

NEBRASKA ARBOVIRUS SURVEILLANCE AND MOSQUITO MONITORING PROGRAM 2018 UPDATE #16

Date: 10/01/2018. Please note that mosquito collection data covers dates 09/09/2018 to 09/22/2018 (CDC Weeks 37 and 38). 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 08/24/2018 to 09/22/2018), precipitation has been below normal over areas of central, northeastern, and western Nebraska and above average precipitation being seen in the eastern, north central, south central, and southeastern portions of the state. Cumulative rainfall during this timeframe ranged from 0.1 to ≥ 6.5 inches across the state. The heavier amounts were located primarily in portions of eastern, south central, and southeastern Nebraska. Average temperatures for the last 30 days (date ending 09/22/2018) were near normal or above over most of the state. Per the United States Drought Monitor, conditions a small area of abnormally dry conditions has emerged in far northwestern Nebraska. The state is now reporting 99.83% of total area with no abnormally dry or drought conditions. A slight decrease from the 100% reported during the last report.
- **Three Month Forecast:** For October 2018 to December 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 and were “moderate” based on historical data from regional traps. Floodwater mosquitoes, *Aedes vexans* (inland floodwater mosquito) and *Ochlerotatus trivittatus* counts now made up the majority of trap collections (64.1%) in the region. *Culex* mosquito counts also decreased and were “moderate” based upon historical regional data. Individual county *Culex* collections ranged from “low” to “extremely high”. Three invasive *Aedes albopictus* (Asian tiger mosquito) were collected from the region. Two individuals were from traps in Richardson County that have collected the mosquito historically and the third was from a trap in Douglas County. While this is not the first time *Aedes albopictus* has been collected in Douglas County (Janousek and et al. 2001), this is the first time it has been collected from Douglas County traps in the Nebraska DHHS CDC light trap network.

- **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 pipiens* (Northern house mosquito) was now the most collected mosquito (43.2%). This mosquito is also a WNV vector. *Culex* mosquito counts decreased slightly but were still at “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 “high” compared to their historical data. Overall mosquito activity from regional traps increased but were considered “low”. *Aedes vexans* was still the most abundant mosquito collected in CDC light traps (61.3%). *Culex tarsalis*, was second making up 24.5% of mosquito collections. *Culex* mosquito counts increased slightly but were still “low” based upon historical regional data. Individual *Culex* counts across counties in the west region ranged from “low” to “moderate” 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 **five 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, albeit at lower levels in the environment. To date 2,489 *Culex* pools have been tested with **121 WNV positives detected** in 25 of the 28 counties in the CDC light trap network. The current WNV cumulative statewide minimum mosquito infection rate increased (2.25/1,000 *Culex*) and is above the 10-year median (1.87/1,000 *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 138 birds have been reported. Of the 138 birds reported, 12 have been a corvid birds (bird group most heavily impacted by WNV and includes: blue jays, crows, and magpies). Of the eight birds reported who have met criteria for WNV testing, five 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:** **195 human clinical WNV cases** have currently been reported along with **44 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, **nine deaths related to WNV have also been reported in the state**. A total of six travel-related mosquito-borne disease have occurred in state residents: five malaria cases (all five were acquired in Africa) and one dengue case (acquired in Southeast Asia).

Comment: *Human clinical (symptomatic) WNV cases continue to be reported and there are now 195 reported in Nebraska residents to date, 96 of which are the more severe neuroinvasive form. This is the most neuroinvasive cases reported in Nebraska since the 2003 outbreak year. Unfortunately, nine deaths related to WNV have now been reported in the state. Additionally, asymptomatic human blood donors also increased with 44 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, 121 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 the fall months risk will gradually decrease, however risk of WNV infection will remain until the first hard freeze of the season. Additionally, six travel-related mosquito-borne illness cases, five 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 decreased in overall mosquito numbers

with a statewide average of “low” when compared to historical data, averaging 98.71 total mosquitoes per trap night. The most abundant mosquito collected over the two week sampling period was *Aedes vexans*, accounting for 37.24% of trap collections. *Culex* mosquito counts statewide continued to decrease and were considered “low” based on historical data, averaging 32.25 *Culex* per trap night.

SOURCES:

Janousek T.E., Plagge, J., and Kramer, W.L. 2001. Record of *Aedes albopictus* in Nebraska with notes on its biology. Journal of the American Mosquito Control Association, 17(4): 265-267.

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.

