

NEBRASKA ARBOVIRUS SURVEILLANCE AND MOSQUITO MONITORING PROGRAM 2018 UPDATE #10

Date: 08/17/2018. Please note that mosquito collection data covers dates 07/29/2018 to 08/11/2018 (CDC Weeks 31 and 32). 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 07/13/2018 to 08/11/2018), precipitation has been above normal over a large swath of the north central and western Nebraska with some areas seeing >200% of normal precipitation. Areas in east central, south central, and southeastern Nebraska saw below normal moisture amounts. Cumulative rainfall during this timeframe ranged from 1.0 to ≥9.0 inches across the state. The heavier amounts were located primarily in north central, southwest, and west central Nebraska. Average temperatures for the last 30 days (date ending 08/11/2018) were below normal over most of the state. Per the United States Drought Monitor, abnormally dry conditions and moderate drought conditions increased 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 again but were still “moderate” based on historical data from regional traps. *Culex tarsalis* (primary vectors of West Nile virus) counts made up the majority of trap collections (34.8%) in the region. *Culex* mosquito counts decrease significantly but are still “high” based upon historical regional data. Individual county collections ranged from “low” to “extremely high”. Twenty-eight 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 “high” based on historical data. Overall mosquito numbers increased compared to the previous update but remained “low”. *Aedes vexans* was the most collected mosquito (32.0%) from region traps. *Culex* mosquito counts increased to “high” levels based upon historical regional data, with individual counties

ranging from “low” to “very high” based upon their historical data. *Culex pipiens* (another WNV vector) made up the majority of the collected *Culex*, accounting for 48.6% of collected *Culex* over the sampling period. 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 and were considered “moderate”. *Aedes vexans* was the most abundant mosquito collected in CDC light traps (46.1%). *Culex* mosquito counts decreased 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 **WNV activity in mosquitoes has slowed somewhat but positive pools were still being detected in samples. Eighteen positive WNV pools have been detected** over the last two weeks. The continued detection of WNV positive mosquito pools demonstrates that WNV is still circulating in the environment. To date 1,483 *Culex* pools have been tested with **46 WNV positives detected to date**. There are remaining mosquito pools to be tested and the number of positive pools may change. The current WNV cumulative statewide minimum mosquito infection rate increased (1.45/1,000 *Culex*) and is just below the 10-year median (1.48/1,000 *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 127 birds have been reported. Of the 127 birds reported, 12 have been a corvid birds (bird group most heavily impacted by WNV and includes: blue jays, crows, and magpies). **The first WNV positive bird of the season has also been detected in a bird submitted from Douglas County.** Of the six birds reported who have met criteria for WNV testing, three were negative, one bird unsuitable for testing, one was positive, and one test result is pending.
- **Equine Surveillance:** Currently no equine cases of WNV have been reported for the season.
- **Human Mosquito-borne Disease Cases: Fifteen human clinical WNV cases** have currently been reported along with **11 asymptomatic human blood donors** in Nebraska residents. Additionally, a total of four 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 with 15 now reported in Nebraska residents to date, seven of which were the neuroinvasive form. Additionally, asymptomatic human blood donors also increased with 11 now reported. Furthermore, 46 WNV mosquito pools have been detected from mosquito samples. With Human WNV cases and 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 the historically highest risk month of the season (August). 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 with the statewide average seeing “moderate” counts when compared to historical data, averaging 121.76 total mosquitoes per trap night. The most abundant mosquito collected over the two week sampling period was *Aedes vexans* (inland floodwater mosquito), accounting for 32.4% of trap collections. *Culex* mosquito counts statewide decreased significantly to “moderate” numbers based on historical data, averaging 50.86 *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.

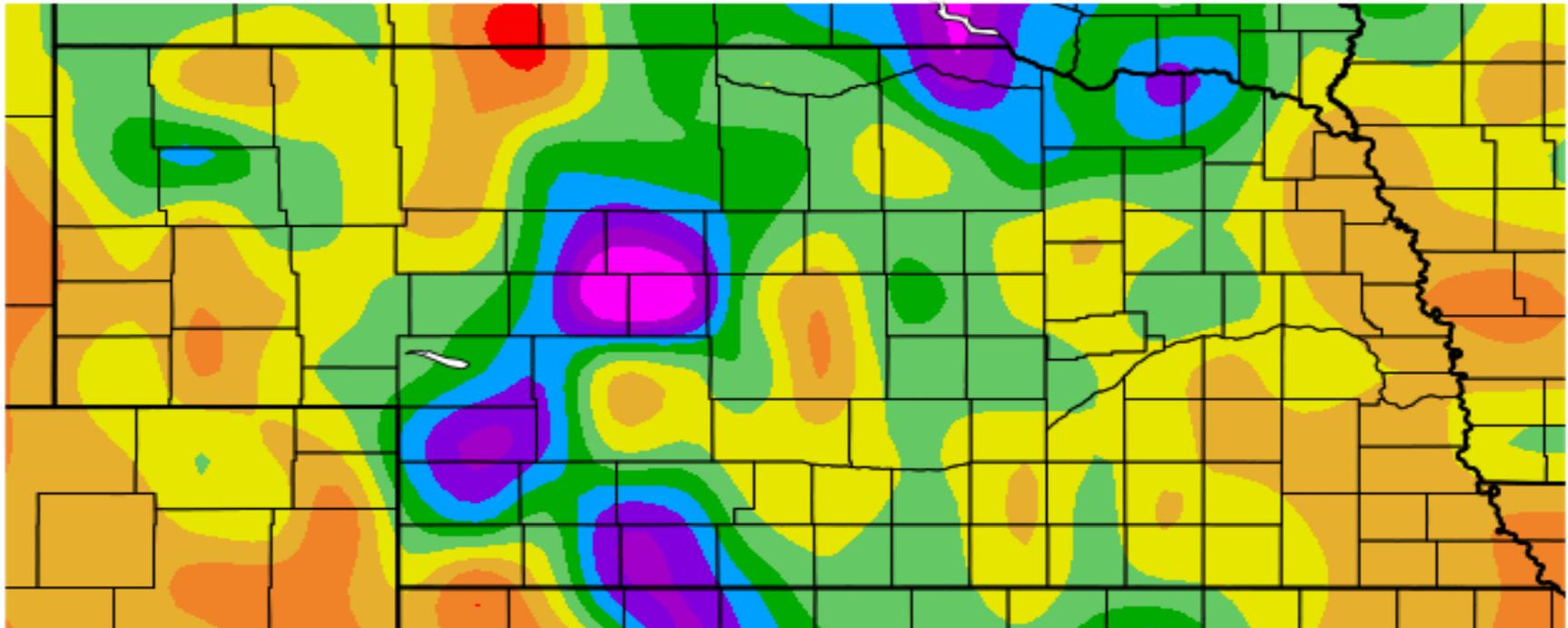
Rainfall and Temperature

Rainfall across Nebraska over the last 30 days (07/13/2018 to 08/11/2018) ranged from 01.0 to ≥ 9.0 inches (pg. 4) across the state. The heavier amounts were located in north central, southwest, and west central Nebraska. For the last 30 days (date ending 08/11/2018), rainfall was well above normal over a large area of north central and western Nebraska and below normal in some areas of east central, south central, and southeastern Nebraska (pg.5). Average temperatures (pg. 6) for the last 30 days were below normal over most of the state. The long range outlook (next 8 to 14 days), is predicting higher of above normal temps over most of the state. Precipitation is predicted to have a higher probability of being below normal over most of the state. 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)
7/13/2018 – 8/11/2018

