

NEBRASKA ARBOVIRUS SURVEILLANCE AND MOSQUITO MONITORING PROGRAM 2018 UPDATE #12

Date: 08/31/2018. Please note that mosquito collection data covers dates 08/12/2018 to 08/25/2018 (CDC Weeks 33 and 34). Bird, human, and equine surveillance may include data from beyond these dates. All data is provisional and may change.

SUMMARY

- **Climate:** Over the past 30 days (dates 07/27/2018 to 08/25/2018), precipitation has been below normal over areas of central, north eastern, and western Nebraska with pockets of above average precipitation also being seen in these areas. Cumulative rainfall during this timeframe ranged from 0.5 to ≥ 6.5 inches across the state. The heavier amounts were located primarily in portions of central, eastern, and southeastern Nebraska. Average temperatures for the last 30 days (date ending 08/25/2018) were below normal over most of the state. Per the United States Drought Monitor, abnormally dry conditions increased slightly while moderate drought conditions decreased slightly across areas of south central and southeastern Nebraska.
- **Three Month Forecast:** For September 2018 to November 2018, the NOAA outlook is predicting an elevated probability of above normal temperatures across Nebraska and equal chances of above or below normal precipitation over most of the state.
- **Mosquito Numbers- Eastern Nebraska:** Individual county collections for the reported two weeks of sampling ranged from “low” to “extremely high” based on historical county data. Overall in the east region, mosquito numbers decreased slightly and were “moderate” based on historical data from regional traps. *Culex tarsalis* (primary vector of West Nile virus) counts made up the majority of trap collections (42.0%) in the region. *Culex* mosquito counts decreased but were still “high” based upon historical regional data. Individual county *Culex* collections ranged from “low” to “extremely high”. Nine invasive *Aedes albopictus* (Asian tiger mosquito) were collected from the region. All specimens were collected from Richardson County at trap sites that have produced *Aedes albopictus* historically.
- **Mosquito Numbers- Central Nebraska:** Individual county collections for the reported two weeks of collecting ranged from “low” to “very high” based on historical data. Overall mosquito numbers increased compared to the previous update and were considered “moderate”. *Culex tarsalis* was again the most collected mosquito (52.7%) from region traps. *Culex* mosquito counts also continued to increase and were at “very high” levels based upon

historical regional data, with individual counties ranging from “low” to “very high” based upon their historical data. No invasive *Aedes albopictus* were collected from the region.

- **Mosquito Numbers- Western Nebraska:** Individual county collections for the reported two weeks ranged from “low” to “extremely high” compared to their historical data. Overall mosquito activity from regional traps decreased but were still considered “moderate”. *Aedes vexans* was the most abundant mosquito collected in CDC light traps (44.8%), however *Culex tarsalis*, was a close second making up 43.3% of mosquito collections. *Culex* mosquito counts also increased and were “moderate” based upon historical regional data. Individual *Culex* counts across counties in the west region ranged from “low” to “extremely high” based upon their historical data. No invasive *Aedes albopictus* were collected from the region.
- **Arboviral Detections:** Over the two weeks of mosquito surveillance covered in this report **20 positive WNV pools have been detected**. However, there are mosquito pools that remain to be tested and results could change. The continued detection of WNV positive mosquito pools demonstrates that WNV is still circulating in the environment. To date 1,738 *Culex* pools have been tested with **67 WNV positives detected to date**. The current WNV cumulative statewide minimum mosquito infection rate increased (1.73/1,000 *Culex*) and is just below the 10-year median (1.77/1,000 *Culex*) for this time of year. No positive pools for St. Louis Encephalitis (SLE) or Western Equine Encephalitis (WEE) viruses were detected over the two weeks and zero have been detected for the season.
- **Dead Bird Surveillance:** To date 130 birds have been reported. Of the 130 birds reported, 12 have been a corvid birds (bird group most heavily impacted by WNV and includes: blue jays, crows, and magpies). Of the seven birds reported who have met criteria for WNV testing, four were negative, two birds were unsuitable for testing, and one was positive.
- **Equine Surveillance:** Currently no equine cases of WNV have been reported for the season.
- **Human Mosquito-borne Disease Cases:** **Fifty-seven human clinical WNV cases** have currently been reported along with **30 asymptomatic human blood donors** in Nebraska residents. **Overall human case counts are significantly above what would be expected at this time of the year.** Additionally, **three deaths related to WNV have also been reported in the state.** A total of five travel-related mosquito-borne disease have occurred in state residents: four malaria cases (all four were acquired in sub-Saharan Africa) and one dengue case (acquired in Southeast Asia).

Comment: *Human clinical (symptomatic) WNV cases continue to increase and there are now 57 reported in Nebraska residents to date, 30 of which are the more severe neuroinvasive form. Unfortunately, three deaths related to WNV have now been reported in the state. Additionally, asymptomatic human blood donors also increased with 30 now reported. Overall human case counts are significantly above what would be expected for this time of year, especially in the eastern portion of the state. Furthermore, 67 WNV mosquito pools have been detected from mosquito samples. With Human WNV cases continuing to increase and positive mosquito pools continuing to be detected, Individuals should take proper mosquito prevention activities to reduce mosquito bites. As we go through September risk will gradually decrease, however risk of WNV infection will remain until the first hard frost of the season. Additionally, five travel-related mosquito-borne illness cases, four malaria and one dengue case, have been reported in Nebraska residents returning from overseas travel. Individuals are strongly encouraged to practice proper mosquito prevention anytime mosquitoes are present or likely to be present no matter where they are to decrease their chances of acquiring a mosquito-borne illness.* Statewide, overall mosquito collections from CDC light traps saw a decrease in overall mosquito numbers but the statewide average was still “moderate” when compared to historical data, averaging 131.18 total mosquitoes per trap night. The most abundant mosquito collected over the two week sampling period was *Culex tarsalis* (primary vector of West Nile virus in Nebraska), accounting for 45.7% of trap collections. *Culex* mosquito counts statewide continued to increase and were “high” based on historical data, averaging 80.35 *Culex* per trap night.

ENVIRONMENTAL CONDITIONS

Environmental and climate conditions can impact mosquito-borne diseases by influencing mosquito numbers and mosquito infection prevalence. For example, drought has been identified as a primary driver of WNV epidemics. This is why rainfall, temperature, and drought conditions are monitored closely during the mosquito surveillance season.

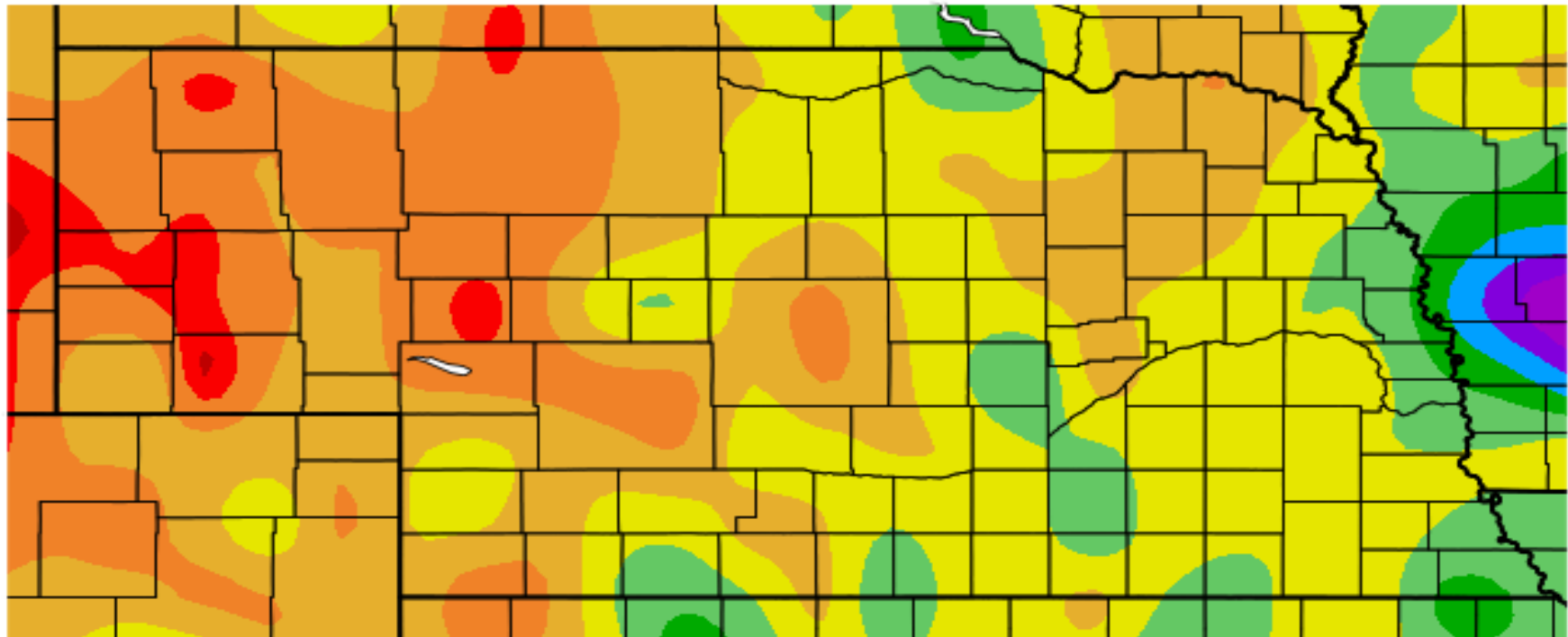
Rainfall and Temperature

Rainfall across Nebraska over the last 30 days (07/27/2018 to 08/25/2018) ranged from 0.5 to ≥ 6.5 inches (pg. 4) across the state. The heavier amounts were located in central, eastern, and southeastern Nebraska. For the last 30 days (date ending 08/25/2018), rainfall was below normal over areas of the state with pockets of precipitation above normal (pg.5). Average temperatures (pg. 6) for the last 30 days were below normal over most of the state. The long range outlook as of 08/31/2018 (next 8 to 14 days), is predicting higher chances of above normal temps over most of the state. Precipitation is also predicted to have a higher probability of being above normal over most of Nebraska. More climate and forecast information can be found at:

High Plains Regional Climate Center at: <https://hprcc.unl.edu/index.php>

National Weather Service 8 to 14 day outlooks: <http://www.cpc.ncep.noaa.gov/products/predictions/814day/index.php>