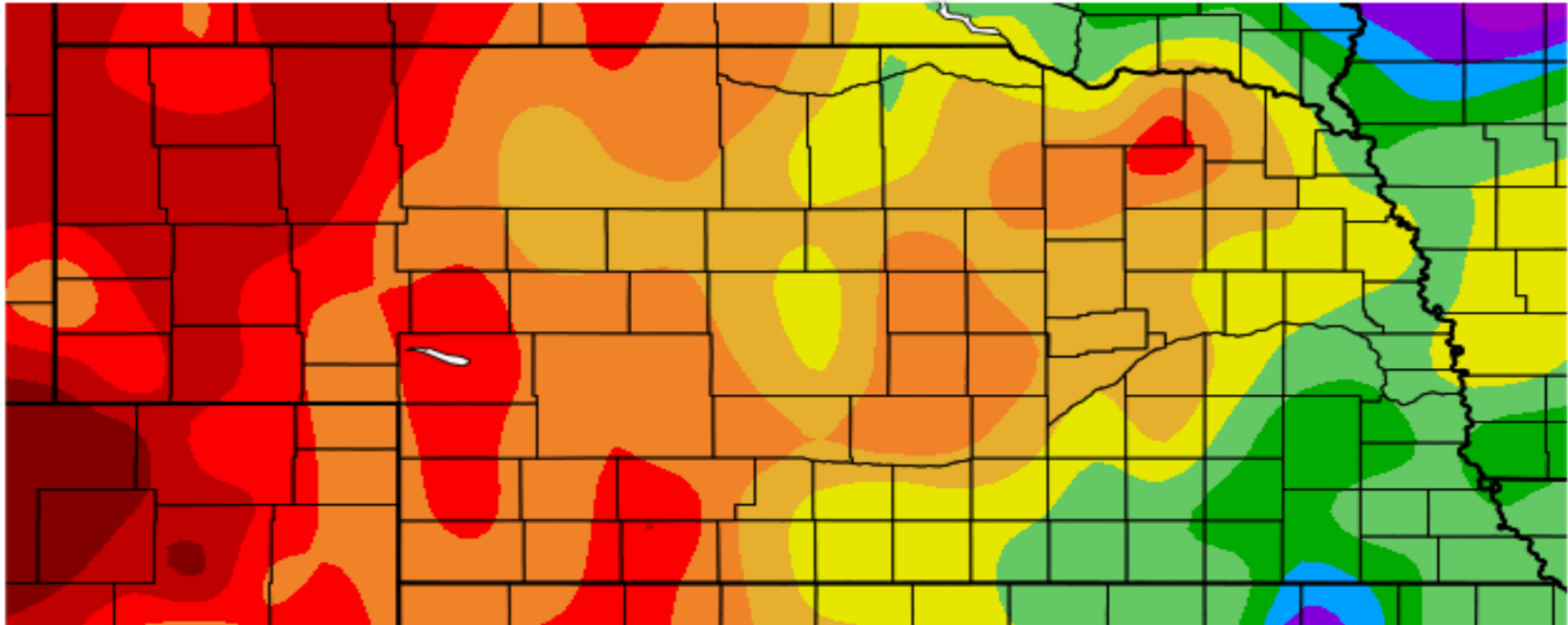
Rainfall and Temperature

Rainfall across Nebraska over the last 30 days (08/24/2018 to 09/22/2018) ranged from 0.1 to ≥ 6.5 inches (pg. 4) across the state. The heavier amounts were located in eastern, south central, and southeastern Nebraska. For the last 30 days (date ending 09/22/2018), rainfall was below normal over areas of central, northeastern and western Nebraska while areas in eastern, south central, and southeastern Nebraska were above normal (pg.5). Average temperatures (pg. 6) for the last 30 days were near to above normal over most of the state with some pockets of temps below normal. The long range outlook as of 09/30/2018 (next 8 to 14 days), is predicting higher chances of below 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>

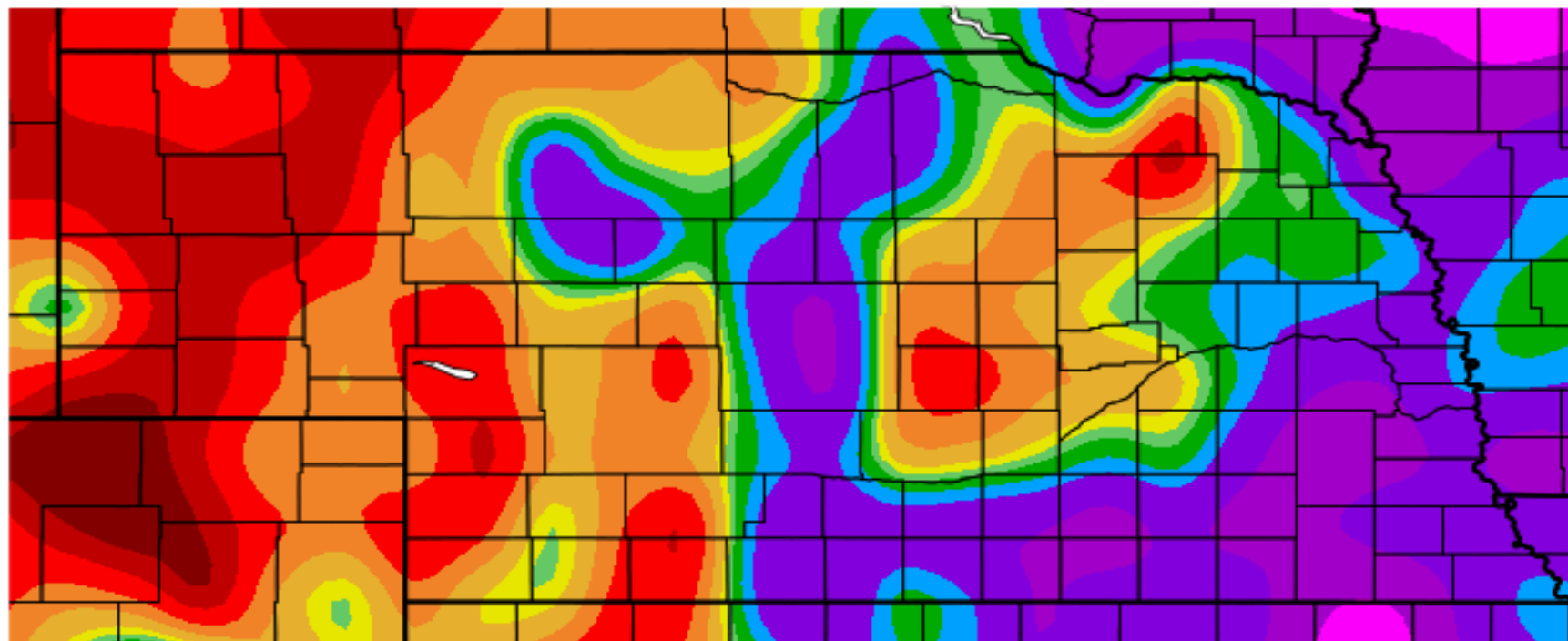
Precipitation (in)
8/24/2018 – 9/22/2018



Generated 9/23/2018 at HPRCC using provisional data.