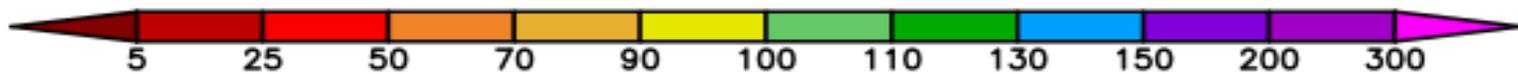
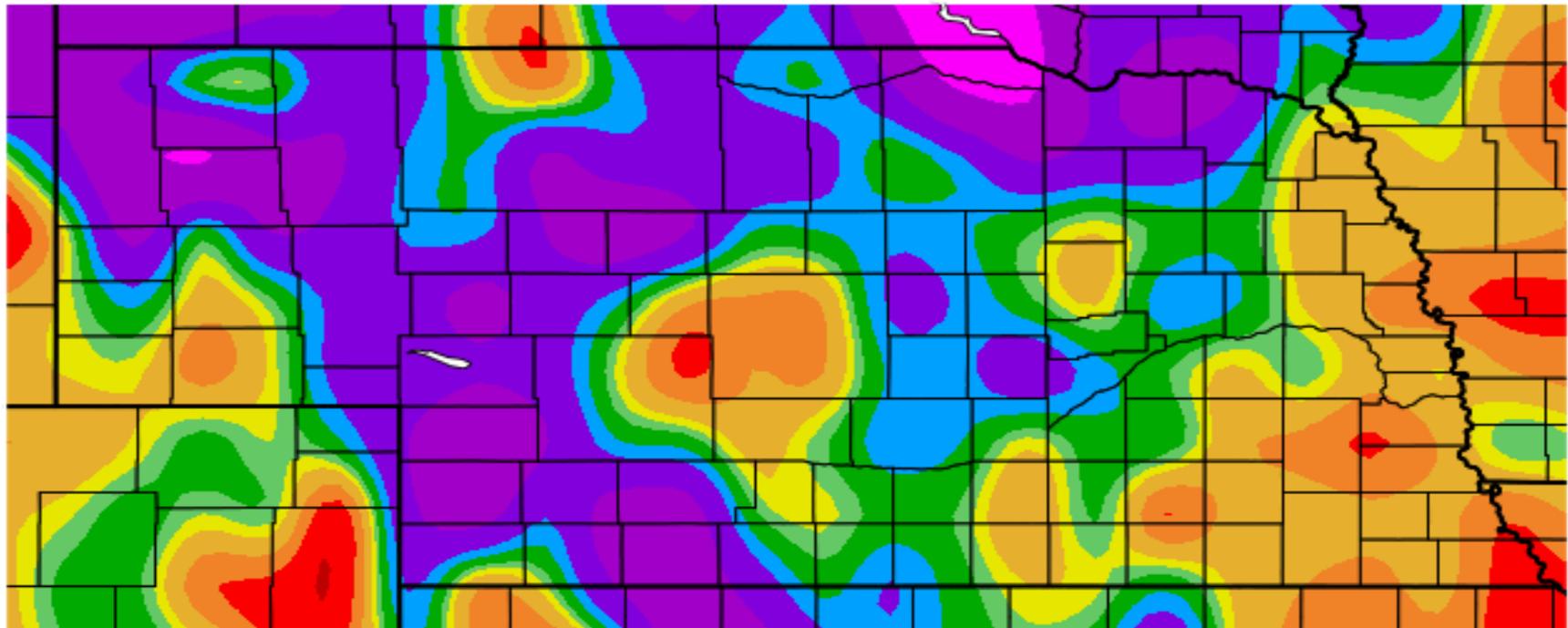


Generated 8/12/2018 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)

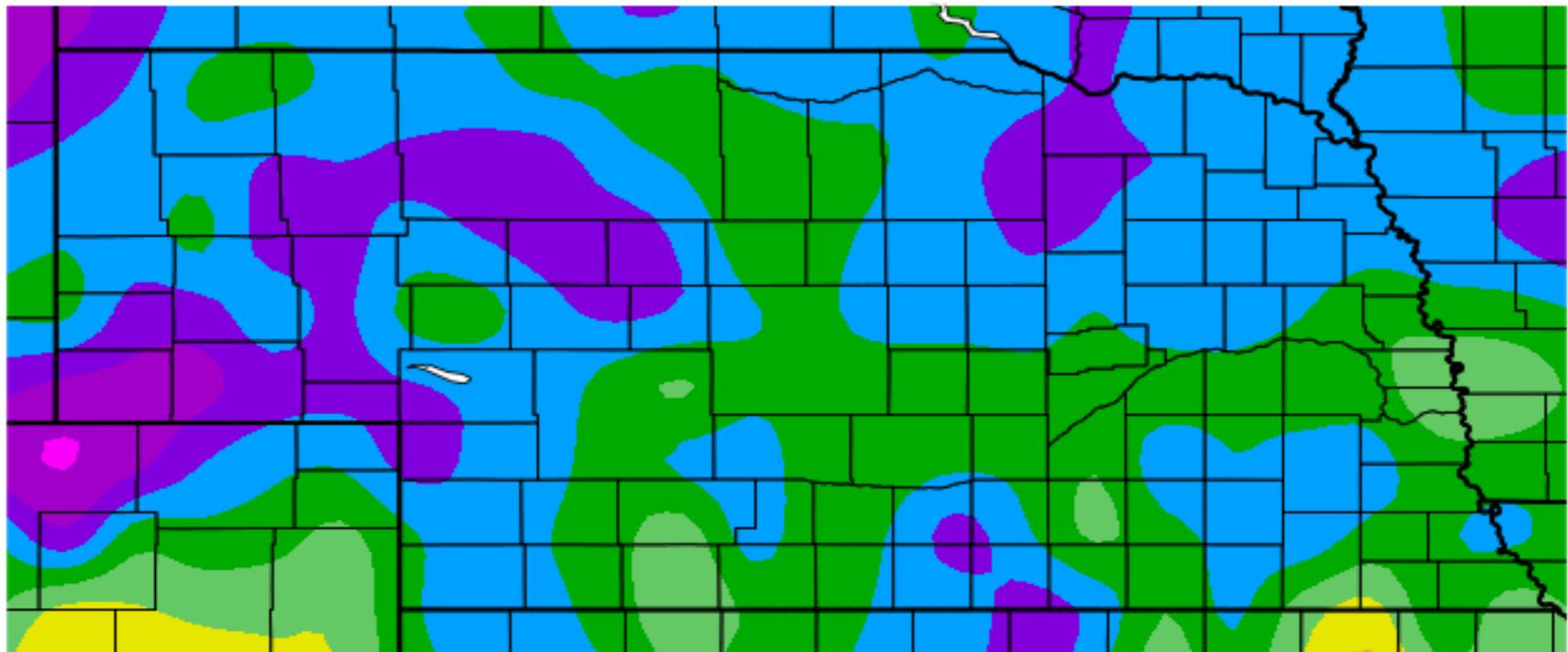
7/13/2018 – 8/11/2018



Generated 8/12/2018 at HPRCC using provisional data.

NOAA Regional Climate Centers

Departure from Normal Temperature (F) 7/13/2018 – 8/11/2018



Generated 8/12/2018 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 08/14/2018) showed abnormally dry condition in portions of south central and southeast Nebraska. Approximately 90.64% of the state is being reported with no drought or abnormally dry conditions, a decrease compared to last week. Currently the land area in the state encompassing abnormal dryness is approximately 5.79% (increase) and moderate drought around 3.12% (increase) of the state area. Additionally, a small area of severe drought (.45%) has developed in far southeastern Nebraska. Last year at this time, 23.25% of the state area reported no drought or abnormally dry conditions per the drought monitor. The current monthly drought outlook for July can be found on page nine. For more information please visit the links below:

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

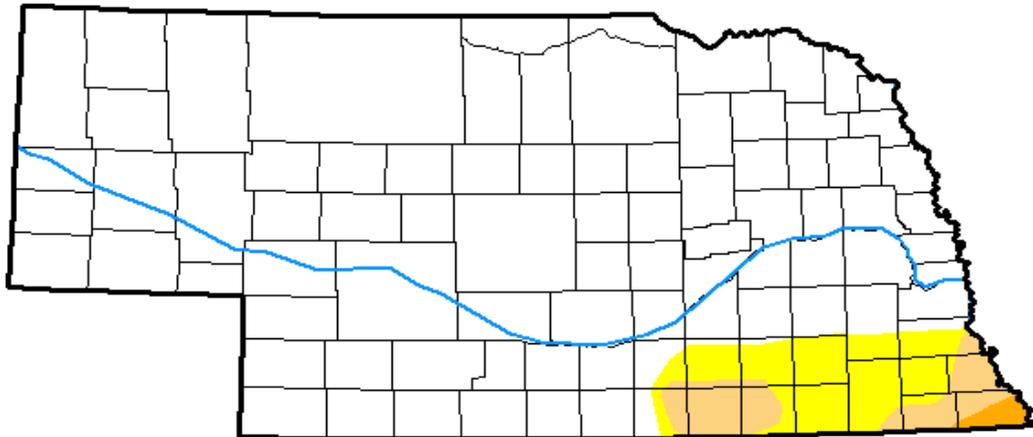
http://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_summary.php (U.S. Monthly Drought Outlook).