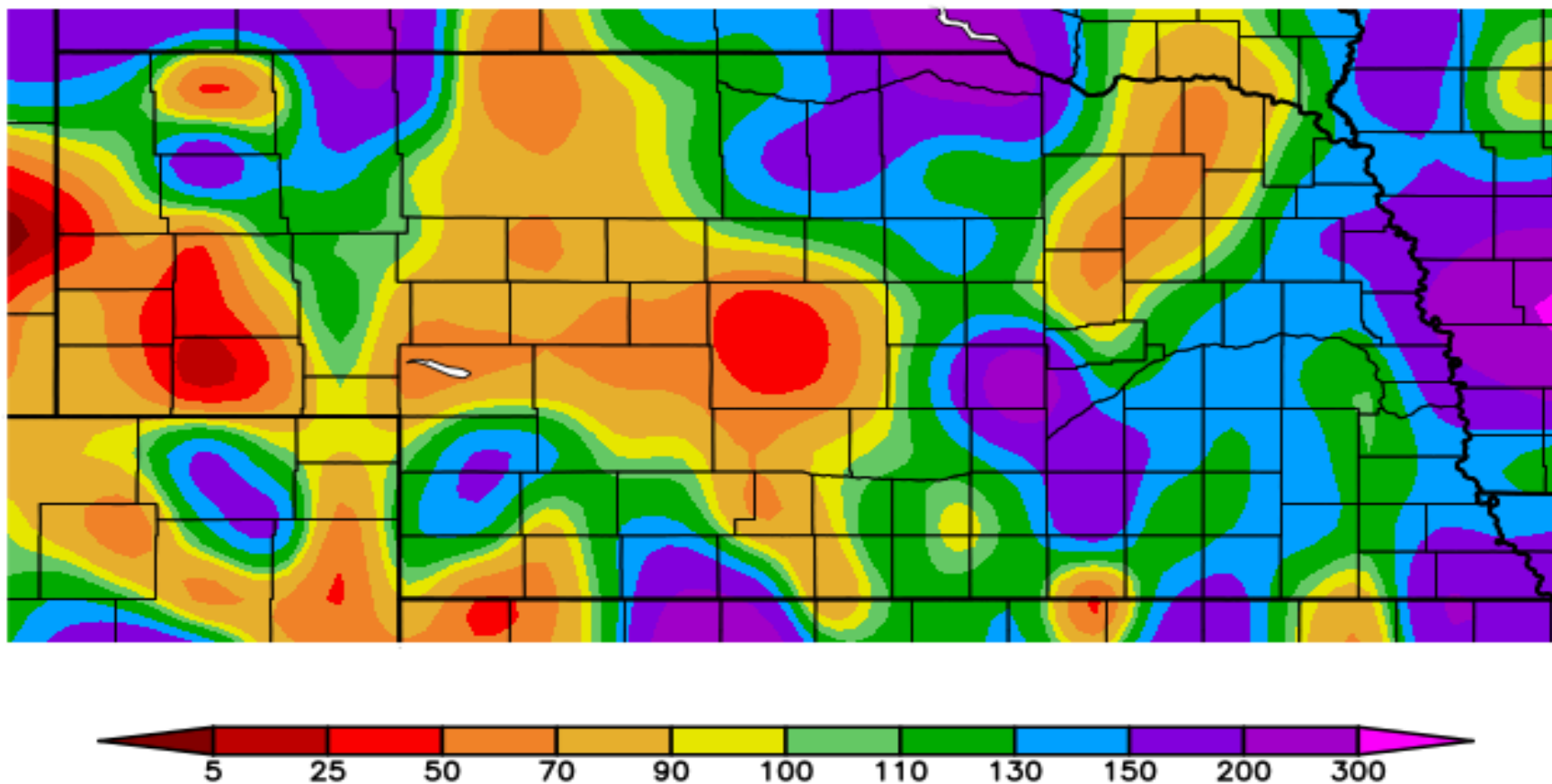
Precipitation (in)
7/27/2018 – 8/25/2018



Generated 8/26/2018 at HPRCC using provisional data.

NOAA Regional Climate Centers

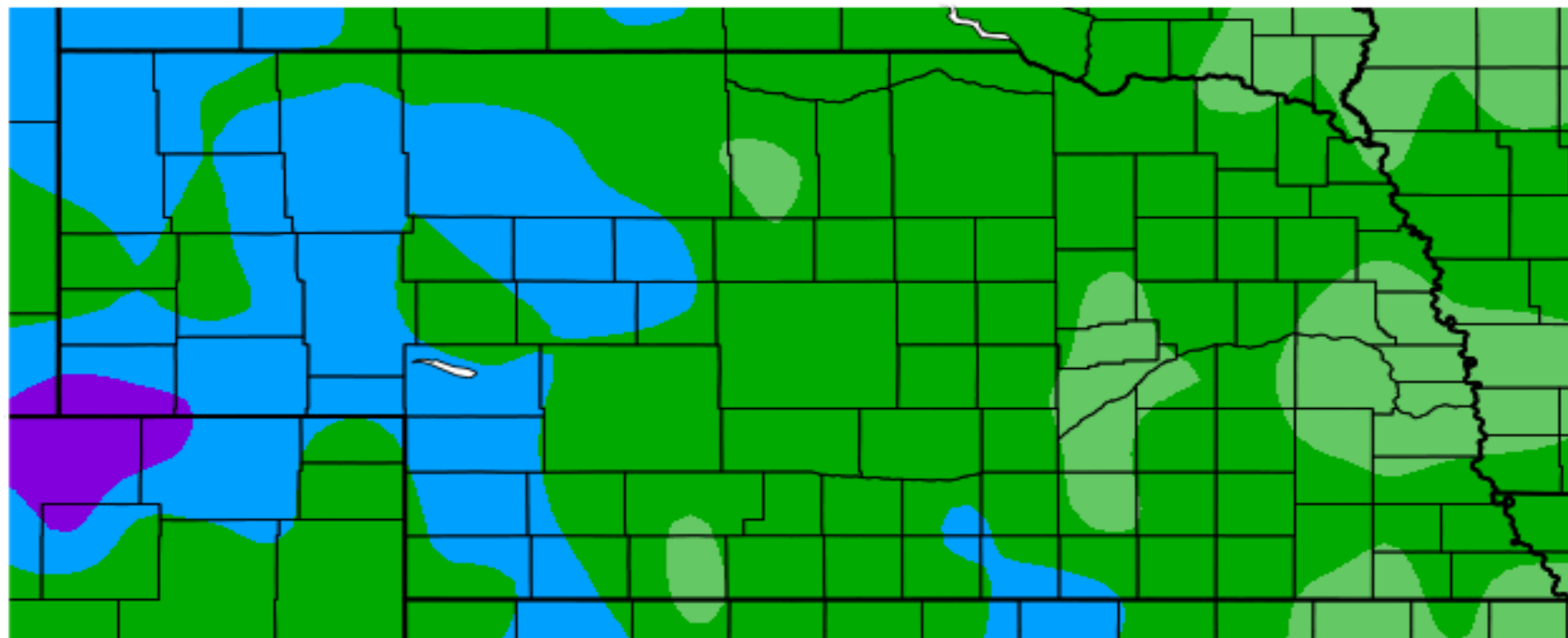
Percent of Normal Precipitation (%)
7/27/2018 – 8/25/2018



Generated 8/26/2018 at HPRCC using provisional data.

NOAA Regional Climate Centers

Departure from Normal Temperature (F) 7/27/2018 – 8/25/2018



Generated 8/26/2018 at HPRCC using provisional data.

NOAA Regional Climate Centers

Three Month Temperature and Rainfall Forecast

For August 2018 to October 2018, forecast predictions for Nebraska are for an elevated probability of above normal temperature over most of the state and equal chances for above and below normal precipitation. Links for the pages containing graphics of the long-term outlook can be found here:

http://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=1 (Temperature and Rainfall Outlook).

Drought Outlook

The current drought monitor on page eight (through 08/28/2018) showed improvements in abnormally dry and moderate drought conditions in portions of south central and southeast Nebraska. Approximately 96.33% of the state is being reported with no drought or abnormally dry conditions, the same as reported last week. Currently the land area in the state encompassing abnormal dryness is approximately 2.99% (increase) and moderate drought around 0.34% (decrease) of the state area. Additionally, the small area of severe drought in far southeastern Nebraska was removed. Last year at this time, 42.43% of the state area reported no drought or abnormally dry conditions per the drought monitor. The current monthly drought outlook for September can be found on page nine. For more information please visit the links below:

<http://droughtmonitor.unl.edu/> (U.S. Drought Monitor).

http://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_summary.php (U.S. Monthly Drought Outlook).

U.S. Drought Monitor Nebraska

August 28, 2018

(Released Thursday, Aug. 30, 2018)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0	D1	D2	D3	D4
Current	96.33	3.33	0.34	0.00	0.00	0.00
Last Week 08-21-2018	96.33	2.99	0.65	0.03	0.00	0.00
3 Months Ago 05-29-2018	81.90	12.73	5.37	0.00	0.00	0.00
Start of Calendar Year 01-02-2018	9.32	88.65	2.03	0.00	0.00	0.00
Start of Water Year 09-26-2017	82.67	13.32	4.01	0.00	0.00	0.00
One Year Ago 08-29-2017	42.43	45.10	12.46	0.00	0.00	0.00

Intensity:

 D0 Abnormally Dry	 D3 Extreme Drought
 D1 Moderate Drought	 D4 Exceptional Drought
 D2 Severe Drought	

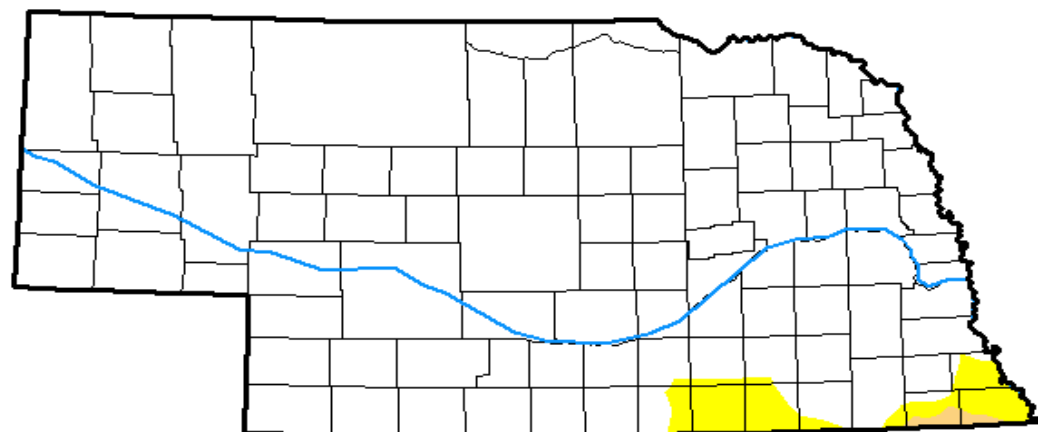
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