NOAA Regional Climate Centers

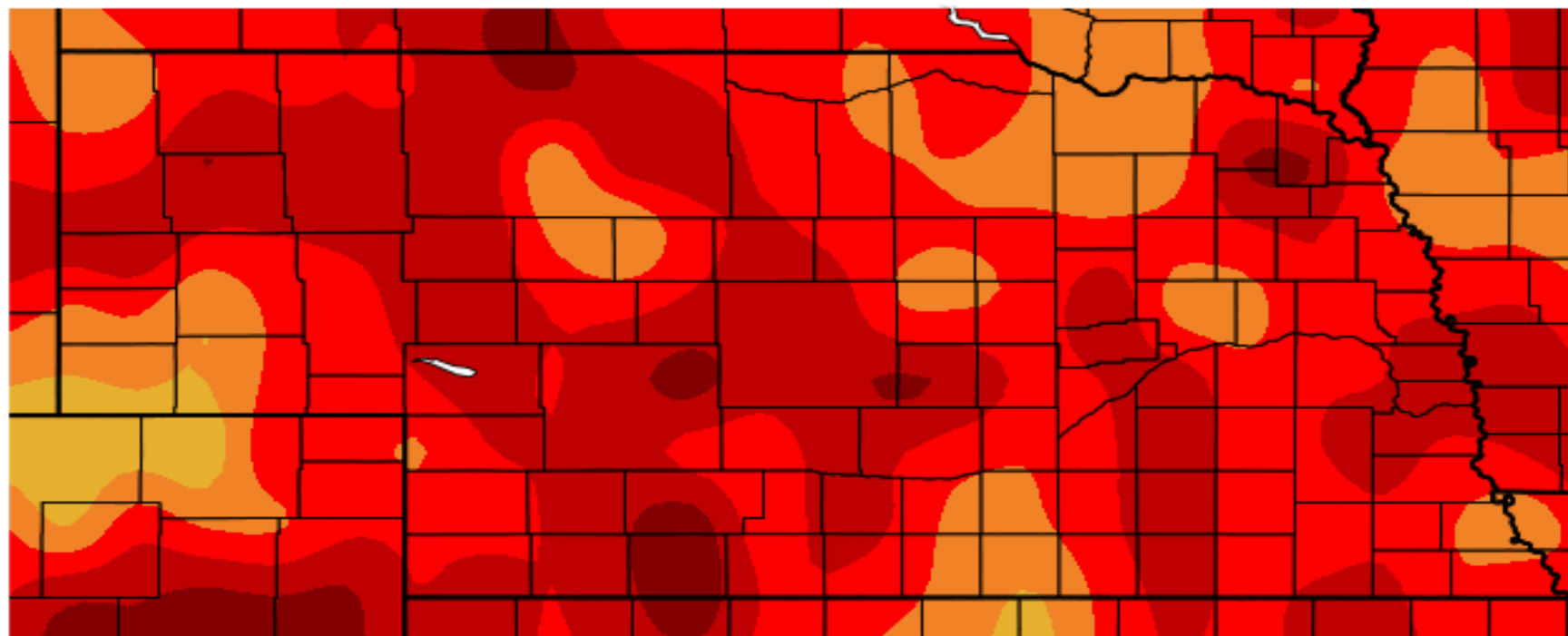
Percent of Normal Precipitation (%)
8/24/2018 – 9/22/2018



Generated 9/23/2018 at HPRCC using provisional data.

NOAA Regional Climate Centers

Departure from Normal Temperature (F)
8/24/2018 – 9/22/2018



Generated 9/23/2018 at HPRCC using provisional data.

NOAA Regional Climate Centers

Three Month Temperature and Rainfall Forecast

For October 2018 to December 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 09/25/2018) saw an emergence of small area of abnormally dry conditions in far northwestern Nebraska. 99.83% of the state is now being reported with no drought or abnormally dry conditions. Last year at this time, 82.67% 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

September 25, 2018


(Released Thursday, Sep. 27, 2018)


Valid 8 a.m. EDT


Drought Conditions (Percent Area)

	None	D0	D1	D2	D3	D4
Current	99.83	0.17	0.00	0.00	0.00	0.00
Last Week <i>09-18-2018</i>	100.00	0.00	0.00	0.00	0.00	0.00
3 Months Ago <i>06-26-2018</i>	92.75	6.40	0.84	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>09-26-2017</i>	82.67	13.32	4.01	0.00	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.