U.S. Drought Monitor Nebraska

August 14, 2018
(Released Thursday, Aug. 16, 2018)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

| | None | D0 | D1 | D2 | D3 | D4 |
|--|-------|-------|-------|------|------|------|
| Current | 90.64 | 5.79 | 3.12 | 0.45 | 0.00 | 0.00 |
| Last Week <i>08-07-2018</i> | 94.36 | 4.59 | 0.60 | 0.45 | 0.00 | 0.00 |
| 3 Months Ago <i>05-15-2018</i> | 77.43 | 20.70 | 1.88 | 0.00 | 0.00 | 0.00 |
| Start of Calendar Year <i>01-02-2018</i> | 9.32 | 88.65 | 2.03 | 0.00 | 0.00 | 0.00 |
| Start of Water Year <i>09-26-2017</i> | 82.67 | 13.32 | 4.01 | 0.00 | 0.00 | 0.00 |
| One Year Ago <i>08-15-2017</i> | 23.25 | 55.94 | 17.83 | 2.98 | 0.00 | 0.00 |



Intensity:

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

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

Author:

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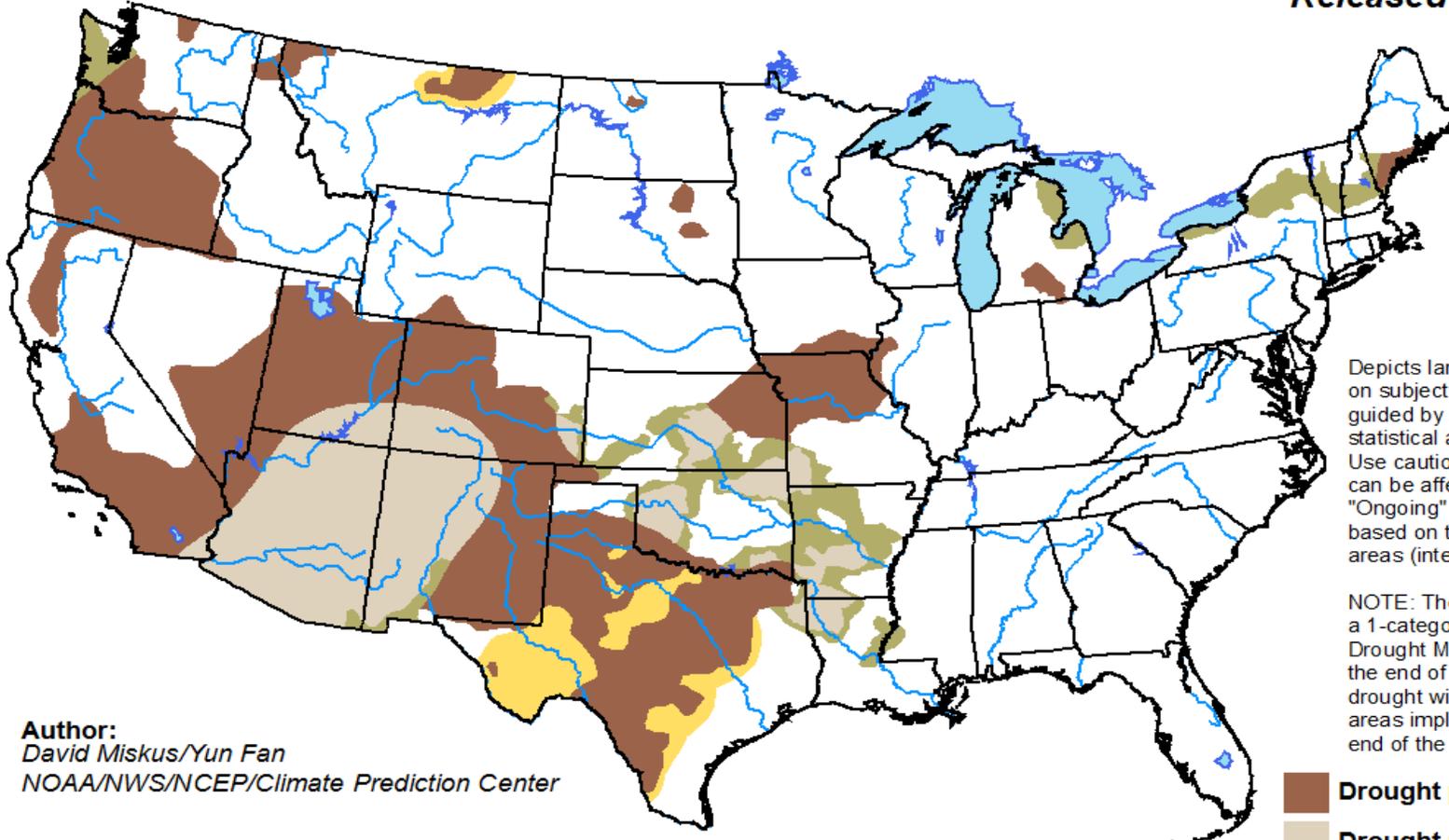


<http://droughtmonitor.unl.edu/>

U.S. Monthly Drought Outlook

Drought Tendency During the Valid Period

Valid for August 2018
Released July 31, 2018

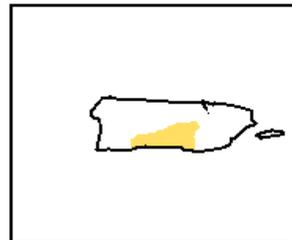
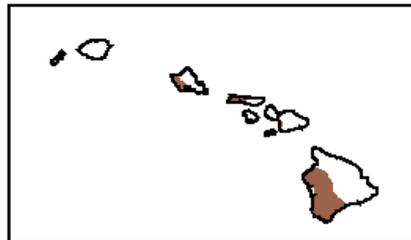
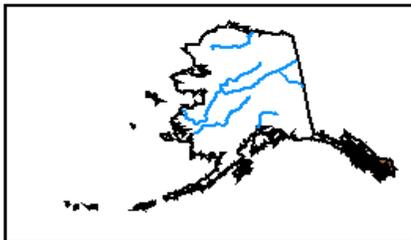


Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to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

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NOAA/NWS/NCEP/Climate Prediction Center

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



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

ARBOVIRAL DETECTIONS

To date, there has been 46 positive arbovirus positive mosquito pools detected in 14 different counties. All 46 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 1.45 which is slightly below the 10-year median of 1.48 for this time of year.

Table 1. Arboviral Detections

| Date Collected | County | Mosquito Species | Virus |
|----------------|------------|-----------------------|-------|
| 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 | 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 |

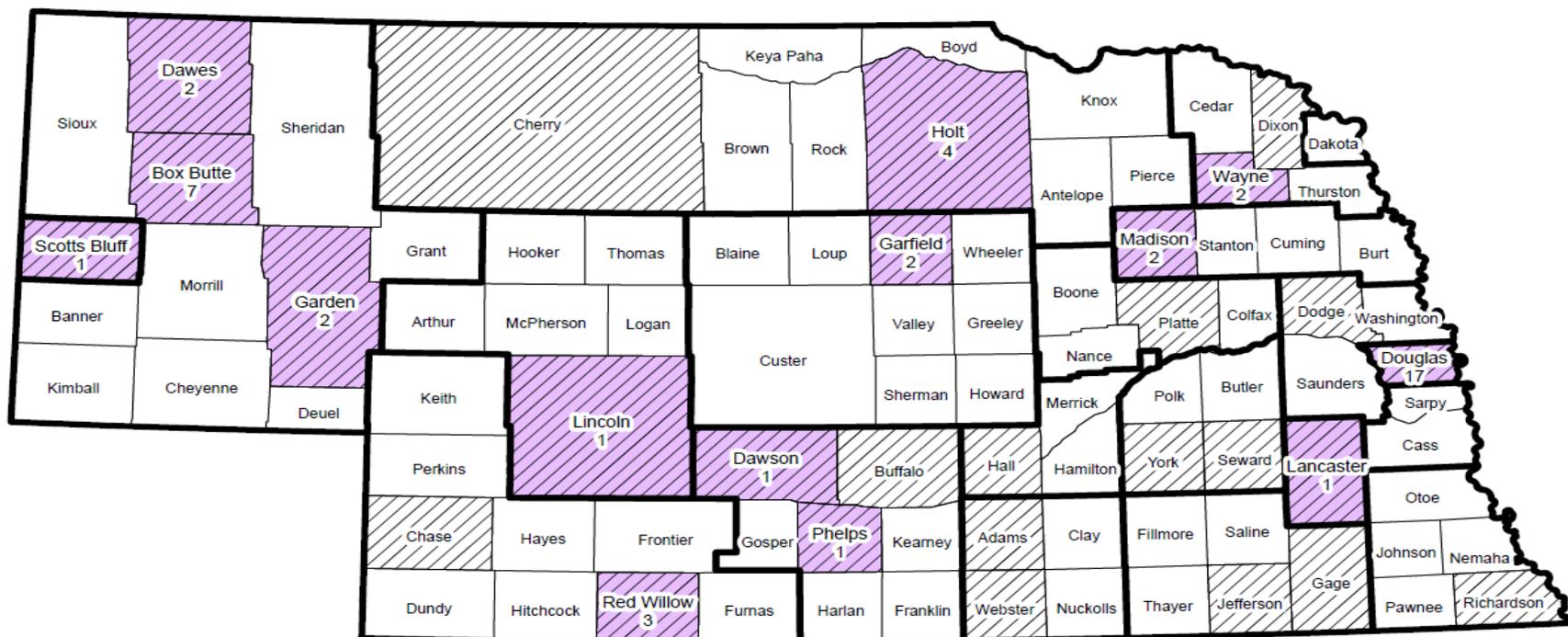
Table 2. Arboviral Detections Summary Table.