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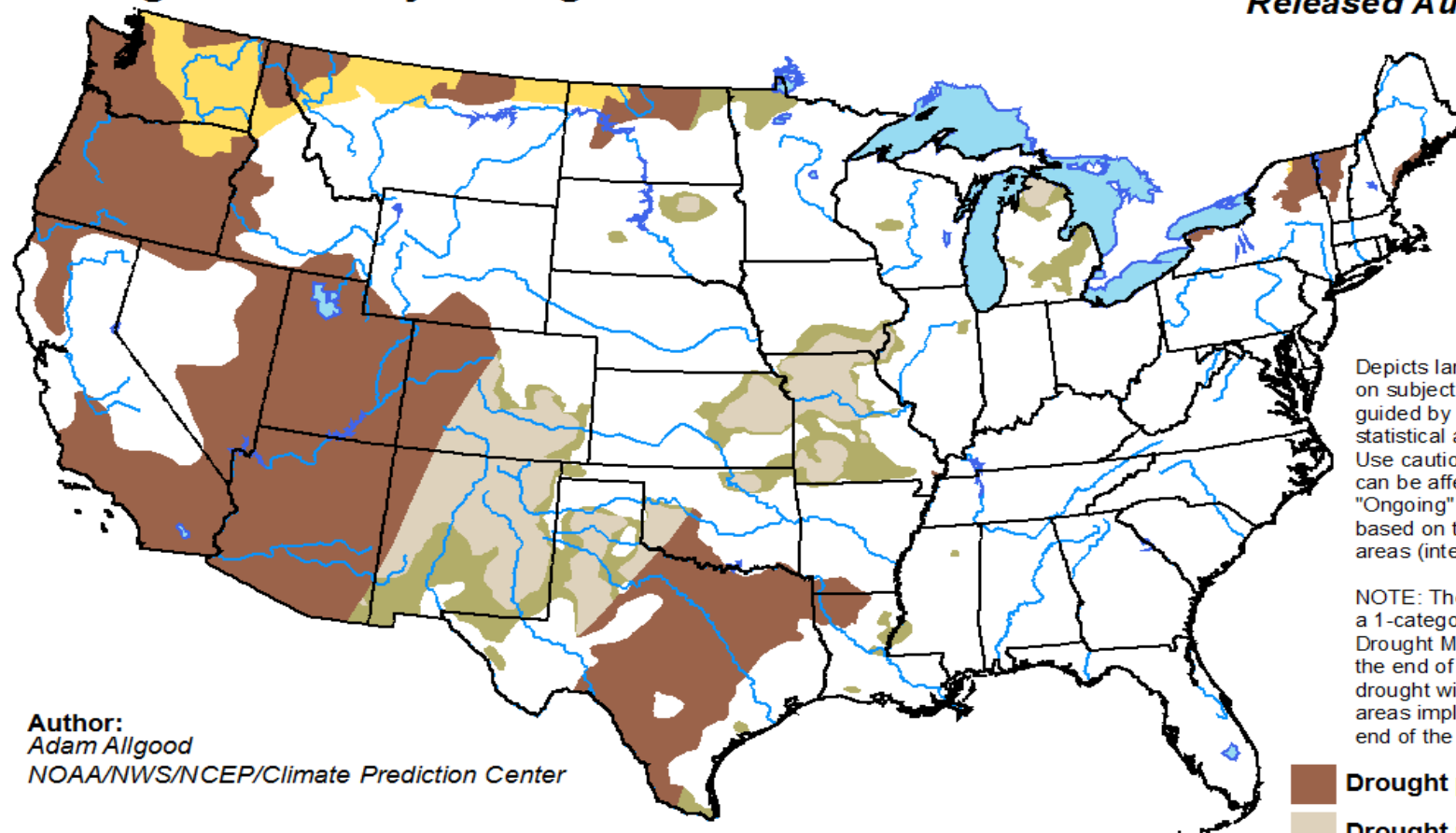
<http://droughtmonitor.unl.edu/>



U.S. Monthly Drought Outlook

Drought Tendency During the Valid Period





Valid for September 2018
Released August 31, 2018

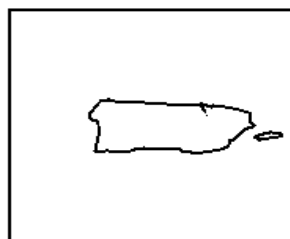
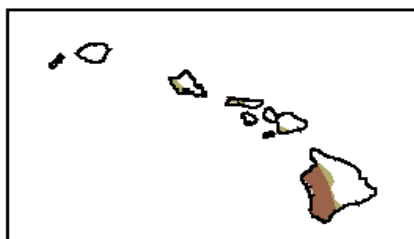
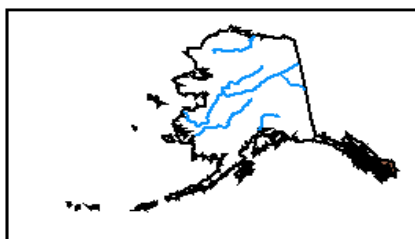


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Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

-  Drought persists
-  Drought remains but improves
-  Drought removal likely
-  Drought development likely



<http://go.usa.gov/3eZGd>

ARBOVIRAL DETECTIONS

To date, there has been 67 positive arbovirus positive mosquito pools detected in 18 different counties. All 67 positive pools have been WNV, no SLE or WEE has been detected to date in mosquito pools. The statewide WNV cumulative mosquito minimum infection rate (MIR) per 1,000 *Culex* increased to 1.73 which is slightly below the 10-year median of 1.77 for this time of year. However, there are mosquito pools that remain to be tested and these results could change.

Table 1. Arboviral Detections

Date Collected	County	Mosquito Species	Virus
8/21/2018	Lincoln	<i>Culex tarsalis</i>	WNV
8/21/2018	Lincoln	<i>Culex tarsalis</i>	WNV
8/15/2018	Phelps	<i>Culex pipiens</i>	WNV
8/15/2018	Phelps	<i>Culex tarsalis</i>	WNV
8/15/2018	Red Willow	<i>Culex tarsalis</i>	WNV
8/14/2018	Cherry	<i>Culex tarsalis</i>	WNV
8/14/2018	Dawes	<i>Culex tarsalis</i>	WNV
8/14/2018	Dawes	<i>Culex tarsalis</i>	WNV
8/14/2018	Dixon	<i>Culex tarsalis</i>	WNV
8/14/2018	Holt	<i>Culex tarsalis</i>	WNV
8/14/2018	Holt	<i>Culex tarsalis</i>	WNV
8/14/2018	Holt	<i>Culex tarsalis</i>	WNV
8/14/2018	Holt	<i>Culex tarsalis</i>	WNV
8/14/2018	Holt	<i>Culex tarsalis</i>	WNV
8/14/2018	Holt	<i>Culex pipiens</i>	WNV
8/14/2018	Scotts Bluff	<i>Culex tarsalis</i>	WNV
8/14/2018	Scotts Bluff	<i>Culex tarsalis</i>	WNV
8/14/2018	Scotts Bluff	<i>Culex tarsalis</i>	WNV
8/14/2018	Scotts Bluff	<i>Culex pipiens</i>	WNV

8/14/2018	York	<i>Culex pipiens</i>	WNV
8/8/2018	Garfield	<i>Culex tarsalis</i>	WNV
8/8/2018	Garfield	<i>Culex pipiens</i>	WNV
8/8/2018	Madison	<i>Culex tarsalis</i>	WNV
8/7/2018	Box Butte	<i>Culex tarsalis</i>	WNV
8/7/2018	Box Butte	<i>Culex tarsalis</i>	WNV
8/7/2018	Box Butte	<i>Culex tarsalis</i>	WNV
8/7/2018	Chase	<i>Culex tarsalis</i>	WNV
8/7/2018	Douglas	<i>Culex tarsalis</i>	WNV
8/7/2018	Garden	<i>Culex tarsalis</i>	WNV
8/7/2018	Lincoln	<i>Culex pipiens</i>	WNV
8/1/2018	Red Willow	<i>Culex tarsalis</i>	WNV
8/1/2018	Red Willow	<i>Culex tarsalis</i>	WNV
8/1/2018	Red Willow	<i>Culex tarsalis</i>	WNV
7/31/2018	Dawes	<i>Culex tarsalis</i>	WNV
7/31/2018	Holt	<i>Culex tarsalis</i>	WNV
7/31/2018	Holt	<i>Culex pipiens</i>	WNV
7/31/2018	Holt	<i>Culex pipiens</i>	WNV
7/31/2018	Holt	<i>Culex unknown</i>	WNV
7/31/2018	Wayne	<i>Culex tarsalis</i>	WNV
7/25/2018	Dawes	<i>Culex tarsalis</i>	WNV
7/24/2018	Box Butte	<i>Culex tarsalis</i>	WNV
7/24/2018	Box Butte	<i>Culex tarsalis</i>	WNV
7/24/2018	Box Butte	<i>Culex tarsalis</i>	WNV
7/24/2018	Dawson	<i>Culex pipiens</i>	WNV
7/24/2018	Douglas	<i>Culex pipiens</i>	WNV
7/24/2018	Douglas	<i>Culex pipiens</i>	WNV
7/24/2018	Douglas	<i>Culex tarsalis</i>	WNV
7/24/2018	Douglas	<i>Culex tarsalis</i>	WNV
7/24/2018	Douglas	<i>Culex tarsalis</i>	WNV
7/24/2018	Douglas	<i>Culex tarsalis</i>	WNV
7/24/2018	Douglas	<i>Culex tarsalis</i>	WNV
7/24/2018	Douglas	<i>Culex tarsalis</i>	WNV

7/24/2018	Douglas	<i>Culex tarsalis</i>	WNV
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7/24/2018	Douglas	<i>Culex tarsalis</i>	WNV
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7/24/2018	Douglas	<i>Culex tarsalis</i>	WNV
7/24/2018	Douglas	<i>Culex tarsalis</i>	WNV
7/24/2018	Douglas	<i>Culex tarsalis</i>	WNV
7/24/2018	Madison	<i>Culex tarsalis</i>	WNV
7/17/2018	Garden	<i>Culex tarsalis</i>	WNV
7/17/2018	Scotts Bluff	<i>Culex tarsalis</i>	WNV
7/17/2018	Wayne	<i>Culex tarsalis</i>	WNV
7/10/2018	Box Butte	<i>Culex tarsalis</i>	WNV
6/7/2018	Lancaster	<i>Culex pipiens</i>	WNV
6/6/2018	Phelps	<i>Culex tarsalis</i>	WNV

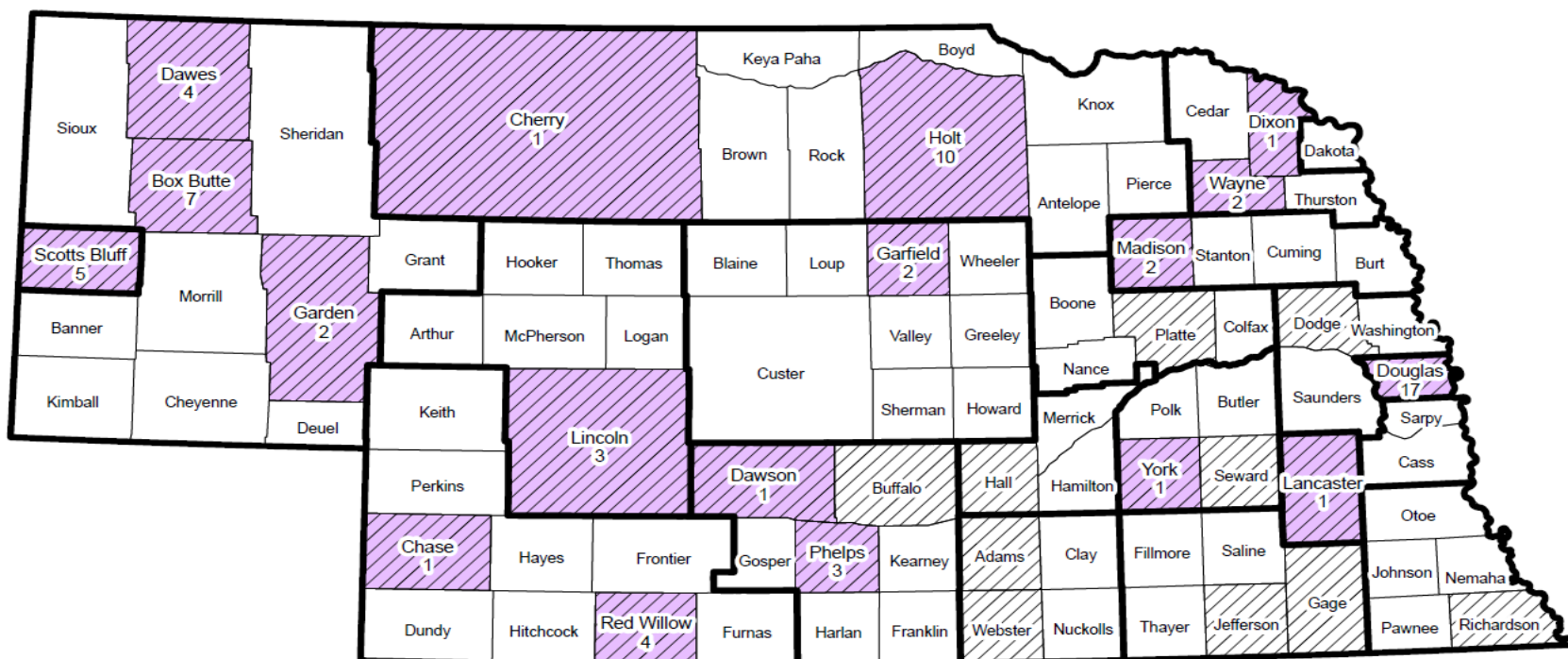
Table 2. Arboviral Detections Summary Table.