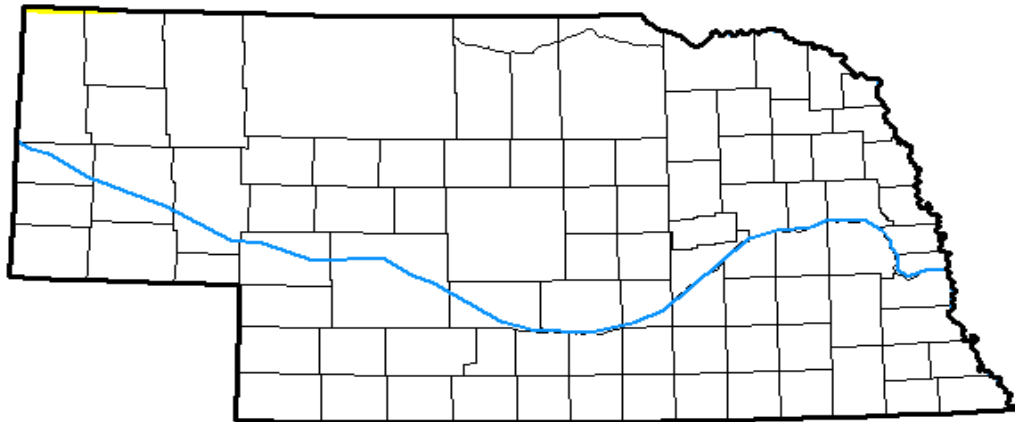
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NCEI/NOAA



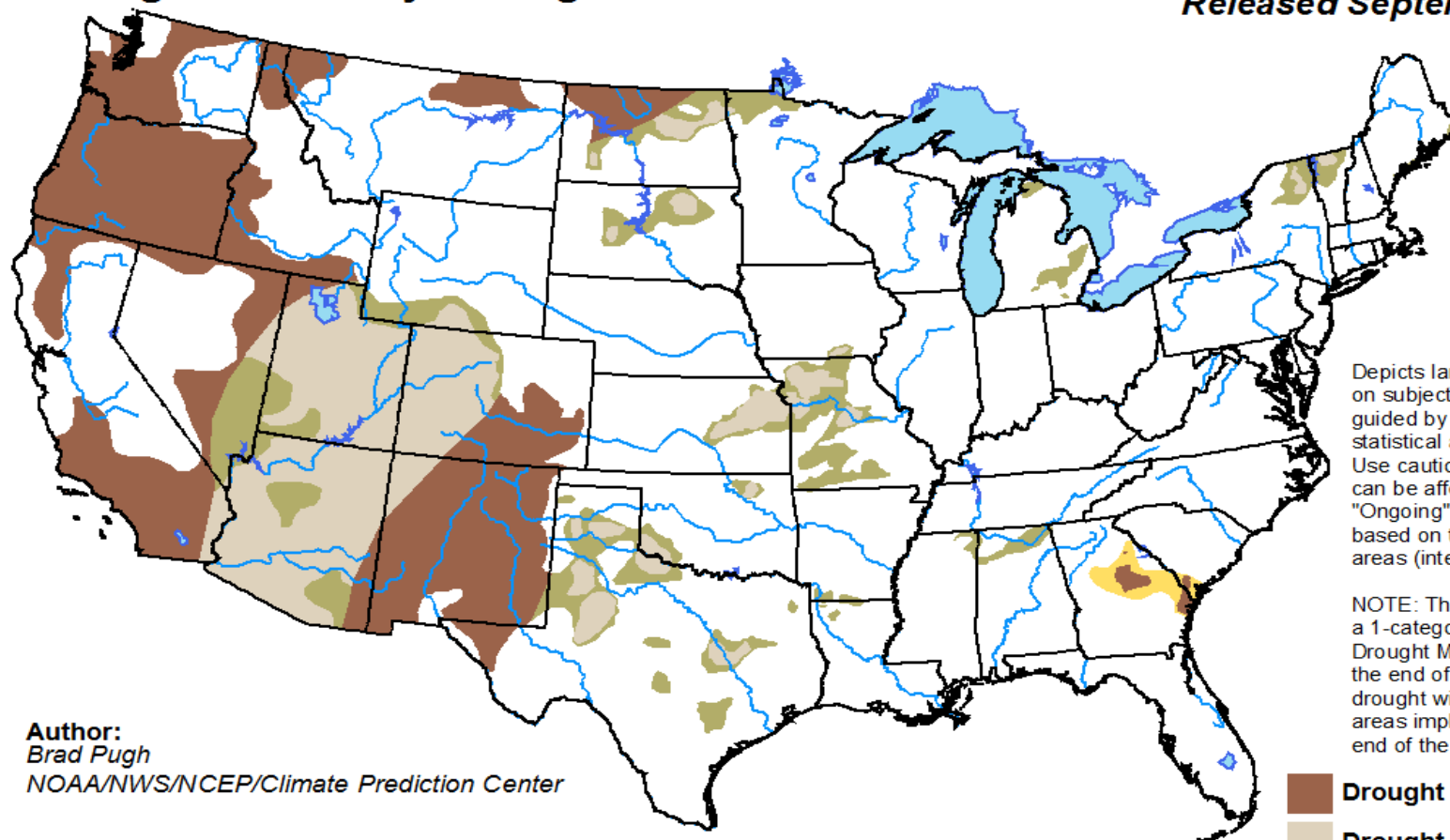
<http://droughtmonitor.unl.edu/>



U.S. Monthly Drought Outlook

Drought Tendency During the Valid Period





Valid for October 2018
Released September 30, 2018

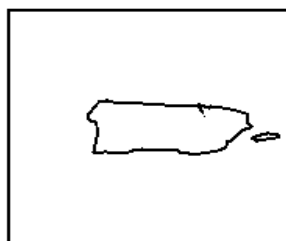
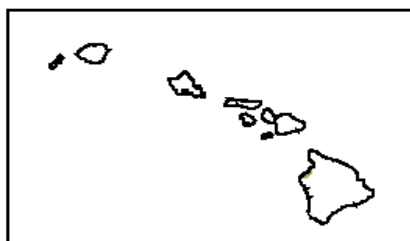
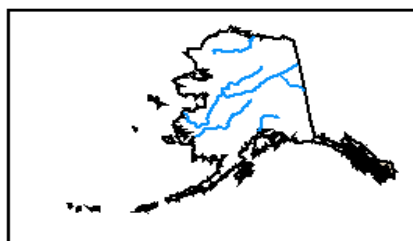