| 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 | 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 |
| 8/1/2018 | Red Willow | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 8/1/2018 | Red Willow | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/31/2018 | Dawes | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/31/2018 | Holt | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/31/2018 | Holt | <i>Culex pipiens</i> | 1 | 0 | 0 | 1 |
| 7/31/2018 | Holt | <i>Culex pipiens</i> | 1 | 0 | 0 | 1 |
| 7/31/2018 | Holt | <i>Culex unknown</i> | 1 | 0 | 0 | 1 |
| 7/31/2018 | Wayne | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/25/2018 | Dawes | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/24/2018 | Box Butte | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/24/2018 | Box Butte | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/24/2018 | Box Butte | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/24/2018 | Dawson | <i>Culex pipiens</i> | 1 | 0 | 0 | 1 |
| 7/24/2018 | Douglas | <i>Culex pipiens</i> | 1 | 0 | 0 | 1 |
| 7/24/2018 | Douglas | <i>Culex pipiens</i> | 1 | 0 | 0 | 1 |
| 7/24/2018 | Douglas | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/24/2018 | Douglas | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/24/2018 | Douglas | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |

| | | | | | | |
|--------------|--------------|-----------------------|-----------|----------|----------|-----------|
| 7/24/2018 | Douglas | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/24/2018 | Douglas | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/24/2018 | Douglas | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/24/2018 | Douglas | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/24/2018 | Douglas | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/24/2018 | Douglas | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/24/2018 | Douglas | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/24/2018 | Douglas | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/24/2018 | Douglas | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/24/2018 | Douglas | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/24/2018 | Douglas | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/24/2018 | Madison | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/17/2018 | Garden | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/17/2018 | Scotts Bluff | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/17/2018 | Wayne | <i>Culex tarsalis</i> | 1 | 0 | 0 | 1 |
| 7/10/2018 | Box Butte | <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 |
| Total | | | 46 | 0 | 0 | 46 |

Mosquito Surveillance Nebraska CDC Light Trap Network, 2018

As of August 17



Legend

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

SLE Positive / Tested Totals

Mosquito Pools: 0 / 1483

Counties: 0 / 28

WNV Positive / Tested Totals

Mosquito Pools: 46 / 1483

Counties: 14 / 28

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

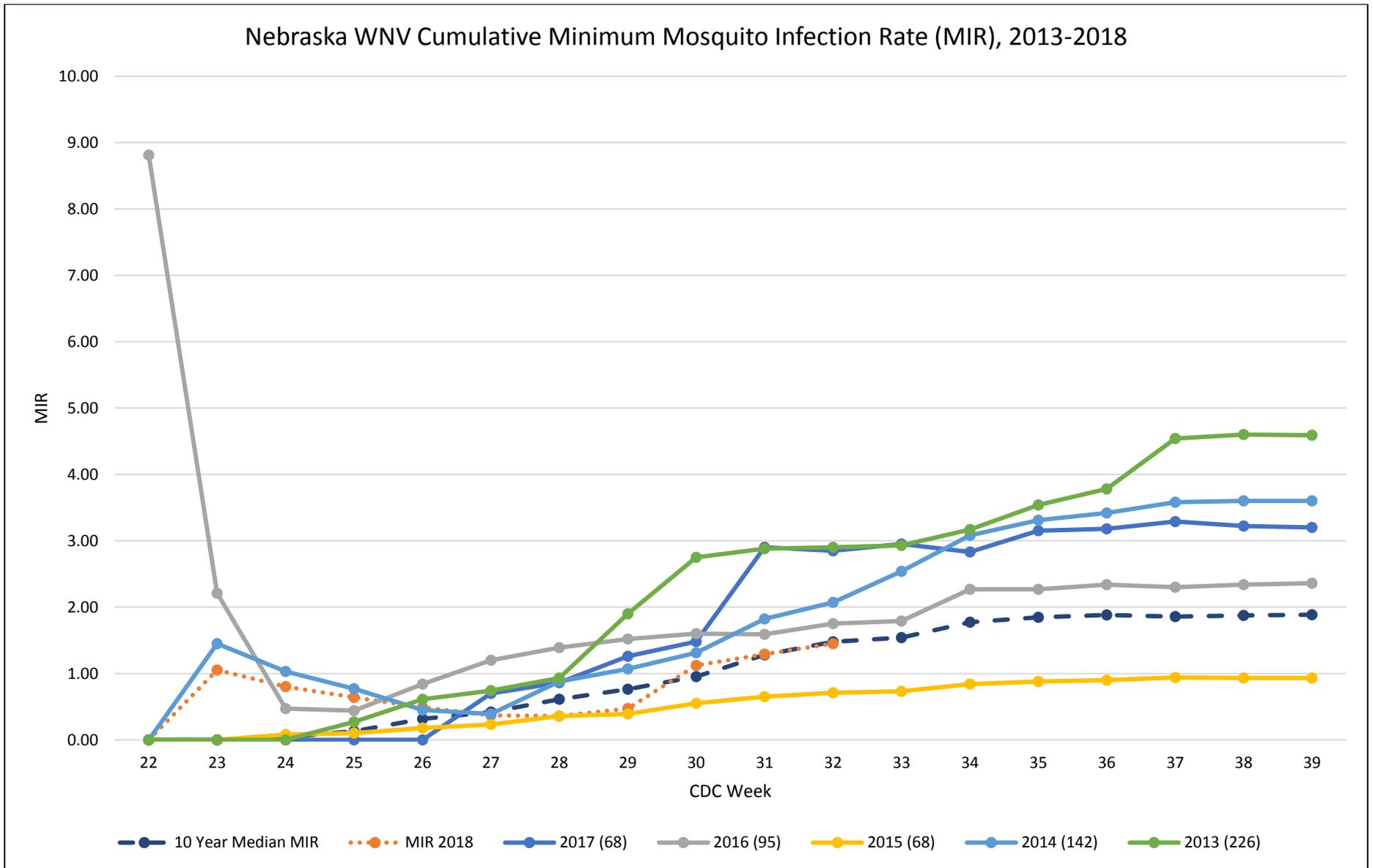


Figure 2. Weekly Nebraska WNV Mosquito Cumulative Mosquito Minimum Infection Rate, 2013-2018. At the state level, the calculated statewide MIR is strongly correlated with the number of human clinical WNV cases. As such, comparisons during the season of the weekly cumulative MIR with previous seasons' 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 | 7 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 11 |
| 33 | 18-Aug-18 | 3 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| Total | | 15 | 11 | 0 | 0 | 0 | 1 | 0 | 4 | 31 |

^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 | 0 |
| 21 to 30 | 3 |
| 31 to 40 | 2 |
| 41 to 50 | 2 |
| 51 to 60 | 4 |
| 61 to 70 | 4 |
| 71+ | 0 |
| Gender | |
| Male | 12 |
| Female | 3 |
| Diagnosis | |
| WNV Neuroinvasive Disease | 7 |
| WNV Non-Neuroinvasive Disease | 8 |
| Hospitalized | 4 |
| Death | 0 |