Date Collected	County	Mosquito Species	Virus			
			WNV	SLE	WEE	Total
8/8/2018	Garfield	<i>Culex tarsalis</i>	1	0	0	1
8/8/2018	Garfield	<i>Culex pipiens</i>	1	0	0	1
8/8/2018	Madison	<i>Culex tarsalis</i>	1	0	0	1
8/7/2018	Box Butte	<i>Culex tarsalis</i>	1	0	0	1
8/7/2018	Box Butte	<i>Culex tarsalis</i>	1	0	0	1
8/7/2018	Box Butte	<i>Culex tarsalis</i>	1	0	0	1
8/7/2018	Chase	<i>Culex tarsalis</i>	1	0	0	1
8/7/2018	Douglas	<i>Culex tarsalis</i>	1	0	0	1
8/7/2018	Garden	<i>Culex tarsalis</i>	1	0	0	1
8/7/2018	Lincoln	<i>Culex pipiens</i>	1	0	0	1
8/1/2018	Red Willow	<i>Culex tarsalis</i>	1	0	0	1

6/7/2018	Lancaster	<i>Culex pipiens</i>	1	0	0	1
6/6/2018	Phelps	<i>Culex tarsalis</i>	1	0	0	1
8/14/2018	Scotts Bluff	<i>Culex tarsalis</i>	1	0	0	1
8/14/2018	Scotts Bluff	<i>Culex tarsalis</i>	1	0	0	1
8/14/2018	Scotts Bluff	<i>Culex tarsalis</i>	1	0	0	1
8/14/2018	Scotts Bluff	<i>Culex pipiens</i>	1	0	0	1
8/14/2018	Holt	<i>Culex tarsalis</i>	1	0	0	1
8/14/2018	Holt	<i>Culex tarsalis</i>	1	0	0	1
8/14/2018	Holt	<i>Culex tarsalis</i>	1	0	0	1
8/14/2018	Holt	<i>Culex tarsalis</i>	1	0	0	1
8/14/2018	Holt	<i>Culex tarsalis</i>	1	0	0	1
8/14/2018	Holt	<i>Culex pipiens</i>	1	0	0	1
8/14/2018	Cherry	<i>Culex tarsalis</i>	1	0	0	1
8/14/2018	Dixon	<i>Culex tarsalis</i>	1	0	0	1
8/15/2018	Red Willow	<i>Culex tarsalis</i>	1	0	0	1
8/15/2018	Phelps	<i>Culex pipiens</i>	1	0	0	1
8/15/2018	Phelps	<i>Culex tarsalis</i>	1	0	0	1
8/14/2018	York	<i>Culex pipiens</i>	1	0	0	1
8/14/2018	Dawes	<i>Culex tarsalis</i>	1	0	0	1
8/14/2018	Dawes	<i>Culex tarsalis</i>	1	0	0	1
8/21/2018	Lincoln	<i>Culex tarsalis</i>	1	0	0	1
8/21/2018	Lincoln	<i>Culex tarsalis</i>	1	0	0	1
Total			67	0	0	67

Mosquito Surveillance Nebraska CDC Light Trap Network, 2018

As of August 31



Legend

- West Nile Positive (WNV)
- Routine Trapping Sites (28)
- Surveillance Regions

SLE Positive / Tested Totals

Mosquito Pools: 0 / 1738

Counties: 0 / 28

WNV Positive / Tested Totals

Mosquito Pools: 67 / 1738

Counties: 18 / 28

Figure 1. Positive mosquito pools in the Nebraska CDC light trap network, 2018.

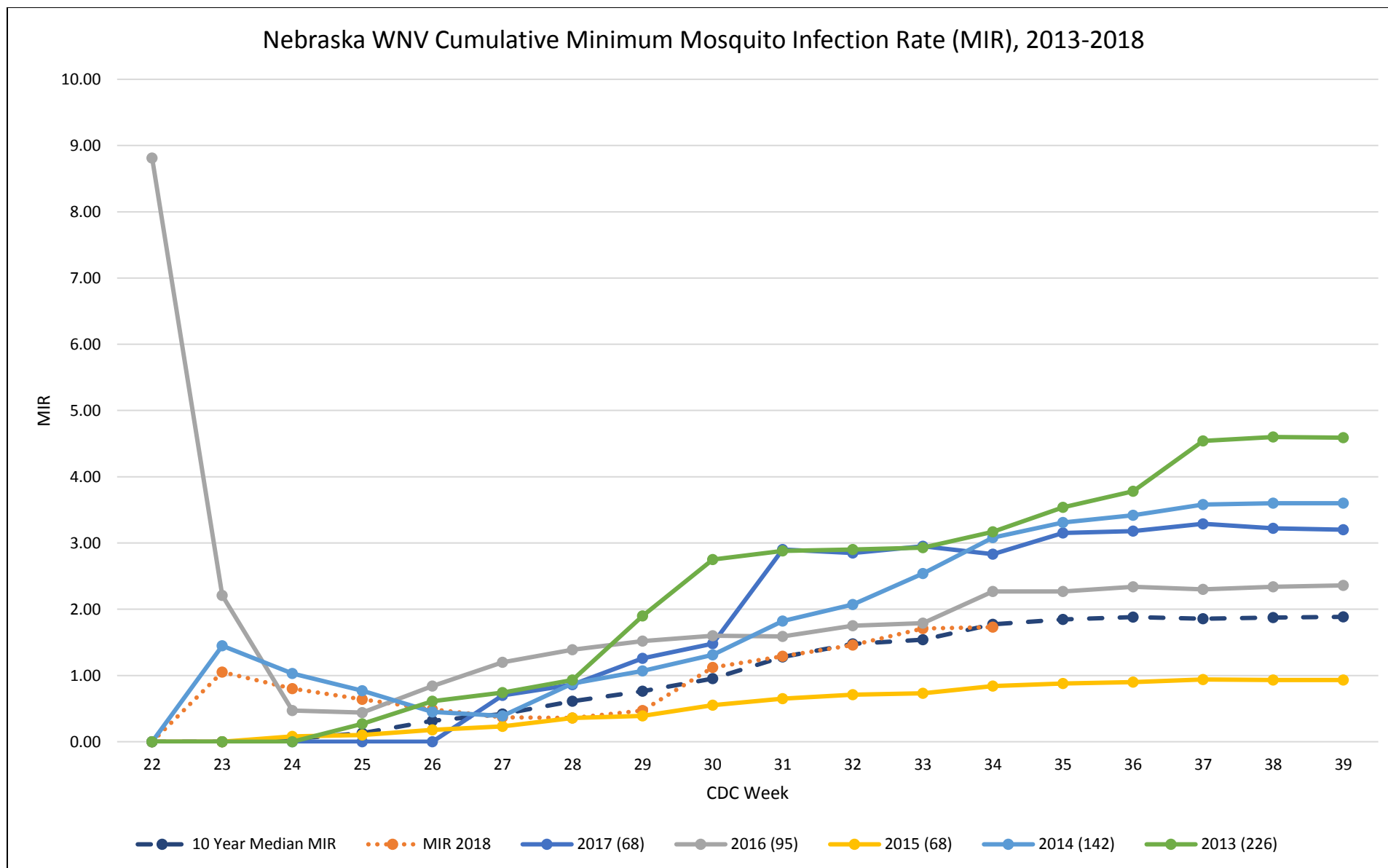


Figure 2. Weekly Nebraska WNV Mosquito Cumulative Mosquito Minimum Infection Rate, 2013-2018. At the state level, the calculated statewide MIR is strongly correlated with the number of human clinical WNV cases. As such, comparisons during the season of the weekly cumulative MIR with previous seasons' cumulative MIRs may give an indication as to how severe a WNV season might be. Please note 2018 data is shown as a dotted line and the 10-year median as a dashed line. Numbers in parentheses next to years indicate the number of human WNV clinical cases reported that year.

HUMAN MOSQUITO-BORNE DISEASE CASES

Weekly reported cases (confirmed and probable) of human clinical mosquito-borne disease infections in Nebraska residents is summarized in the table below (pg. 13 and 14). It includes human infections of West Nile virus (WNV), St. Louis Encephalitis virus (SLE), Western Equine Encephalitis virus (WEE), chikungunya (CHIKV), dengue (DENV), Zika, and malaria. Please note that cases are by earliest report date of infection not necessarily by date of onset. Table only includes reported cases that had exposure or onset of disease in 2018. All data is preliminary and may change as more information is received.

Table 3. Reports of Mosquito-Borne Disease in Nebraska, 2018

CDC Week	Week Ending Date	WNV^ (Clinical Cases)	WNV^ (Asymptomatic Blood Donors)	SLE^	WEE^	CHIKV*	DENV*	ZIKA*	Malaria*	Total
1	6-Jan-18	0	0	0	0	0	0	0	0	0
2	13-Jan-18	0	0	0	0	0	0	0	0	0
3	20-Jan-18	0	0	0	0	0	0	0	0	0
4	27-Jan-18	0	0	0	0	0	0	0	0	0
5	3-Feb-18	0	0	0	0	0	0	0	1	1
6	10-Feb-18	0	0	0	0	0	0	0	0	0
7	17-Feb-18	0	0	0	0	0	0	0	0	0
8	24-Feb-18	0	0	0	0	0	0	0	0	0
9	3-Mar-18	0	0	0	0	0	0	0	0	0
10	10-Mar-18	0	0	0	0	0	0	0	0	0
11	17-Mar-18	0	0	0	0	0	0	0	0	0
12	24-Mar-18	0	0	0	0	0	0	0	0	0
13	31-Mar-18	0	0	0	0	0	0	0	0	0
14	7-Apr-18	0	0	0	0	0	0	0	1	1
15	14-Apr-18	0	0	0	0	0	0	0	0	0

16	21-Apr-18	0	0	0	0	0	0	0	0	0
17	28-Apr-18	0	0	0	0	0	0	0	0	0
18	5-May-18	0	0	0	0	0	0	0	0	0
19	12-May-18	0	0	0	0	0	0	0	0	0
20	19-May-18	0	0	0	0	0	0	0	0	0
21	26-May-18	0	0	0	0	0	0	0	0	0
22	2-Jun-18	0	0	0	0	0	0	0	0	0
23	9-Jun-18	0	0	0	0	0	0	0	0	0
24	16-Jun-18	0	0	0	0	0	0	0	1	1
25	23-Jun-18	0	0	0	0	0	0	0	0	0
26	30-Jun-18	0	0	0	0	0	0	0	0	0
27	7-Jul-18	1	0	0	0	0	1	0	0	2
28	14-Jul-18	1	0	0	0	0	0	0	0	1
29	21-Jul-18	1	1	0	0	0	0	0	0	2
30	28-Jul-18	0	0	0	0	0	0	0	0	0
31	4-Aug-18	2	1	0	0	0	0	0	0	3
32	11-Aug-18	10	3	0	0	0	0	0	1	14
33	18-Aug-18	11	7	0	0	0	0	0	0	18
34	25-Aug-18	22	10	0	0	0	0	0	0	32
35	1-Sep-18	9	8	0	0	0	0	0	0	17
Total		57	30	0	0	0	1	0	4	92

^These are endemic viruses that have been historically transmitted by mosquitoes in Nebraska and maybe acquired within the state. It should be noted that reports are for Nebraska residents and that infection may have been acquired elsewhere. *These diseases are typically acquired via travel overseas to areas where the virus or parasite is endemic. Currently, Nebraska does not have local transmission via mosquitoes of these organisms and the probability of local transmission by local mosquitoes is thought to be very low and not expected. However, to further lower and prevent the chance of local transmission of these “travel-related” diseases, returning travelers or visitors from these areas should prevent mosquito bites for at least three weeks upon arrival to Nebraska. Additionally, although cases of CHIKV, DENV, and ZIKA are most often acquired via overseas travel, small areas of transmission and small, local outbreaks within the U.S. have occurred and may occur in the future. Examples of states that have seen local transmission include: Florida, (DENV, CHIKV, and ZIKA), Hawaii (DENV), and Texas (DENV, CHIKV, and ZIKA).