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Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on 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 121 positive arbovirus positive mosquito pools detected in 25 different counties. All 121 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* decreased slightly to 2.25 which is above the 10-year median of 1.87 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
9/18/2018	Douglas	<i>Culex pipiens</i>	WNV
9/18/2018	Garden	<i>Culex pipiens</i>	WNV
9/18/2018	Garden	<i>Culex tarsalis</i>	WNV
9/12/2018	Phelps	<i>Culex tarsalis</i>	WNV
9/11/2018	Dodge	<i>Culex salinarius</i>	WNV
9/6/2018	Platte	<i>Culex tarsalis</i>	WNV
9/6/2018	Platte	<i>Culex pipiens</i>	WNV
9/5/2018	Dawson	<i>Culex pipiens</i>	WNV
9/5/2018	Garden	<i>Culex tarsalis</i>	WNV
9/5/2018	Hall	<i>Culex pipiens</i>	WNV
8/29/2018	Dodge	<i>Culex tarsalis</i>	WNV
8/29/2018	Lancaster	<i>Culex tarsalis</i>	WNV
8/29/2018	Phelps	<i>Culex tarsalis</i>	WNV
8/29/2018	Red Willow	<i>Culex tarsalis</i>	WNV
8/29/2018	Red Willow	<i>Culex salinarius</i>	WNV
8/28/2018	Adams	<i>Culex pipiens</i>	WNV
8/28/2018	Adams	<i>Culex pipiens</i>	WNV
8/28/2018	Adams	<i>Culex pipiens</i>	WNV
8/28/2018	Adams	<i>Culex pipiens</i>	WNV
8/28/2018	Adams	<i>Culex tarsalis</i>	WNV

8/28/2018	Cherry	<i>Culex tarsalis</i>	WNV
8/28/2018	Dawes	<i>Culex tarsalis</i>	WNV
8/28/2018	Dixon	<i>Culex tarsalis</i>	WNV
8/28/2018	Holt	<i>Culex pipiens</i>	WNV
8/28/2018	Scotts Bluff	<i>Culex pipiens</i>	WNV
8/28/2018	Scotts Bluff	<i>Culex tarsalis</i>	WNV
8/28/2018	Wayne	<i>Culex tarsalis</i>	WNV
8/28/2018	Wayne	<i>Culex tarsalis</i>	WNV
8/28/2018	Wayne	<i>Culex tarsalis</i>	WNV
8/28/2018	Wayne	<i>Culex pipiens</i>	WNV
8/28/2018	Wayne	<i>Culex pipiens</i>	WNV
8/22/2018	Gage	<i>Culex pipiens</i>	WNV
8/22/2018	Garfield	<i>Culex pipiens</i>	WNV
8/22/2018	Garfield	<i>Culex pipiens</i>	WNV
8/22/2018	Garfield	<i>Culex tarsalis</i>	WNV
8/22/2018	Garfield	<i>Culex pipiens</i>	WNV
8/22/2018	Hall	<i>Culex tarsalis</i>	WNV
8/22/2018	Hall	<i>Culex tarsalis</i>	WNV
8/22/2018	Madison	<i>Culex tarsalis</i>	WNV
8/22/2018	Richardson	<i>Culex tarsalis</i>	WNV
8/22/2018	Richardson	<i>Culex tarsalis</i>	WNV
8/21/2018	Box Butte	<i>Culex tarsalis</i>	WNV
8/21/2018	Dawson	<i>Culex pipiens</i>	WNV
8/21/2018	Dawson	<i>Culex tarsalis</i>	WNV
8/21/2018	Dawson	<i>Culex pipiens</i>	WNV
8/21/2018	Douglas	<i>Culex tarsalis</i>	WNV
8/21/2018	Douglas	<i>Culex tarsalis</i>	WNV
8/21/2018	Douglas	<i>Culex pipiens</i>	WNV
8/21/2018	Douglas	<i>Culex pipiens</i>	WNV
8/21/2018	Garden	<i>Culex tarsalis</i>	WNV
8/21/2018	Garden	<i>Culex tarsalis</i>	WNV
8/21/2018	Garden	<i>Culex tarsalis</i>	WNV
8/21/2018	Garden	<i>Culex tarsalis</i>	WNV
8/21/2018	Lincoln	<i>Culex tarsalis</i>	WNV

8/21/2018	Lincoln	<i>Culex tarsalis</i>	WNV
8/21/2018	Webster	<i>Culex pipiens</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

Table 2. Arboviral Detections Summary Table.