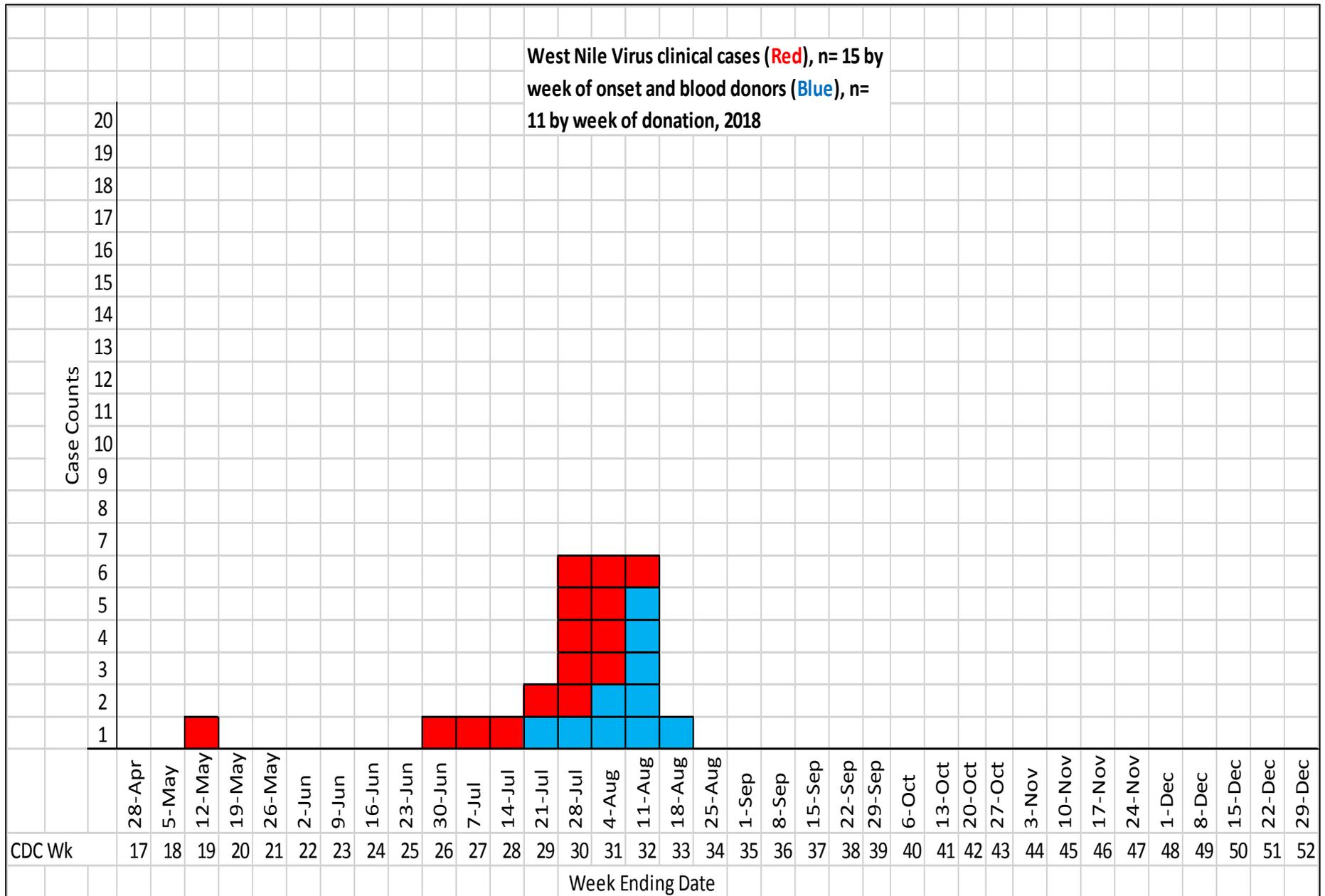


Figure 3. Epi-curve of human WNV infections (clinical and asymptomatic blood donors) by onset date, Nebraska 2018.

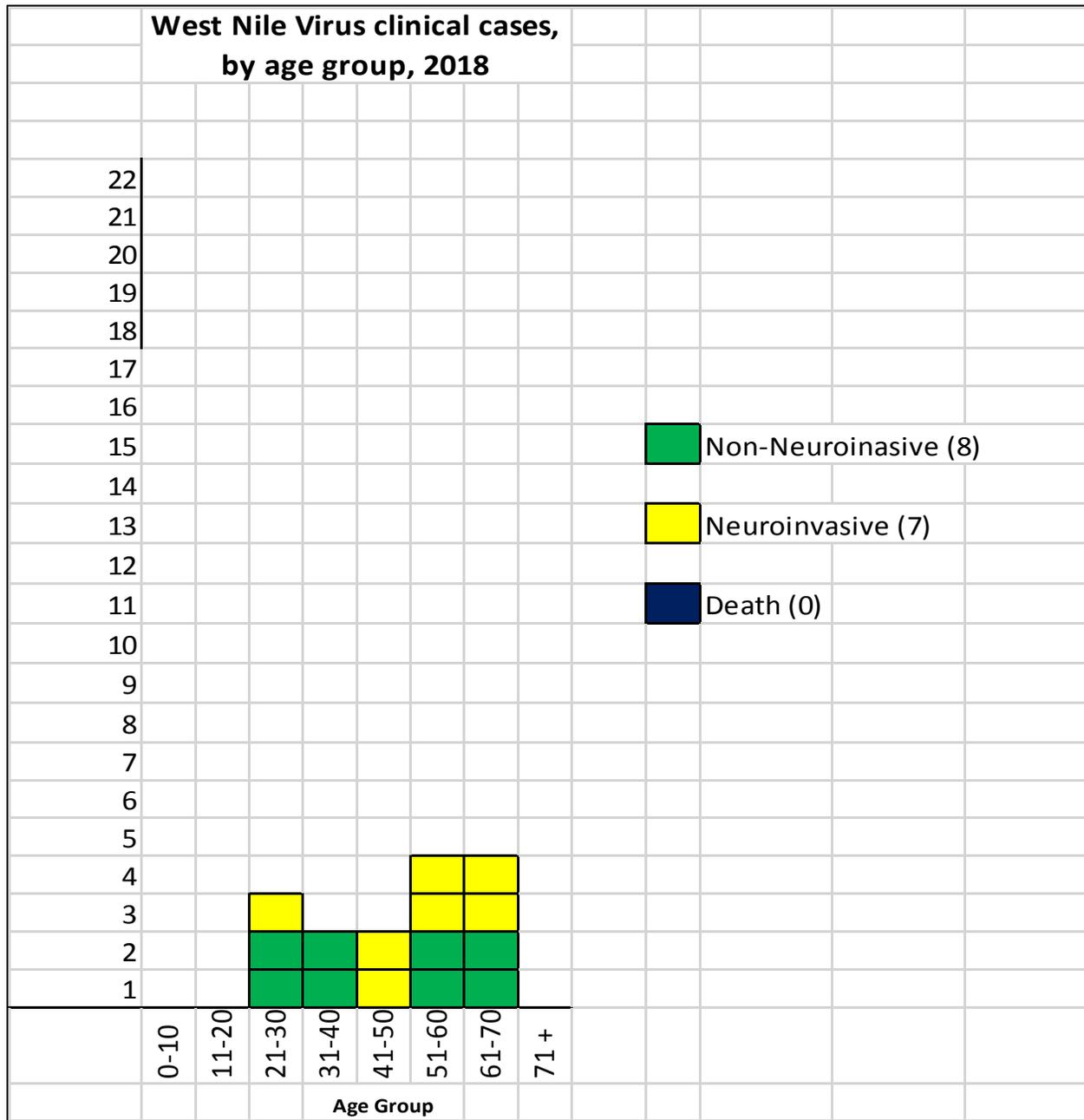


Figure 4. WNV human clinical cases by 10 year age groups, 2018.

Human Clinical Positives for West Nile Virus, Nebraska, 2018, (n = 15)

As of August 17

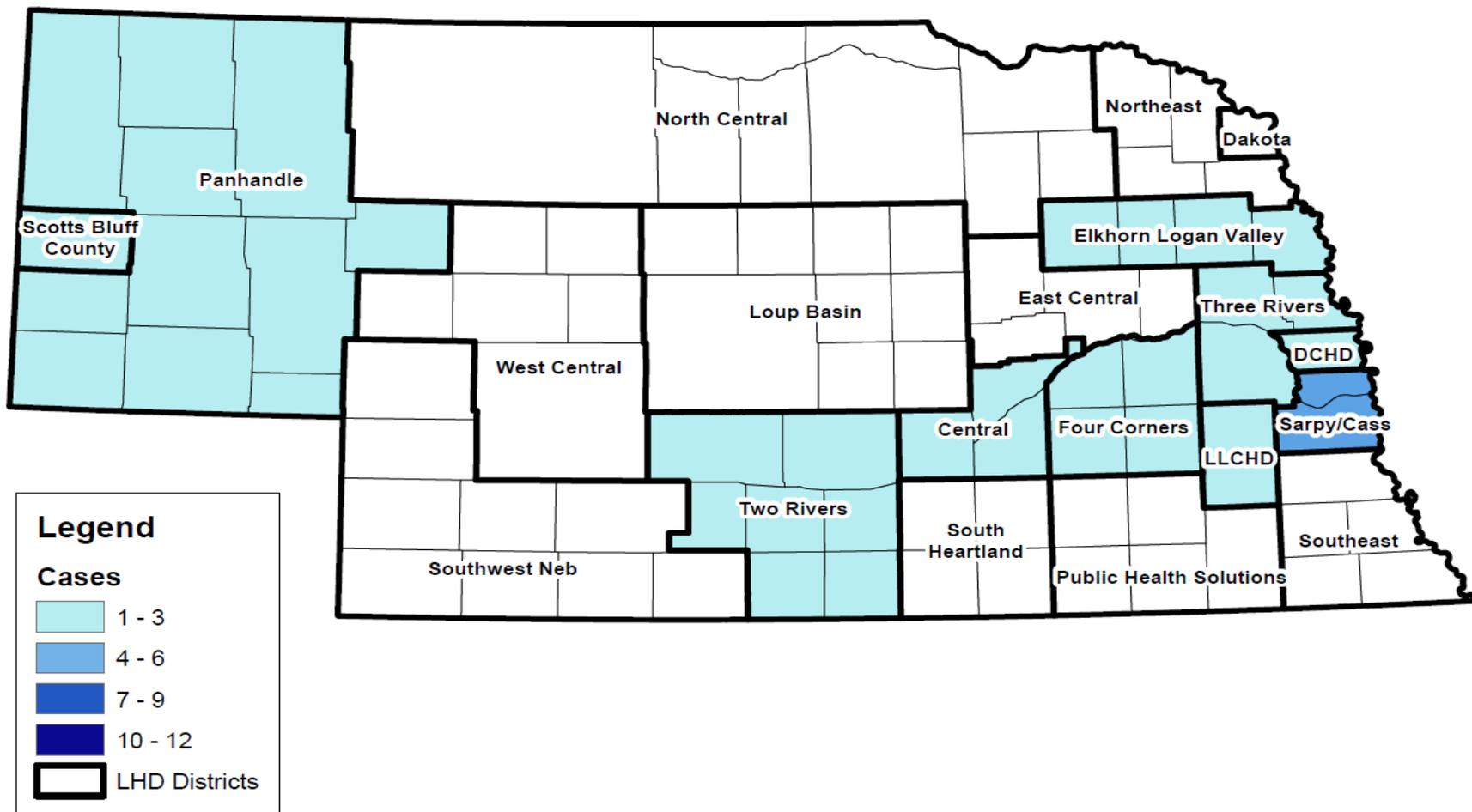


Figure 5. Nebraska human clinical WNV cases by local health jurisdiction, 2018.