Table 4. Human WNV Clinical Case Information, Nebraska 2018

Age Range	Number
0 to 10	0
11 to 20	2
21 to 30	7
31 to 40	11
41 to 50	9
51 to 60	10
61 to 70	9
71+	9
Gender	
Male	38
Female	19
Diagnosis	
WNV Neuroinvasive Disease	30
WNV Non-Neuroinvasive Disease	27
Hospitalized	27
Death	3

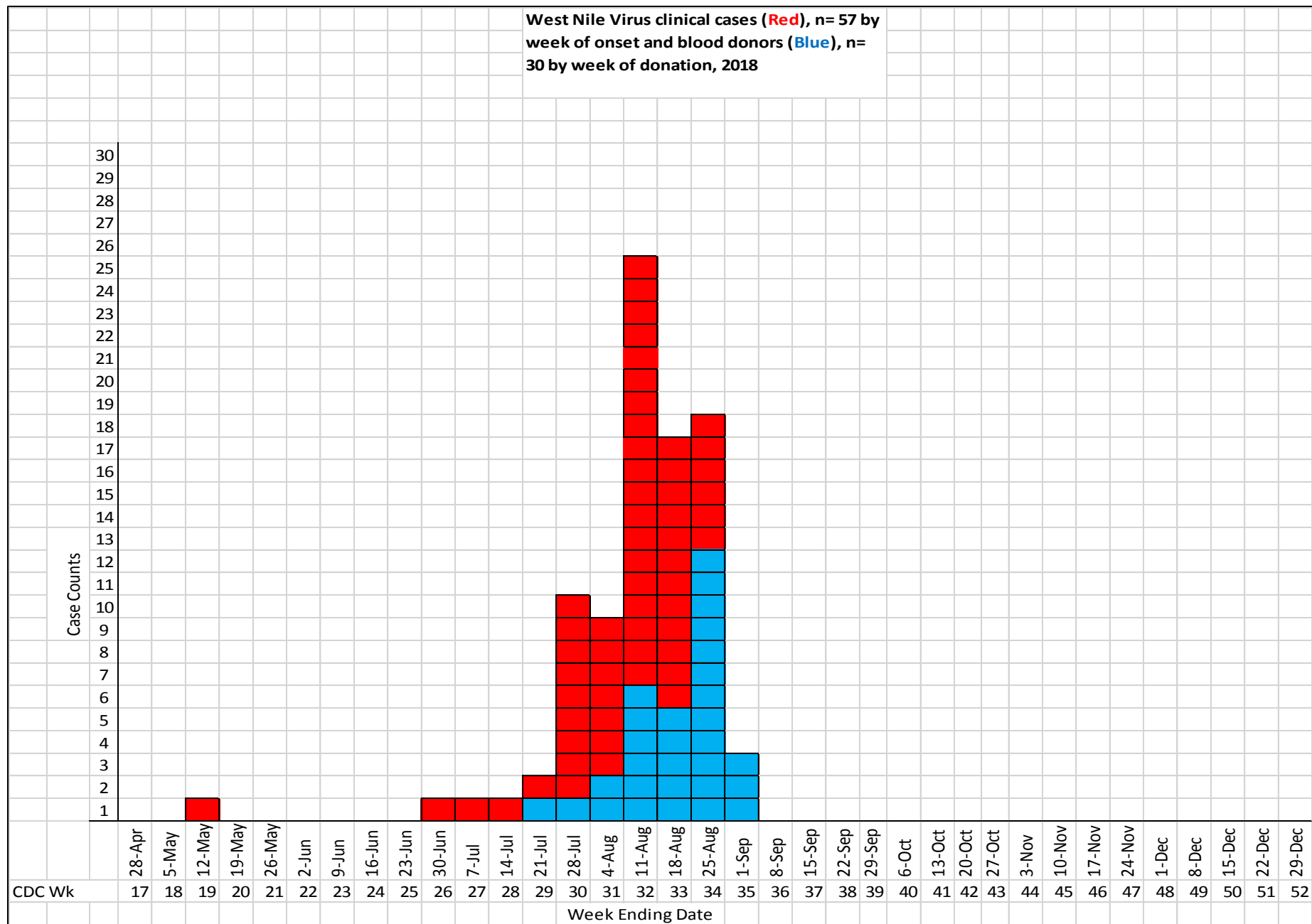


Figure 3. Epi-curve of human WNV infections (clinical and asymptomatic blood donors) by onset date, Nebraska 2018.

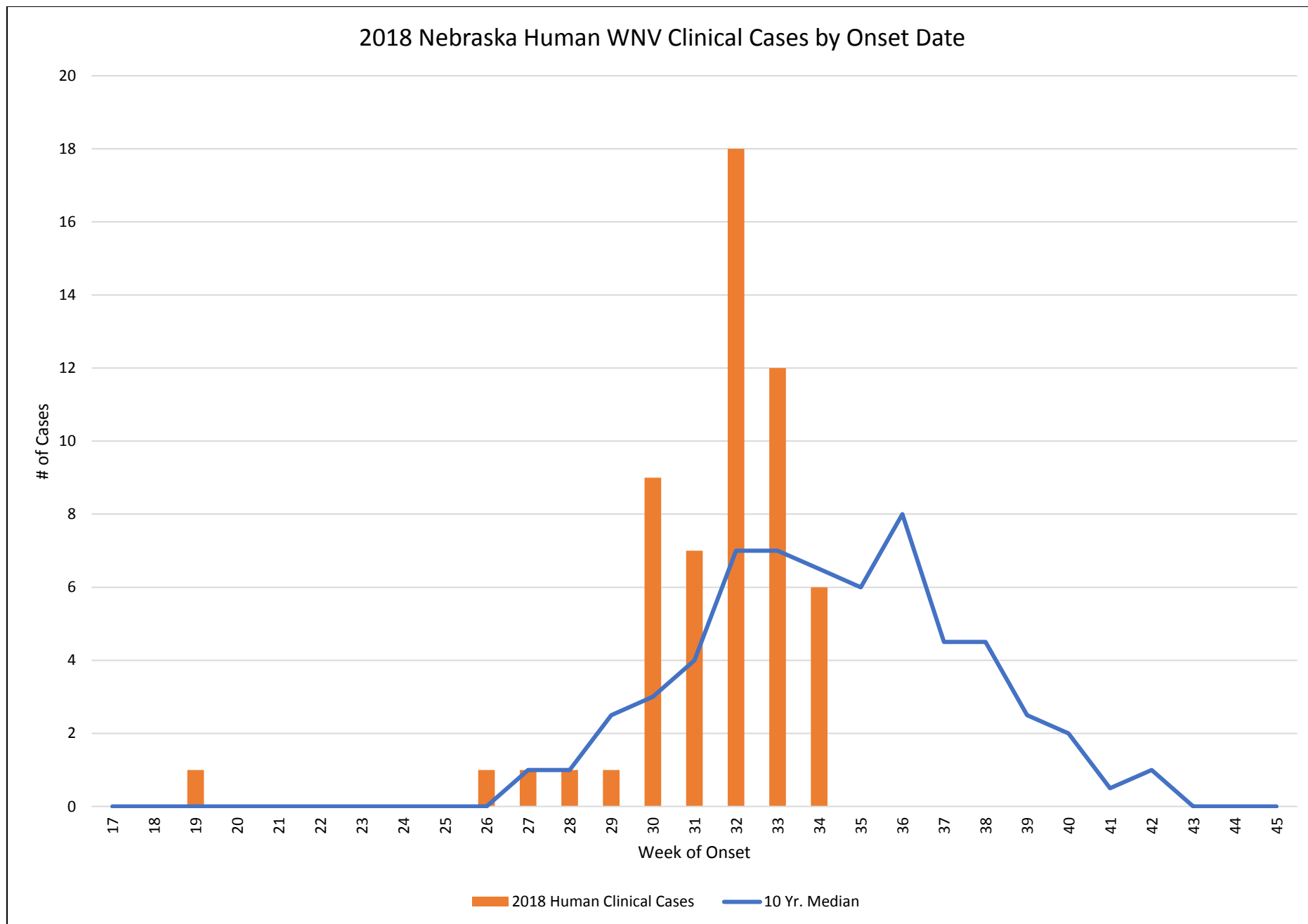


Figure 4. Epi-curve of human WNV clinical cases and 10 yr. median by onset date, Nebraska 2018.

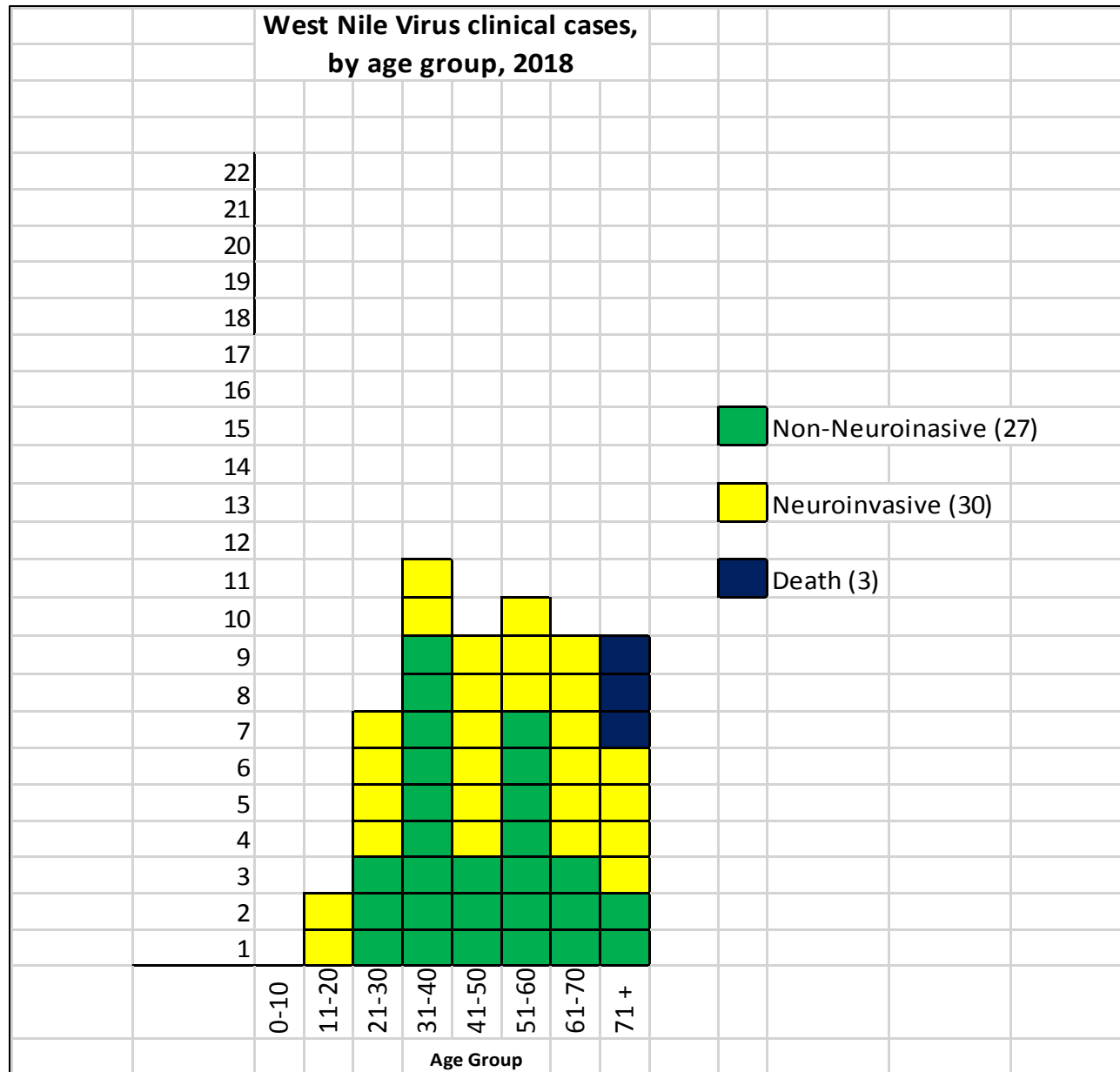


Figure 5. WNV human clinical cases by 10 year age groups, 2018.

