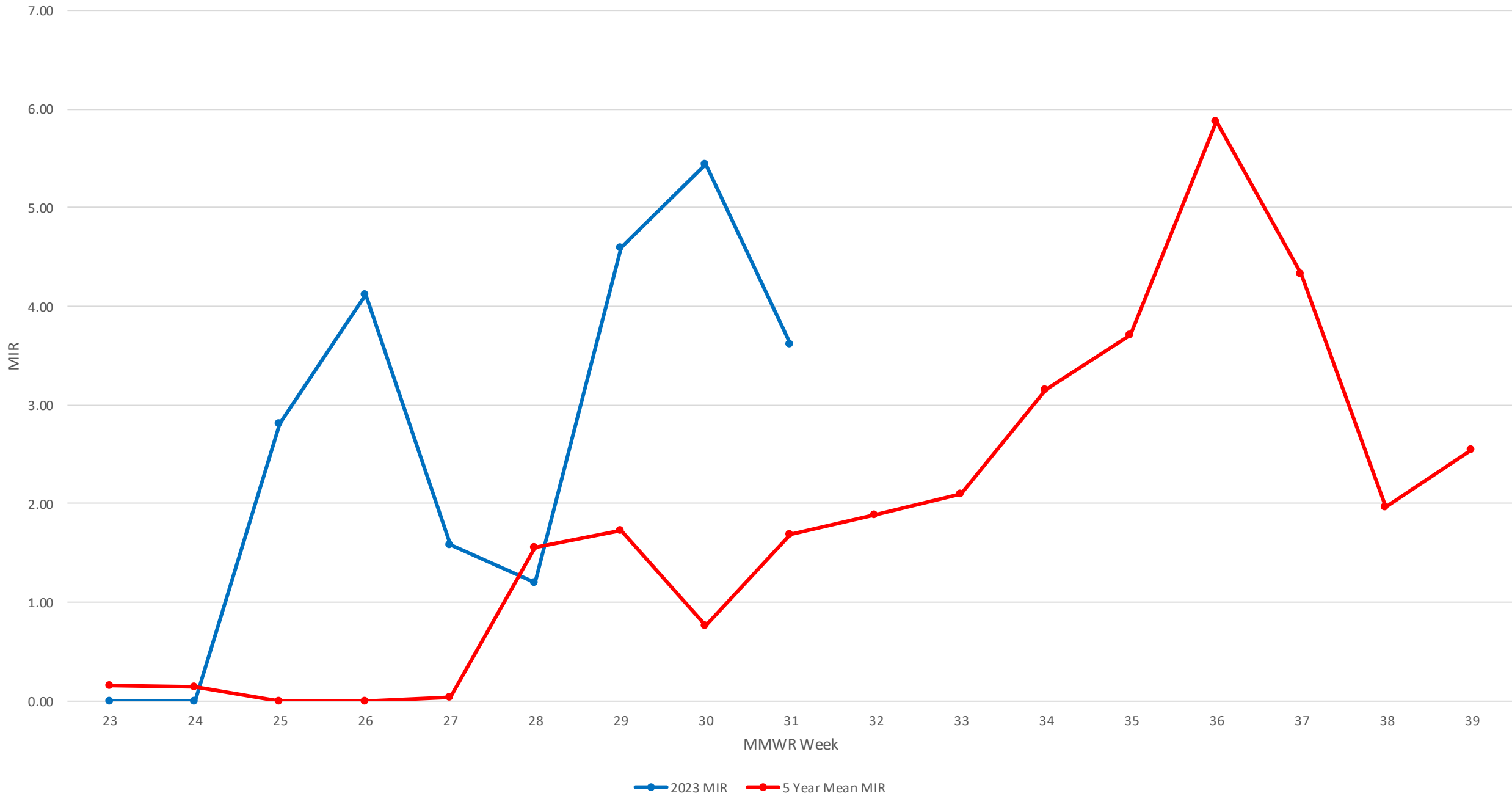
Nebraska WNV *Culex* Mosquito Infection Rate (MIR) Table

Region	Positive Pools	*MIR	**Activity Levels
Statewide	51	3.6	4
Southeast	0	0.0	1
Metro	0	0.0	1
North	0	0.0	1
South Central	6	7.9	5
West Central	1	9.2	5
Panhandle	44	8.4	5