			Virus			
Date Collected	County	Mosquito Species	WNV	SLE	WEE	Total
9/18/2018	Douglas	<i>Culex pipiens</i>	1	0	0	1
9/18/2018	Garden	<i>Culex pipiens</i>	1	0	0	1
9/18/2018	Garden	<i>Culex tarsalis</i>	1	0	0	1
9/12/2018	Phelps	<i>Culex tarsalis</i>	1	0	0	1
9/11/2018	Dodge	<i>Culex salinarius</i>	1	0	0	1
9/6/2018	Platte	<i>Culex tarsalis</i>	1	0	0	1
9/6/2018	Platte	<i>Culex pipiens</i>	1	0	0	1
9/5/2018	Dawson	<i>Culex pipiens</i>	1	0	0	1
9/5/2018	Garden	<i>Culex tarsalis</i>	1	0	0	1
9/5/2018	Hall	<i>Culex pipiens</i>	1	0	0	1
8/29/2018	Dodge	<i>Culex tarsalis</i>	1	0	0	1
8/29/2018	Lancaster	<i>Culex tarsalis</i>	1	0	0	1
8/29/2018	Phelps	<i>Culex tarsalis</i>	1	0	0	1
8/29/2018	Red Willow	<i>Culex tarsalis</i>	1	0	0	1
8/29/2018	Red Willow	<i>Culex salinarius</i>	1	0	0	1
8/28/2018	Adams	<i>Culex pipiens</i>	1	0	0	1
8/28/2018	Adams	<i>Culex pipiens</i>	1	0	0	1
8/28/2018	Adams	<i>Culex pipiens</i>	1	0	0	1
8/28/2018	Adams	<i>Culex pipiens</i>	1	0	0	1
8/28/2018	Adams	<i>Culex tarsalis</i>	1	0	0	1
8/28/2018	Cherry	<i>Culex tarsalis</i>	1	0	0	1
8/28/2018	Dawes	<i>Culex tarsalis</i>	1	0	0	1
8/28/2018	Dixon	<i>Culex tarsalis</i>	1	0	0	1
8/28/2018	Holt	<i>Culex pipiens</i>	1	0	0	1
8/28/2018	Scotts Bluff	<i>Culex pipiens</i>	1	0	0	1
8/28/2018	Scotts Bluff	<i>Culex tarsalis</i>	1	0	0	1
8/28/2018	Wayne	<i>Culex tarsalis</i>	1	0	0	1
8/28/2018	Wayne	<i>Culex tarsalis</i>	1	0	0	1

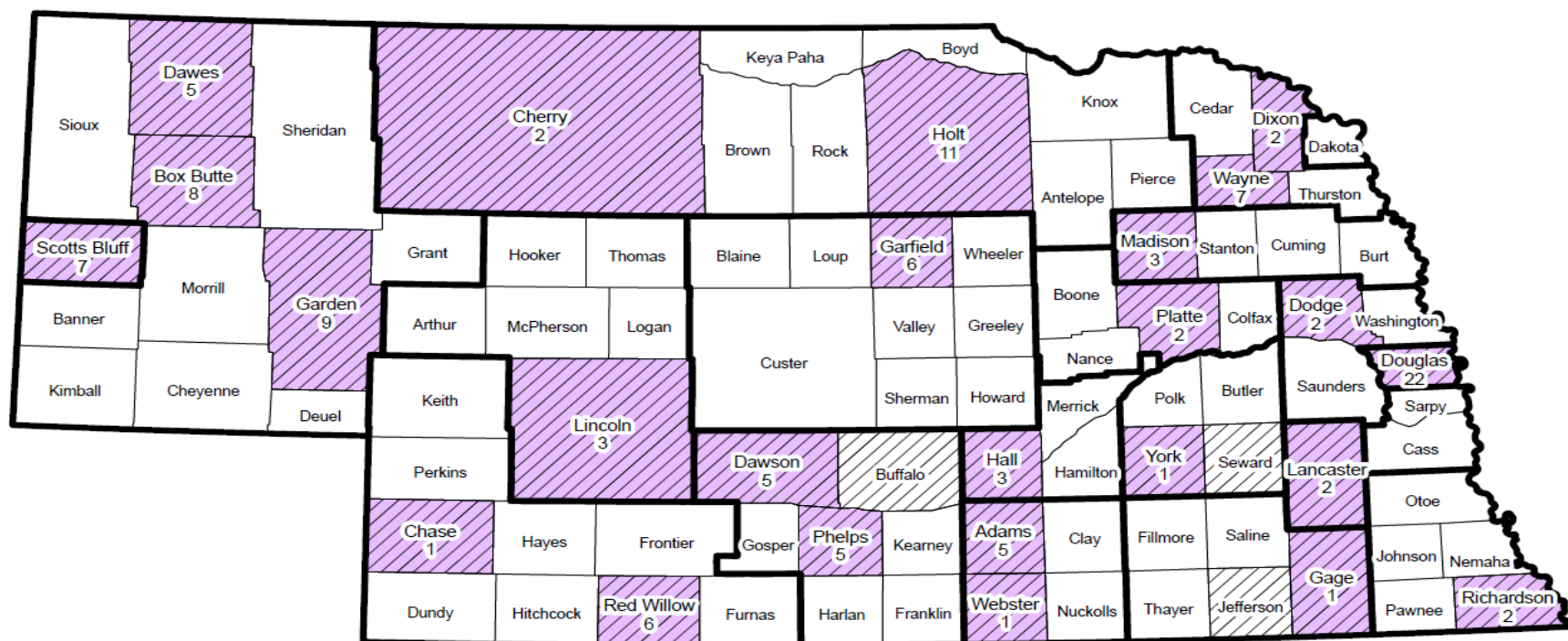
8/28/2018	Wayne	<i>Culex tarsalis</i>	1	0	0	1
8/28/2018	Wayne	<i>Culex pipiens</i>	1	0	0	1
8/28/2018	Wayne	<i>Culex pipiens</i>	1	0	0	1
8/22/2018	Gage	<i>Culex pipiens</i>	1	0	0	1
8/22/2018	Garfield	<i>Culex pipiens</i>	1	0	0	1
8/22/2018	Garfield	<i>Culex pipiens</i>	1	0	0	1
8/22/2018	Garfield	<i>Culex tarsalis</i>	1	0	0	1
8/22/2018	Garfield	<i>Culex pipiens</i>	1	0	0	1
8/22/2018	Hall	<i>Culex tarsalis</i>	1	0	0	1
8/22/2018	Hall	<i>Culex tarsalis</i>	1	0	0	1
8/22/2018	Madison	<i>Culex tarsalis</i>	1	0	0	1
8/22/2018	Richardson	<i>Culex tarsalis</i>	1	0	0	1
8/22/2018	Richardson	<i>Culex tarsalis</i>	1	0	0	1
8/21/2018	Box Butte	<i>Culex tarsalis</i>	1	0	0	1
8/21/2018	Dawson	<i>Culex pipiens</i>	1	0	0	1
8/21/2018	Dawson	<i>Culex tarsalis</i>	1	0	0	1
8/21/2018	Dawson	<i>Culex pipiens</i>	1	0	0	1
8/21/2018	Douglas	<i>Culex tarsalis</i>	1	0	0	1
8/21/2018	Douglas	<i>Culex tarsalis</i>	1	0	0	1
8/21/2018	Douglas	<i>Culex pipiens</i>	1	0	0	1
8/21/2018	Douglas	<i>Culex pipiens</i>	1	0	0	1
8/21/2018	Garden	<i>Culex tarsalis</i>	1	0	0	1
8/21/2018	Garden	<i>Culex tarsalis</i>	1	0	0	1
8/21/2018	Garden	<i>Culex tarsalis</i>	1	0	0	1
8/21/2018	Garden	<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
8/21/2018	Webster	<i>Culex pipiens</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
8/15/2018	Red Willow	<i>Culex tarsalis</i>	1	0	0	1
8/14/2018	Cherry	<i>Culex tarsalis</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
8/14/2018	Dixon	<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 tarsalis</i>	1	0	0	1
8/14/2018	Holt	<i>Culex pipiens</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	York	<i>Culex pipiens</i>	1	0	0	1
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
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 sp.</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