Human Clinical Positives for West Nile Virus, Nebraska, 2018, (n = 57)

As of August 31

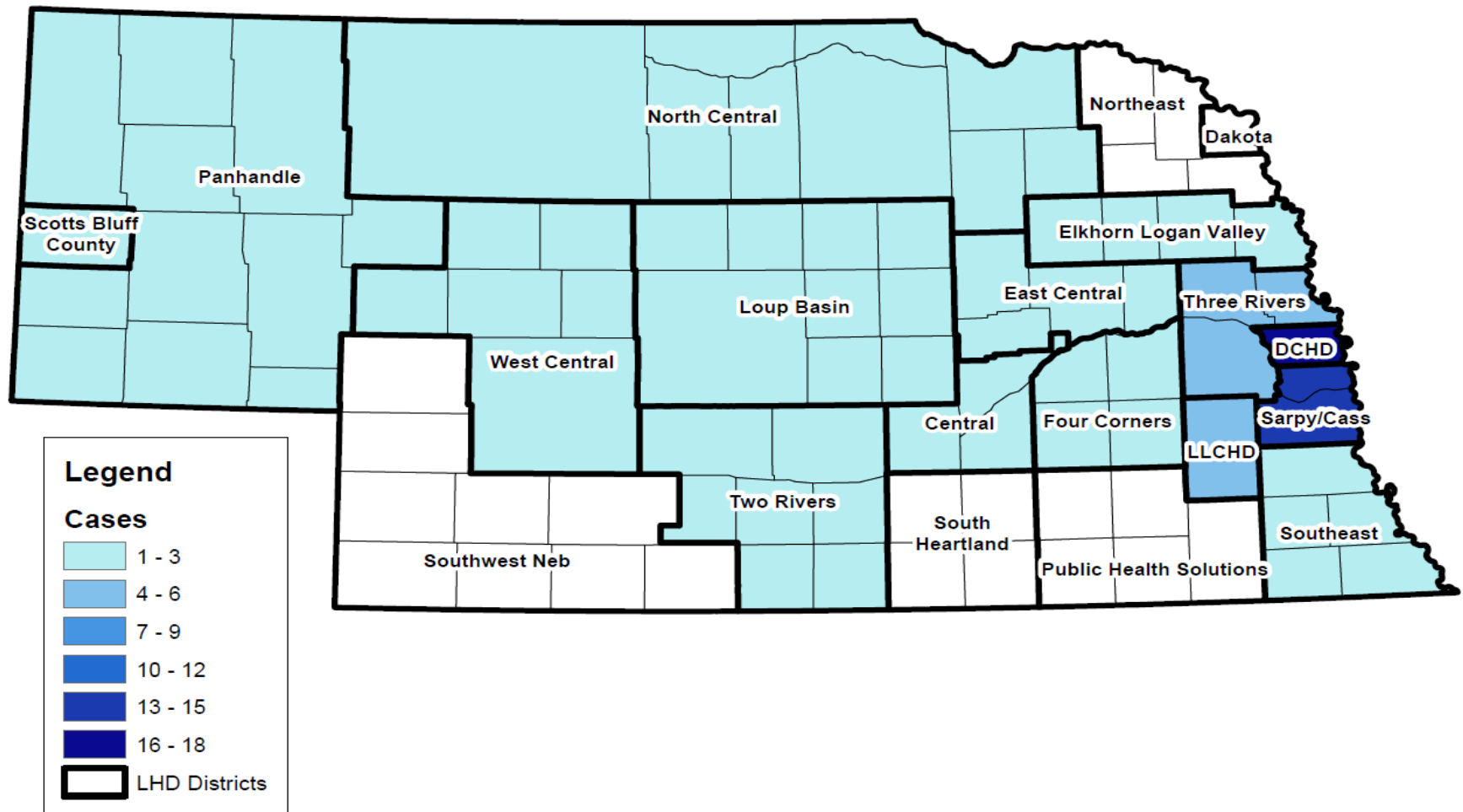


Figure 6. Nebraska human clinical WNV cases by local health jurisdiction, 2018.

Table 5. Number of Human WNV Clinical Cases by Onset Week and Nebraska Local Health Jurisdiction, 2018

CDC Wk.	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
Local Health Dept. Jurisdiction																				Total
Central District Health Dept.	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Dakota County Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Douglas County Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	9	5	0	0	17
East Central District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Elkhorn-Logan Valley Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2
Four Corners Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Lincoln-Lancaster County Health Dept.	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	2	1	0	6
Loup Basin Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
North Central District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2
Northeast Nebraska Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panhandle Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Public Health Solutions	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sarpy-Cass Dept. of Health and Wellness	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	5	2	3	0	14
Scotts Bluff County Health Dept.	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
South Heartland District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southeast District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Southwest Nebraska Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Three Rivers Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	1	0	0	4
Two Rivers Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	3
West Central District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
Statewide Total	0	0	1	0	0	0	0	0	0	1	1	1	1	9	7	18	12	6	0	57

Human Blood Donor Positives for West Nile Virus, Nebraska, 2018, (n = 30)

As of August 31

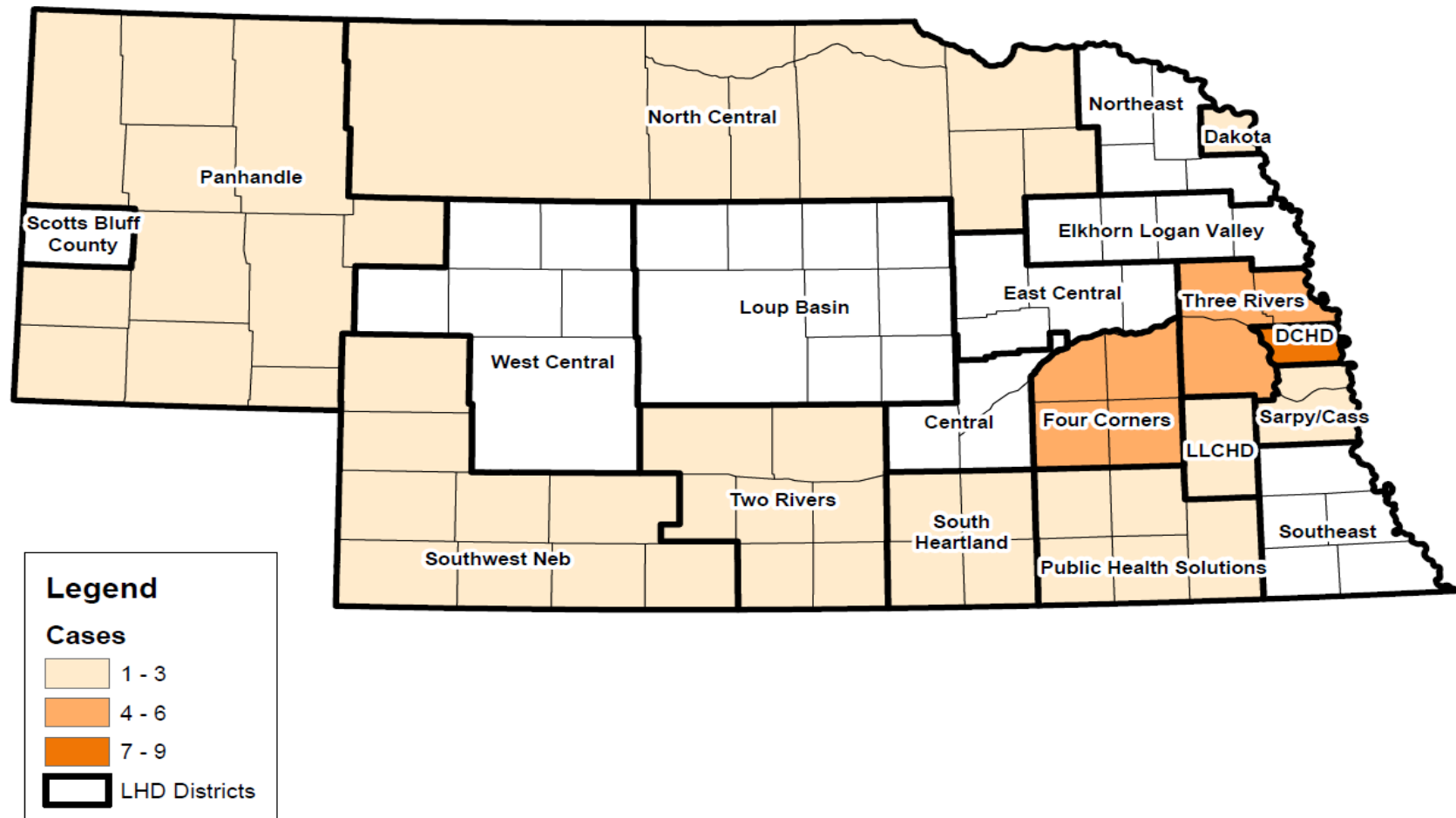


Figure 7. Nebraska asymptomatic WNV blood donors by local health jurisdiction, 2018.

Table 6. Number of Human WNV Blood Donors by Week Reported and Nebraska Local Health Jurisdiction, 2018

CDC Wk. Reported	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
Local Health Dept. Jurisdiction																				Total
Central District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dakota County Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Douglas County Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	4	8
East Central District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elkhorn-Logan Valley Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Four Corners Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4
Lincoln-Lancaster County Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2
Loup Basin Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Central District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Northeast Nebraska Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panhandle Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Public Health Solutions	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Sarpy-Cass Dept. of Health and Wellness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
Scotts Bluff County Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Heartland District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Southeast District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southwest Nebraska Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	2
Three Rivers Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	5
Two Rivers Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
West Central District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Statewide Total	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	3	7	10	8	30

Comment: WNV is the most widespread, locally acquired mosquito-borne disease in Nebraska. The state has one of the highest incidences of WNV in the U.S. and the virus is highly endemic to the state. **Fifty-seven human clinical cases have been reported in Nebraska residents to date along with 30 positive asymptomatic human blood donors.** Additionally, **67 positive WNV mosquito pools have been detected indicating WNV continues to circulate in the environment.** Overall WNV risk is typically highest during the month of August and will begin to decline as we go through the month of September. However, there will still be some risk to becoming infected with WNV until the first hard frost of the season takes care of the mosquito activity. It is important to note that there are many factors that come into play in determining an individual person's risk of acquiring WNV and other mosquito-borne diseases. **Low WNV activity or no WNV activity detected DOES NOT mean NO RISK!** For travel related mosquito-borne diseases (confirmed and probable cases), three cases of malaria (South Sudan= 1 and Togo= 2) and one case of dengue (Thailand= 1) have been reported this year. Anytime mosquitoes are active there is always the possibility of acquiring WNV or another mosquito-borne disease and proper mosquito prevention methods should be utilized both here at home and when traveling abroad. Examples include:

- Applying an EPA approved mosquito repellent (DEET, picaridin, oil of lemon eucalyptus, or IR3535).
- Limiting exposure when outdoors by wearing long sleeve shirts and pants.
- Limiting time spent outdoors when mosquitoes are most active, typically dusk to midnight.
- Getting rid of standing water that mosquitoes may breed in at least once a week. Remember to change water in outdoor pet watering dishes along with bird baths and dump out water in flower pots, garden containers, or other objects that may hold water.