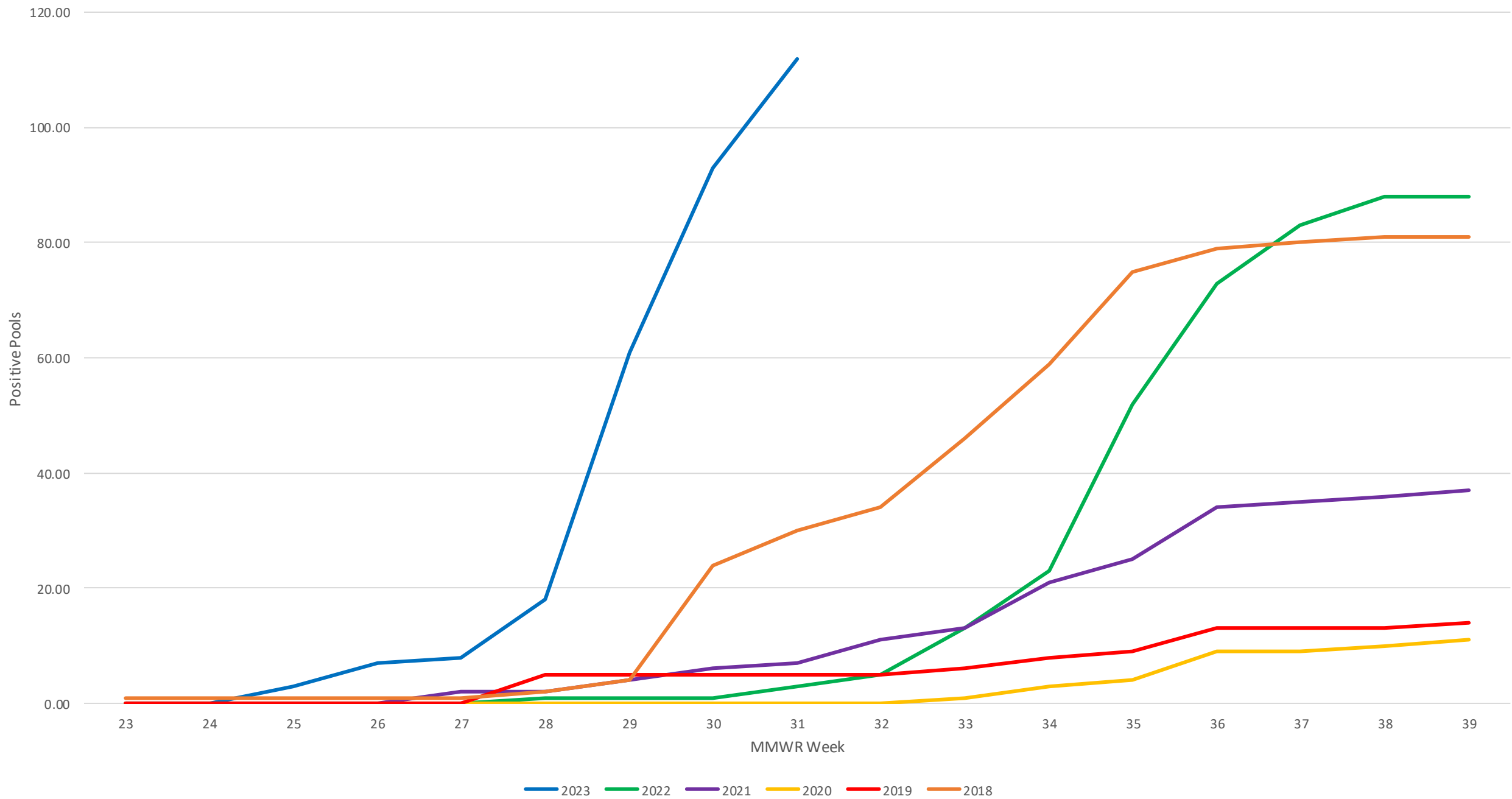
*MIR is the estimated infection rate of tested mosquito samples and is reported as the rate per 1,000 mosquitoes tested.

** Activity levels correspond to: **1 = No positives (0.0)**, **2 = Low (0.1-1.0)**, **3 = Moderate (1.1-2.0)**, **4 = High (2.1-5.0)**, **5 = Very High (>5.0)**.