[illegible]

Mosquito Surveillance Nebraska CDC Light Trap Network, 2018

As of September 29



Legend

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

SLE Positive / Tested Totals

Mosquito Pools: 0 / 2489

Counties: 0 / 28

WNV Positive / Tested Totals

Mosquito Pools: 121 / 2489

Counties: 25 / 28

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

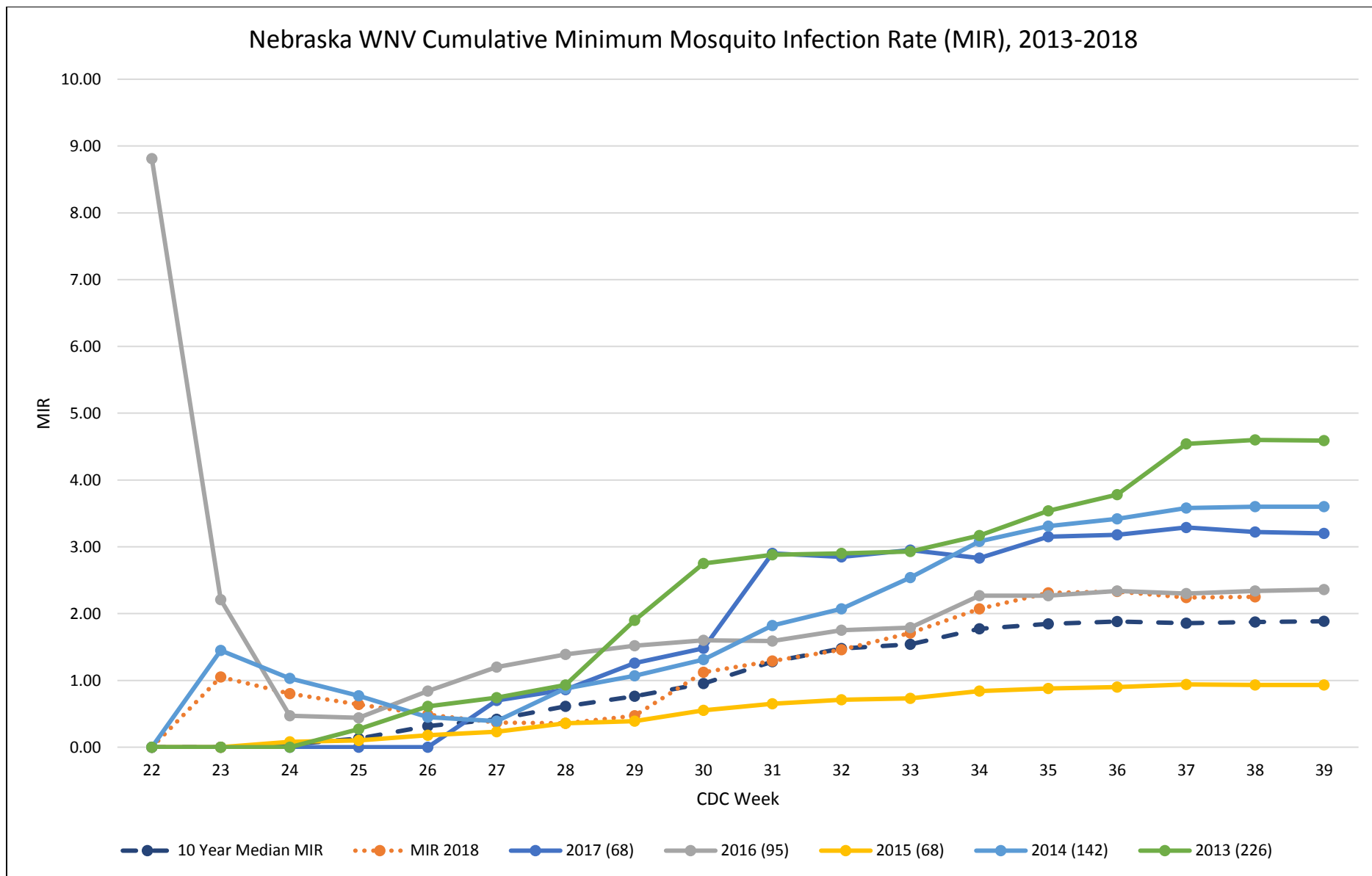


Figure 2. Weekly Nebraska WNV Mosquito Cumulative Mosquito Minimum Infection Rate, 2013-2018. At the state level, the calculated statewide MIR is strongly correlated with the number of human clinical WNV cases. As such, comparisons during the season of the weekly cumulative MIR with previous seasons' 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	1	3