For more information on mosquito-borne diseases and prevention information please visit the following websites:

<http://dhhs.ne.gov/wnv> (Nebraska Department of Health and Human Services WNV Surveillance Program web site).

<http://dhhs.ne.gov/publichealth/EPI/Pages/Mosquito-borne.aspx> (Nebraska Department of Health and Human Services Mosquito-Borne Disease web site and links to downloadable educational pamphlets).

<https://www.cdc.gov/westnile/> (CDC West Nile Virus web site).

<https://www.cdc.gov/sle/> (CDC St. Louis Encephalitis Virus web site).

<https://www.cdc.gov/chikungunya/index.html> (CDC Chikungunya Virus web site).

<https://www.cdc.gov/dengue/index.html> (CDC Dengue Virus web site).

<https://www.cdc.gov/zika/index.html> (CDC Zika Virus web site).

<https://www.cdc.gov/parasites/malaria/index.html> (CDC Malaria web site).

<https://www.cdc.gov/features/stopmosquitoes/index.html> (CDC Avoid Mosquito Bites web site).

MOSQUITO RESULTS

The Nebraska CDC light trap network consists of 143 traps set across the state to monitor mosquito populations and test for the presence of arboviruses circulating in the state's mosquito populations.

Total mosquito and *Culex* mosquito counts from CDC light traps are described in relative terms based on individual historical county data and are depicted in the tables below:

0 to 40th percentile	41st to 60th percentile	61st to 80th percentile	81st to 97th percentile	>97th percentile
Low	Mod.	High	Very High	Extremely High

The individual county mosquito trapping data for the final trap period can be found on pg. 23-24.

Table 7. Nebraska CDC Light Trap Network Mosquito Results, 2018

CDC Weeks 33/34		
Region/County	Total Mosquito	Total Culex
West Region	189.75	90.19
Box Butte	77.33	59.33
Chase	8.67	7.67
Cherry	148.50	113.67
Dawes	239.00	59.83
Garden	316.17	188.50
Lincoln	337.50	90.50
Red Willow	110.33	19.50
Scotts Bluff	280.50	182.50
CDC Weeks 33/34		
Region/County	Total Mosquito	Total Culex
Central Region	117.96	90.67
Adams	44.33	43.00
Buffalo	10.67	5.83

Dawson	147.33	146.50
Garfield	157.33	117.00
Hall	89.67	77.83
Holt	396.33	263.50
Phelps	38.67	35.33
Webster	22.50	12.50
CDC Weeks 33/34		
Region/County	Total Mosquito	Total Culex
East Region	85.00	60.83
Dixon	120.00	102.00
Dodge	36.20	28.80
Douglas	44.00	35.83
Gage	37.00	21.00
Jefferson	145.50	111.25
Lancaster	44.17	17.33
Madison	88.00	18.17
Platte	107.00	72.20
Richardson	78.83	73.67
Seward	58.00	58.00
Wayne	165.33	151.00
York	264.00	241.00

Each county or region represents the average for all CDC light trapping sites in that county or region. ND= No Data.

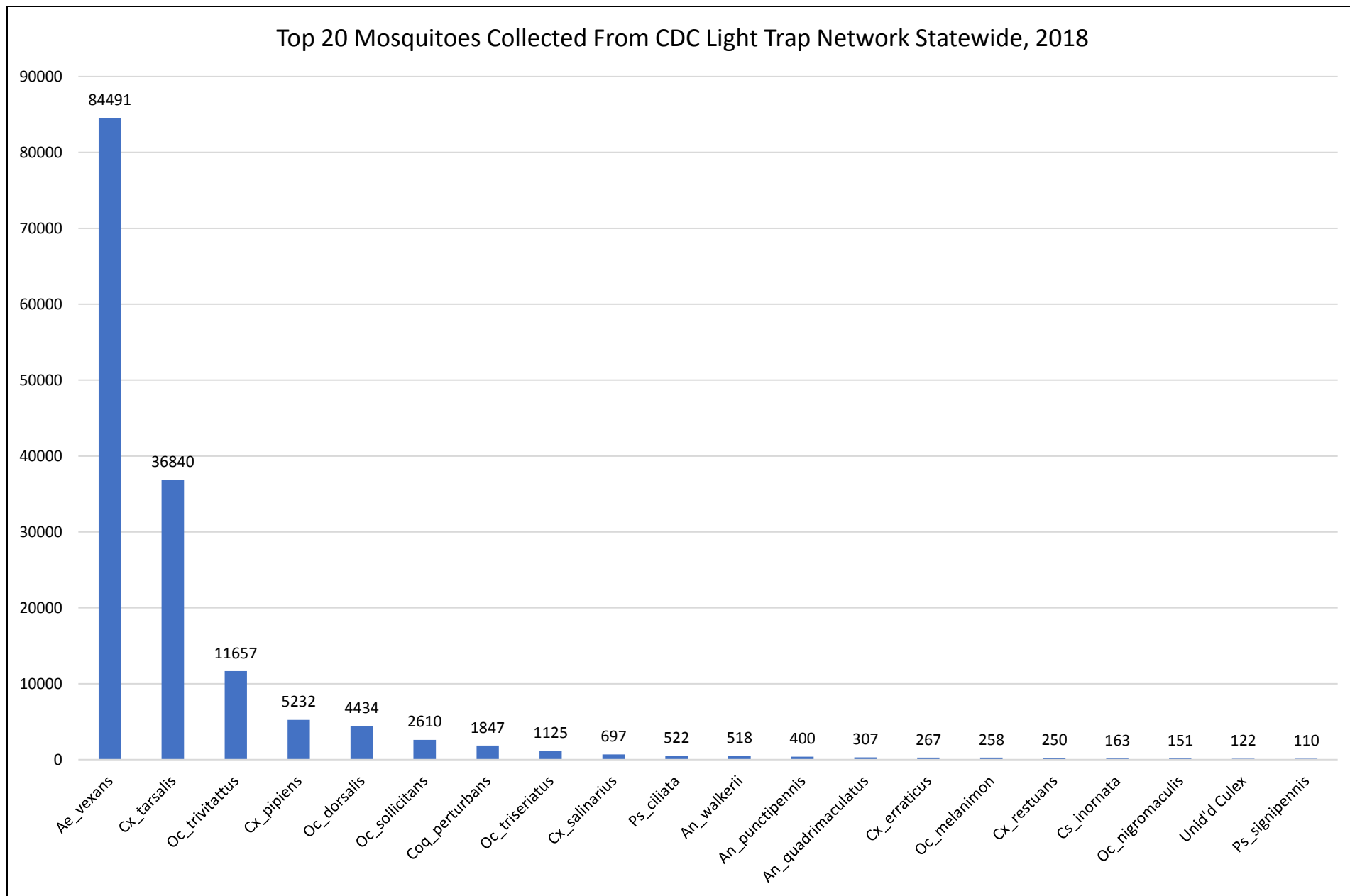


Figure 8. Top 20 cumulative mosquitoes collected statewide from CDC light trap network, 2018. Note that the first part of the mosquito species name has been abbreviated. Ae= *Aedes*, An= *Anopheles*, Cs= *Culex*, Cx= *Culex*, Oc= *Ochlerotatus*, Ps= *Psorophora*, Unid'd= Unidentified.

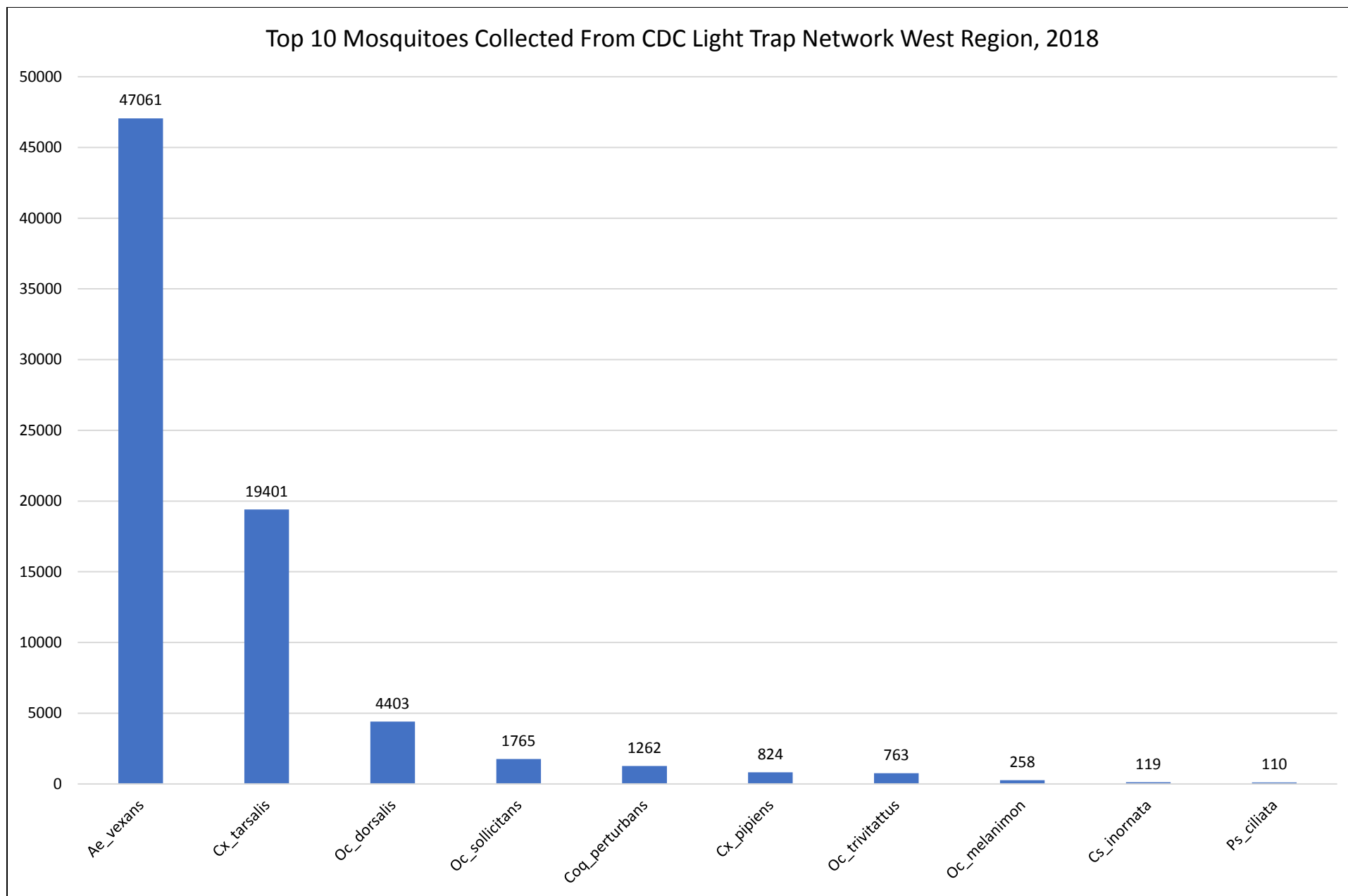


Figure 9. Top 10 cumulative mosquitoes collected in West region of the state from CDC light trap network, 2018. Note that the first part of the mosquito species name has been abbreviated. Ae= *Aedes*, An= *Anopheles*, Cs= *Culex*, Cx= *Culex*, Oc= *Ochlerotatus*, Ps= *Psorophora*, and Unid'd= Unidentified.