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 | Total |
|---|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|--------------|
| 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 | 1 |
| Dakota County Health Dept. | 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 | 1 | 0 | 0 | 0 | 1 |
| East Central District Health Dept. | 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 | 1 | 0 | 0 | 0 | 0 | 1 |
| Four Corners Health Dept. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Lincoln-Lancaster County Health Dept. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 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 |
| North Central District Health Dept. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Northeast Nebraska Public Health Dept. | 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 | 1 |
| Public Health Solutions | 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 | 1 | 2 | 1 | 0 | 4 |
| Scotts Bluff County Health Dept. | 0 | 0 | 1 | 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 |
| Southeast District Health Dept. | 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 | 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 | 0 | 0 | 0 | 2 |
| Two Rivers Public Health Dept. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 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 |
| Statewide Total | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 5 | 4 | 1 | 0 | 15 |

Human Blood Donor Positives for West Nile Virus, Nebraska, 2018, (n = 11)

As of August 17

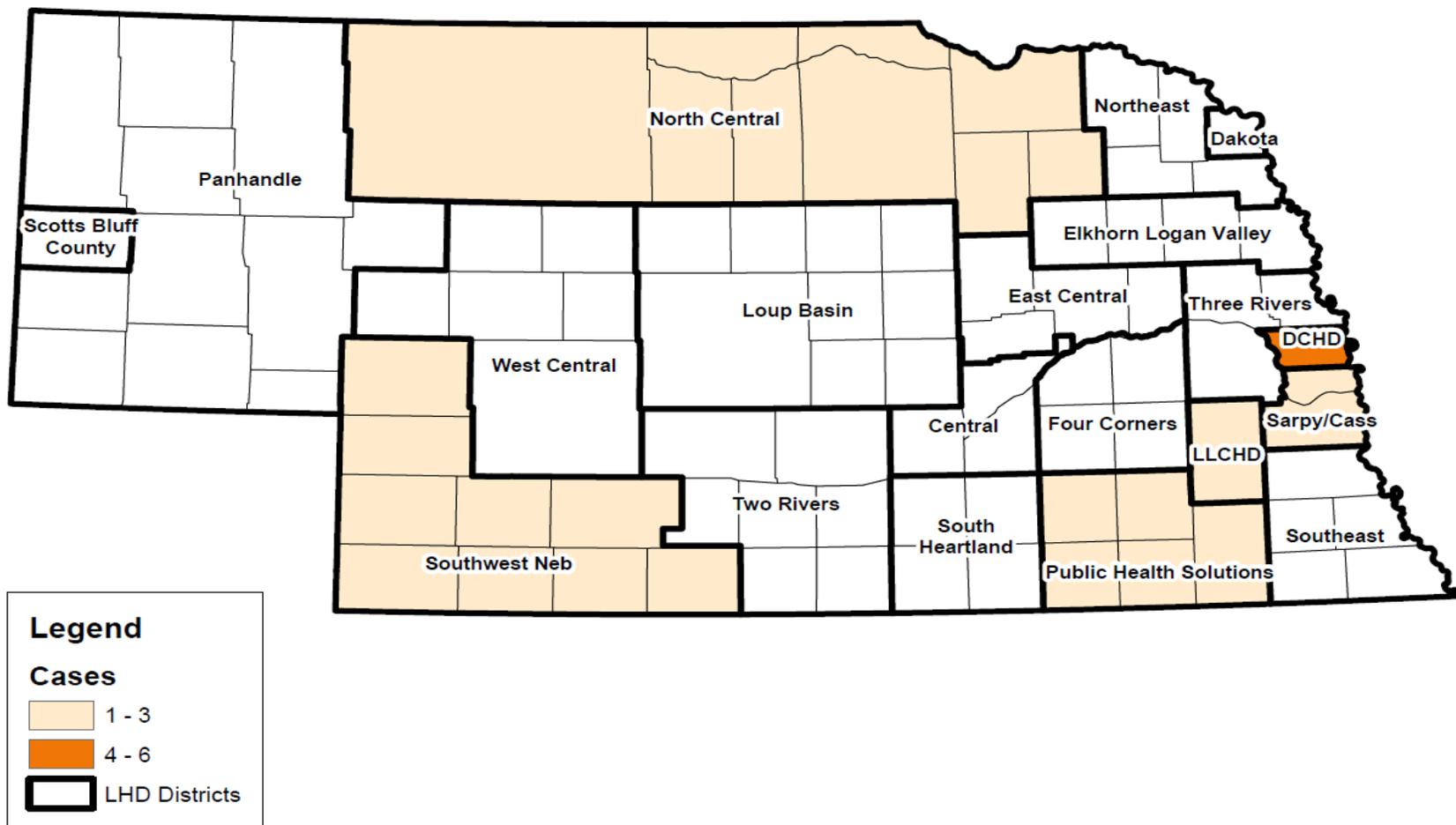


Figure 6. Nebraska asymptomatic WNV blood donors by local health jurisdiction, 2018.

Table 6. Number of Human WNV Blood Donors by Week of Donation 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 | Total | |
|---|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|--------------|----------|
| 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 |
| Dakota County Health Dept. | 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 | 0 | 0 | 2 | 2 | 4 | 0 |
| East Central District Health Dept. | 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 |
| Four Corners Health Dept. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lincoln-Lancaster County Health Dept. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| Loup Basin Public Health Dept. | 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 | 1 | 0 |
| Northeast Nebraska Public Health Dept. | 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 | 0 |
| Public Health Solutions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| Sarpy-Cass Dept. of Health and Wellness | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 |
| Scotts Bluff County Health Dept. | 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 | 0 | 0 |
| Southeast District Health Dept. | 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 | 2 | 0 |
| Three Rivers Public Health Dept. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Two Rivers Public Health Dept. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| West Central District Health Dept. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Statewide Total | 0 | 1 | 0 | 1 | 3 | 6 | 11 | 0 |

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. **Fifteen human clinical cases have been reported in Nebraska residents to date along with the 11 positive asymptomatic human blood donors.** Additionally, **46 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 in Nebraska. 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 31/32 | |
|-----------------------|--------------|-----------------|--------------|
| Region/County | | Total Mosquito | Total Culex |
| West Region | | 182.79 | 59.65 |
| | Box Butte | 152.83 | 75.33 |
| | Chase | 23.83 | 17.00 |
| | Cherry | 209.00 | 75.83 |
| | Dawes | 184.17 | 135.00 |
| | Garden | 55.67 | 41.00 |
| | Lincoln | 549.50 | 57.50 |
| | Red Willow | 57.83 | 21.00 |
| | Scotts Bluff | 259.67 | 62.17 |
| | | | |
| | | CDC Weeks 31/32 | |
| Region/County | | Total Mosquito | Total Culex |
| Central Region | | 63.98 | 35.55 |
| | Adams | 15.67 | 15.67 |
| | Buffalo | 2.83 | 2.67 |

| | | |
|----------------------|------------------------|--------------------|
| Dawson | 44.50 | 40.00 |
| Garfield | 189.33 | 76.50 |
| Hall | 6.67 | 6.17 |
| Holt | 199.17 | 120.33 |
| Phelps | 2.83 | 2.67 |
| Webster | 19.20 | 5.40 |
| | | |
| | CDC Weeks 31/32 | |
| Region/County | Total Mosquito | Total Culex |
| East Region | 113.69 | 56.10 |
| Dixon | 110.00 | 106.00 |
| Dodge | 34.60 | 27.20 |
| Douglas | 665.33 | 607.33 |
| Gage | 111.50 | 44.00 |
| Jefferson | 34.75 | 28.25 |
| Lancaster | 57.67 | 36.17 |
| Madison | 468.67 | 133.50 |
| Platte | 83.60 | 53.40 |
| Richardson | 57.33 | 31.17 |
| Seward | 5.00 | 5.00 |
| Wayne | 151.67 | 138.67 |
| York | 10.00 | 6.00 |