WNV Minimum Infection Rate Nebraska Statewide, 2023

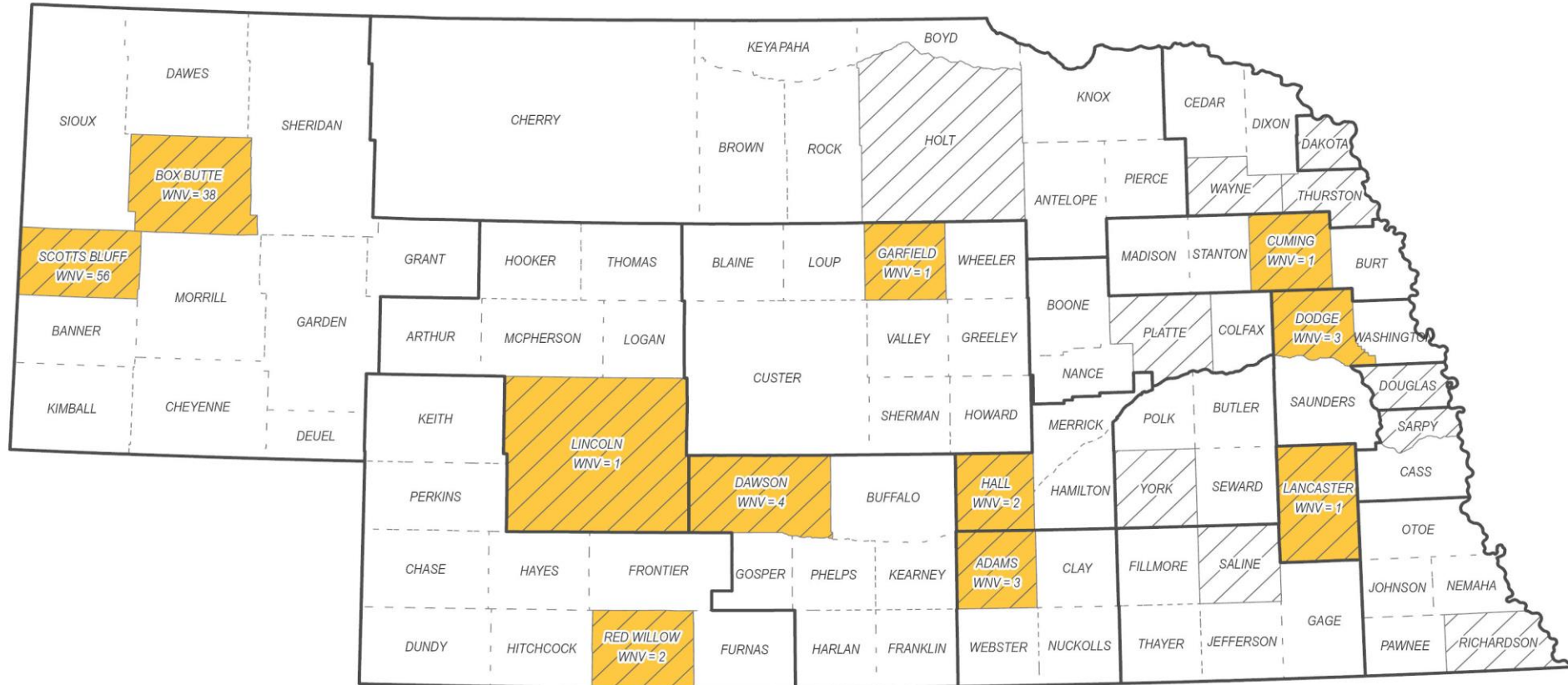


WNV Cumulative Positive Pools Nebraska Statewide, 2018-2023



2023 CDC Light Trap Mosquito Surveillance

Updated 09 August 2023



Total Pools Tested: 840

Positive WNV Pool

Counties with Traps

Counties without Traps

Local Health Department Boundary

West Nile Virus (WNV)
Positive Pools: 112
Counties with Positive Pools: 11

There are 21 counties with mosquito surveillance traps in 2023.