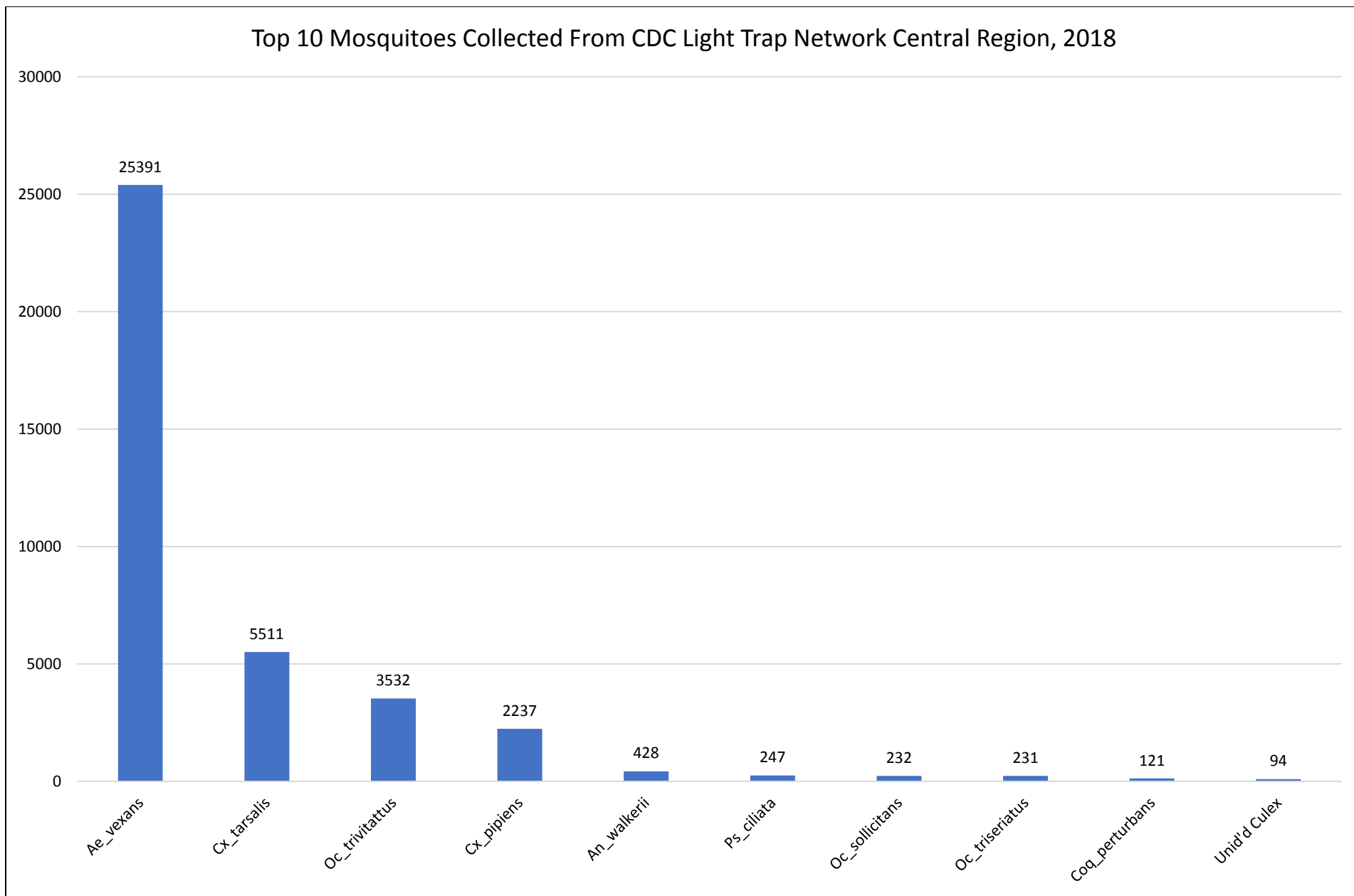


Figure 10. Top 10 cumulative mosquitoes collected in Central region of the state from CDC light trap network, 2018. Note that the first part of the mosquito species name has been abbreviated. Ae= *Aedes*, An= *Anopheles*, Cs= *Culex*, Cx= *Culex*, Oc= *Ochlerotatus*, Ps= *Psorophora*, and Unid'd= Unidentified.

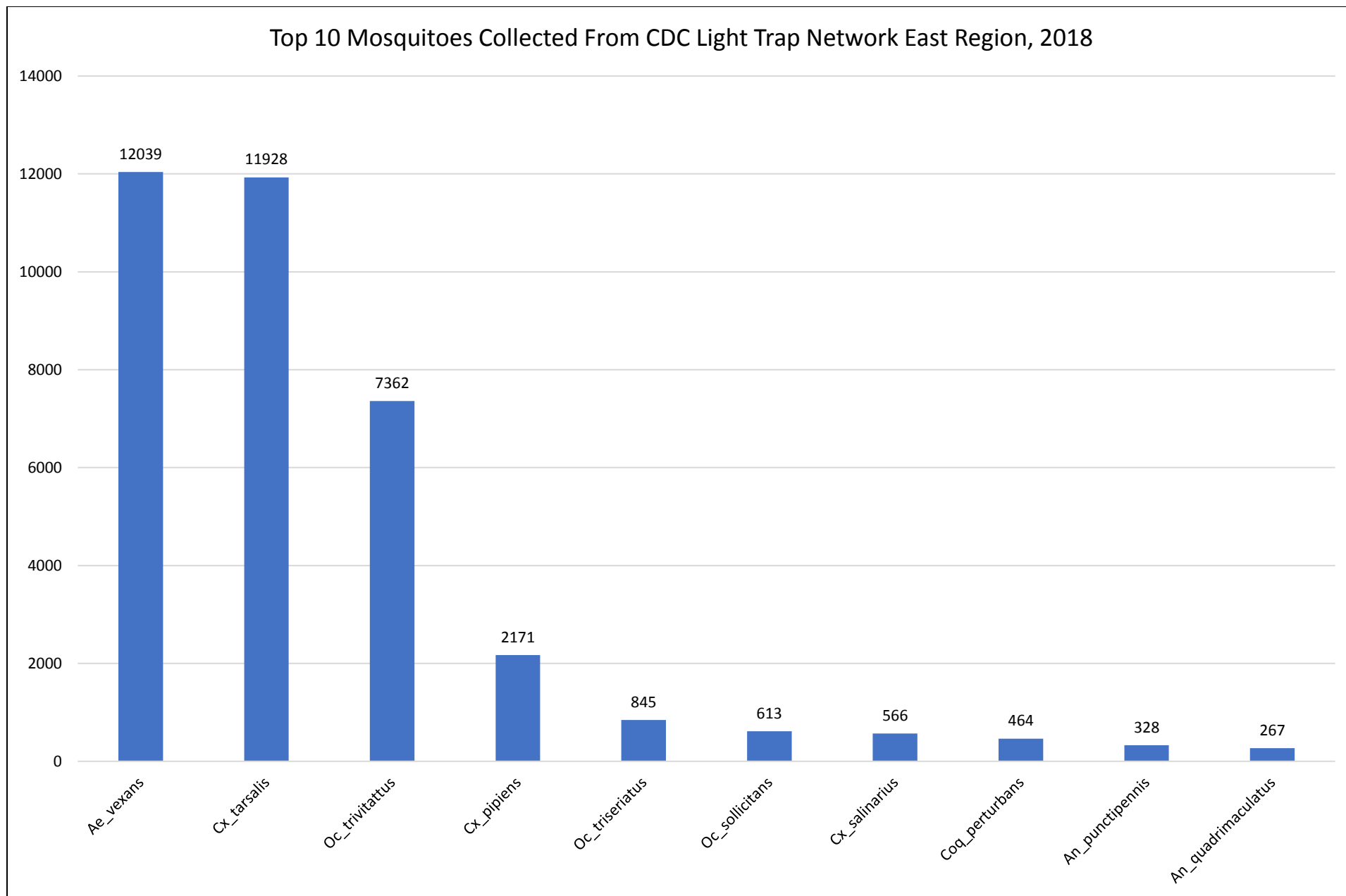


Figure 11. Top 10 cumulative mosquitoes collected in East region of the state from CDC light trap network, 2018. Note that the first part of the mosquito species name has been abbreviated. Ae= *Aedes*, An= *Anopheles*, Cs= *Culex*, Cx= *Culex*, Oc= *Ochlerotatus*, Ps= *Psorophora*, and Unid'd= Unidentified.

The Nebraska BG Sentinel 2 trap network was established to better survey areas of eastern and southeastern Nebraska for the presence of the invasive *Aedes albopictus* (Asian tiger) mosquito. During the season, four local health departments will participate in this trap network including: Douglas County Health Dept., Lincoln-Lancaster Health Dept., Sarpy-Cass Health Dept., and Southeast District Health Dept. For the season, counting all trap sites and types (CDC light and BG sentinel 2) from across the state, a total of 145,210 mosquitoes were captured with 133 (0.092%) *Aedes albopictus* collected.

Table 8. Cumulative Trap Collections in Counties Performing BG Sentinel 2 Trapping, 2018.

County	Trap Type	Total Mosquitoes	Total Culex	Total Ae_albopictus
Cass	CDC Light	NA	NA	NA
	BG Sentinel 2	3	2	0
Cass Co. Overall Total		3	2	0
Douglas	CDC Light	7616	4255	0
	BG Sentinel 2	1086	360	0
Douglas Co. Overall Total		8702	4615	0
Lancaster	CDC Light	2727	594	0
	BG Sentinel 2	201	92	0
Lancaster Co. Overall Total		2928	686	0
Nemaha	CDC Light	NA	NA	NA
	BG Sentinel 2	8	7	0
Nemaha Co. Overall Total		8	7	0
Otoe	CDC Light	NA	NA	NA
	BG Sentinel 2	1	0	0
Otoe Co. Overall Total		1	0	0
Richardson	CDC Light	1791	1121	104
	BG Sentinel 2	153	83	58
Richardson Co. Overall Total		1944	1204	162
Sarpy	CDC Light	NA	NA	NA
	BG Sentinel 2	89	79	0
Sarpy Co. Overall Total		89	79	0

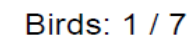
Overall Total		13675	6593	162
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Note: ND= No data, NA = Not applicable.

Bird and Equine Surveillance

Dead bird reporting: For the season, 130 dead birds have been reported to the Nebraska DHHS dead bird database. Of these, seven have met the established criteria for WNV testing. One WNV positive has been reported from Douglas County (see Figure 11 below). Additionally, four have been negative and two were unsuitable for testing.

As of August 31



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Equine surveillance: For the season no equine WNV case has been reported to the Nebraska DHHS.



Fight the Bite!!