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

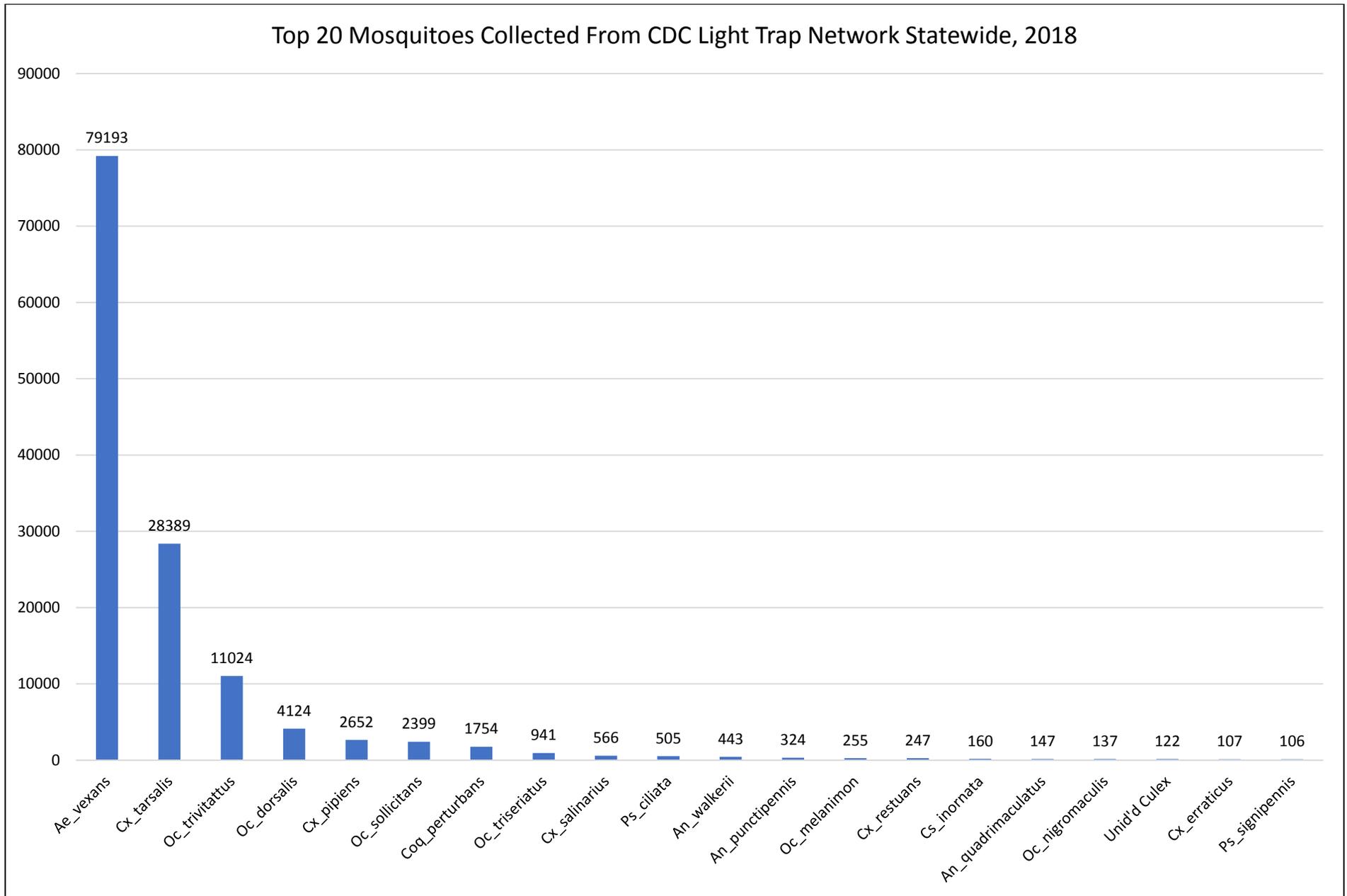


Figure 7. Top 20 cumulative mosquitoes collected statewide from CDC light trap network, 2018. Note that the first part of the mosquito species name has been abbreviated. Ae= *Aedes*, An= *Anopheles*, Cs= *Culex*, Cx= *Culex*, Oc= *Ochlerotatus*, Ps= *Psorophora*, Unid'd= Unidentified.

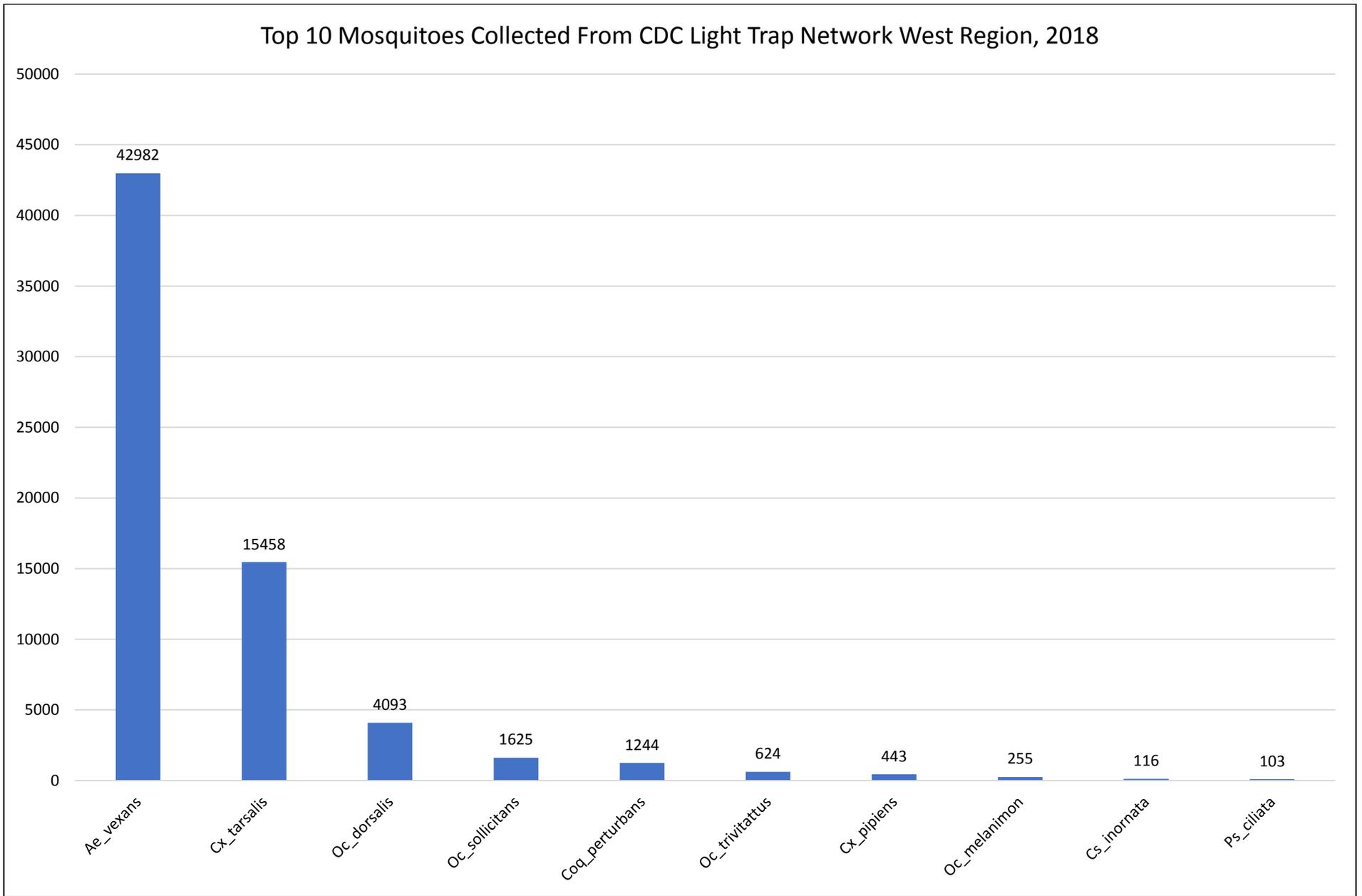


Figure 8. Top 10 cumulative mosquitoes collected in West region of the state from CDC light trap network, 2018. Note that the first part of the mosquito species name has been abbreviated. Ae= *Aedes*, An= *Anopheles*, Cs= *Culex*, Cx= *Culex*, Oc= *Ochlerotatus*, Ps= *Psorophora*, and Unid'd= Unidentified.