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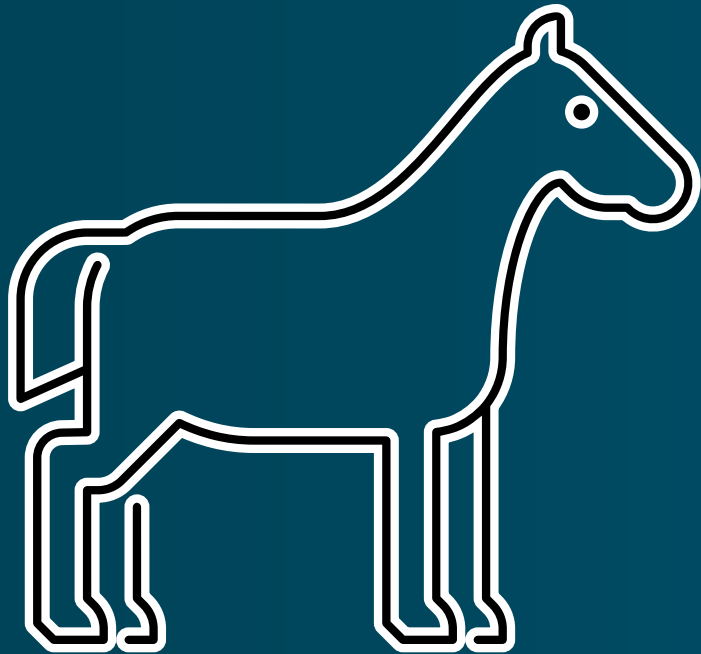
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**BIRD AND EQUINE
WNV POSITIVE
REPORTS**



2023 Equine West Nile Virus Surveillance

Updated 09 August 2023



Positive Equine WNV Case
County Boundary



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2023 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	7
2	8	9	10	11	12	13	14
3	15	16	17	18	19	20	21
4	22	23	24	25	26	27	28
5	29	30	31				

FEBRUARY

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

MARCH

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

APRIL

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

MAY

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

JUNE

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

JULY

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

AUGUST

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

SEPTEMBER

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
35						1	2
36	3	4	5	6	7	8	9
37	10	11	12	13	14	15	16
38	17	18	19	20	21	22	23
39	24	25	26	27	28	29	30

OCTOBER

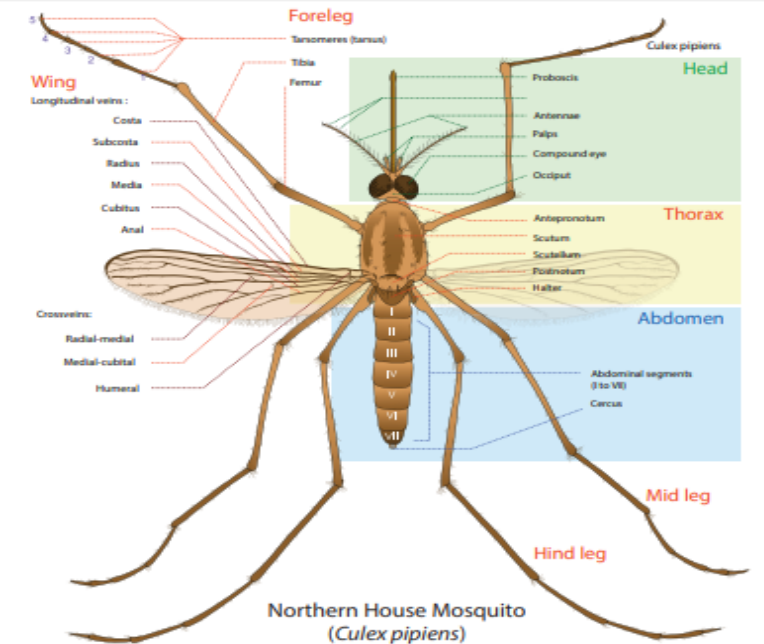
EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
40	1	2	3	4	5	6	7
41	8	9	10	11	12	13	14
42	15	16	17	18	19	20	21
43	22	23	24	25	26	27	28
44	29	30	31				

NOVEMBER

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

DECEMBER

EPI Week #	Sun	Mon	Tue	Wed	Thu	Fri	Sat
48						1	2
49	3	4	5	6	7	8	9
50	10	11	12	13	14	15	16
51	17	18	19	20	21	22	23
52	24	25	26	27	28	29	30
1	31						



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

Resources

- CDC Prevent Mosquito Bites Page:
<https://www.cdc.gov/ncezid/dvbd/media/stopmosquitoes.html>
- CDC West Nile Virus Page:
<https://www.cdc.gov/westnile/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>