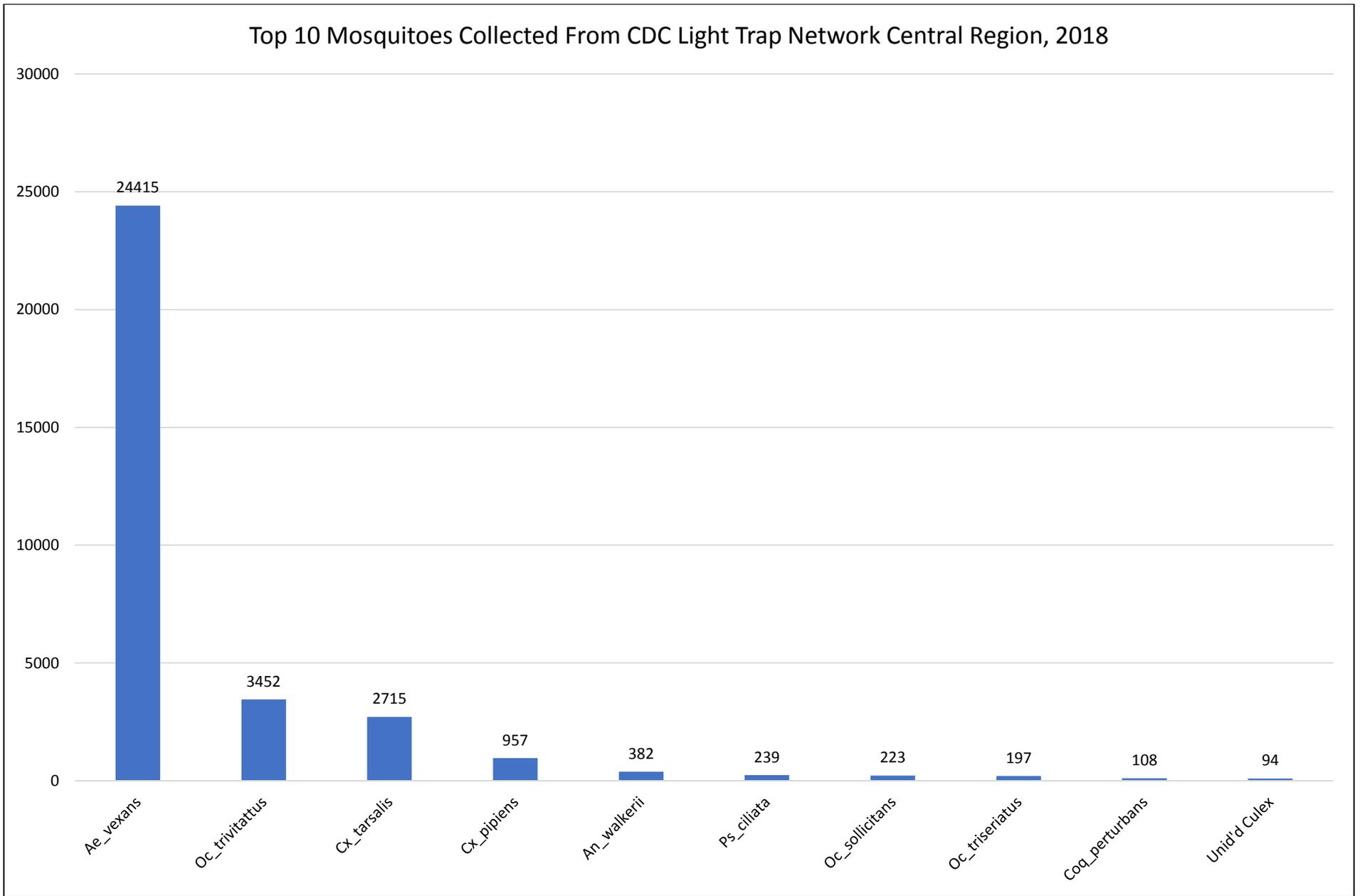


Figure 9. Top 10 cumulative mosquitoes collected in Central region of the state from CDC light trap network, 2018. Note that the first part of the mosquito species name has been abbreviated. Ae= *Aedes*, An= *Anopheles*, Cs= *Culex*, Cx= *Culex*, Oc= *Ochlerotatus*, Ps= *Psorophora*, and Unid'd= Unidentified.

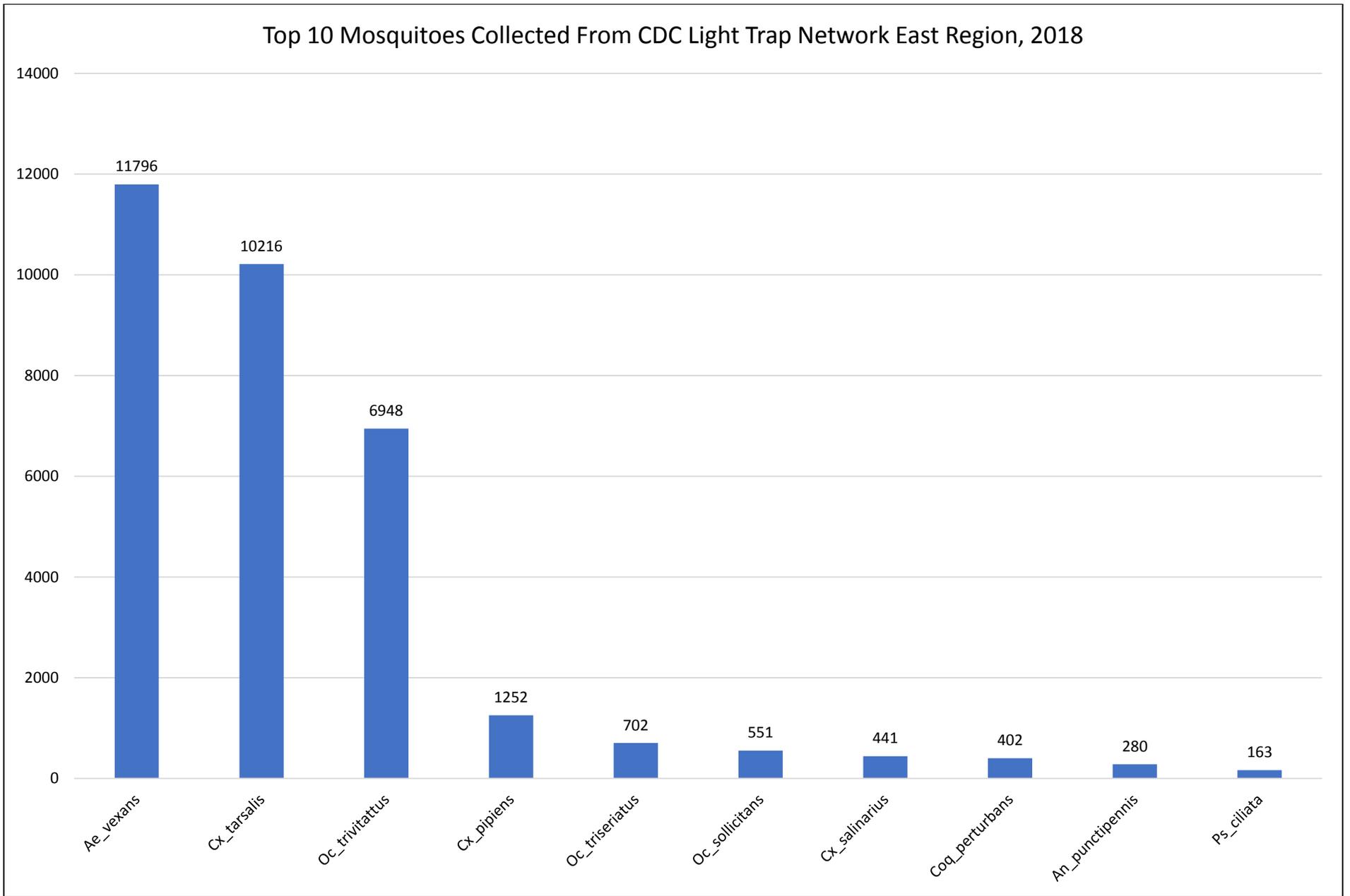


Figure 10. Top 10 cumulative mosquitoes collected in East region of the state from CDC light trap network, 2018. Note that the first part of the mosquito species name has been abbreviated. Ae= *Aedes*, An= *Anopheles*, Cs= *Culesita*, Cx= *Culex*, Oc= *Ochlerotatus*, Ps= *Psorophora*, and Unid'd= Unidentified.

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 135,515 mosquitoes were captured with 133 (0.098%) *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 | 7352 | 4040 | 0 |
| | BG Sentinel 2 | 1053 | 333 | 0 |
| Douglas Co. Overall Total | | 8405 | 4373 | 0 |
| | | | | |
| Lancaster | CDC Light | 2462 | 490 | 0 |
| | BG Sentinel 2 | 165 | 62 | 0 |
| Lancaster Co. Overall Total | | 2555 | 515 | 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 | 1318 | 679 | 95 |
| | BG Sentinel 2 | 118 | 67 | 38 |
| Richardson Co. Overall Total | | 1436 | 746 | 133 |
| | | | | |
| Sarpy | CDC Light | NA | NA | NA |
| | BG Sentinel 2 | 77 | 71 | 0 |
| Sarpy Co. Overall Total | | 77 | 71 | 0 |

| | | | | |
|----------------------|--|--------------|-------------|------------|
| Overall Total | | 12557 | 5751 | 133 |
|----------------------|--|--------------|-------------|------------|

Note: ND= No data, NA = Not applicable.

Bird and Equine Surveillance

Dead bird reporting: For the season, 127 dead birds have been reported to the Nebraska DHHS dead bird database. Of these, six have met the established criteria for WNV testing. The first WNV positive of the season in a bird was reported from Douglas County (see Figure 11 below). Additionally, three have been negative, one was unsuitable for testing, and one test result is pending.

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



Fight the Bite!!