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	13	7	0	0	0	0	0	0	20
34	25-Aug-18	24	10	0	0	0	0	0	0	34
35	1-Sep-18	37	8	0	0	0	0	0	0	45
36	8-Sep-18	34	5	0	0	0	0	0	0	39

37	15-Sep-18	30	3	0	0	0	0	0	0	33
38	22-Sep-18	29	3	0	0	0	0	0	0	32
39	29-Sep-18	13	2	0	0	0	0	0	0	15
	Total	195	44	0	0	0	1	0	5	245

^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	6
21 to 30	14
31 to 40	33
41 to 50	31
51 to 60	42
61 to 70	33
71+	36
Gender	
Male	111
Female	84
Diagnosis	
WNV Neuroinvasive Disease	96
WNV Non-Neuroinvasive Disease	99
Hospitalized	90
Death	9

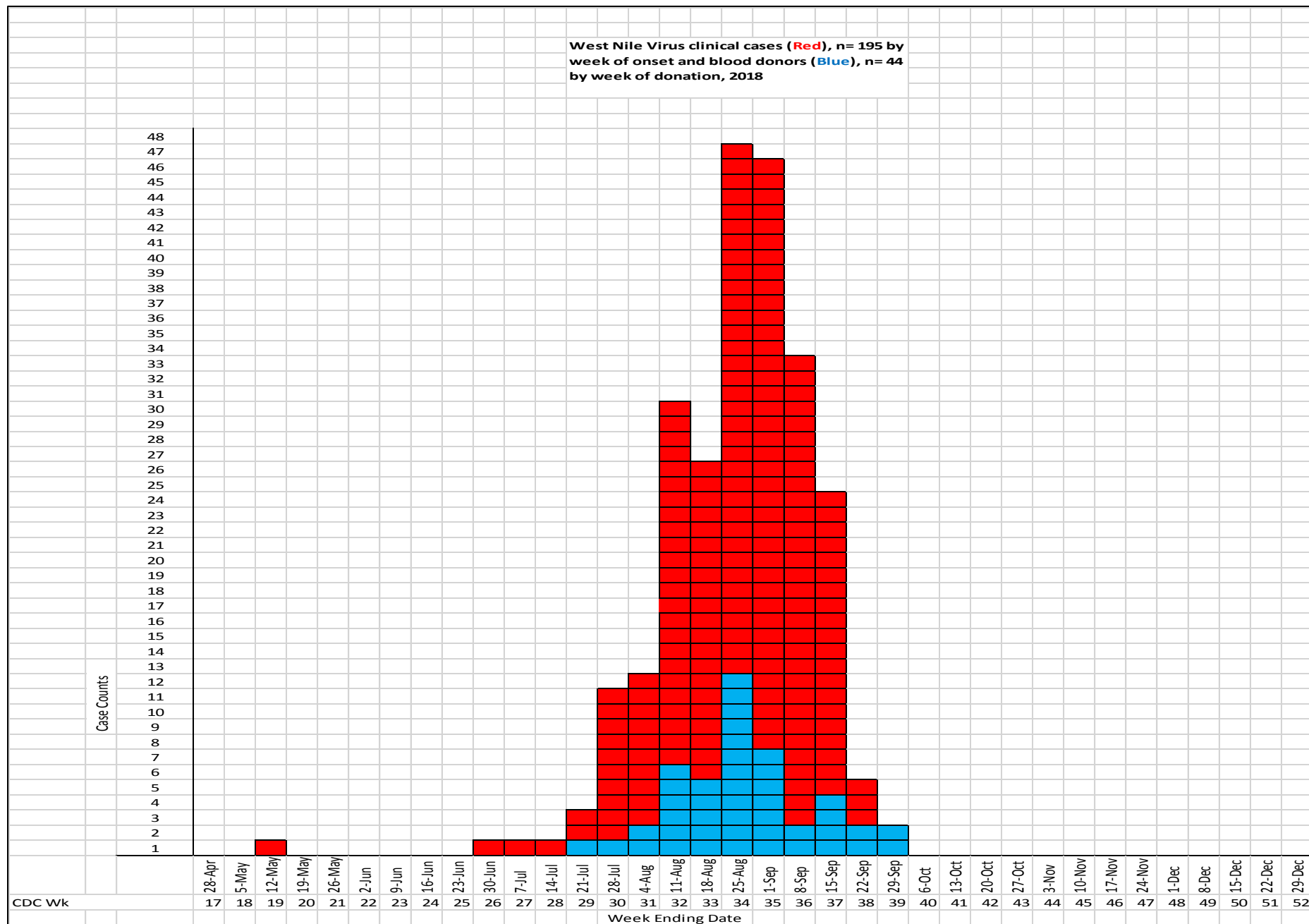


Figure 3. Epi-curve of human WNV infections (clinical and asymptomatic blood donors) by onset date, Nebraska 2018.

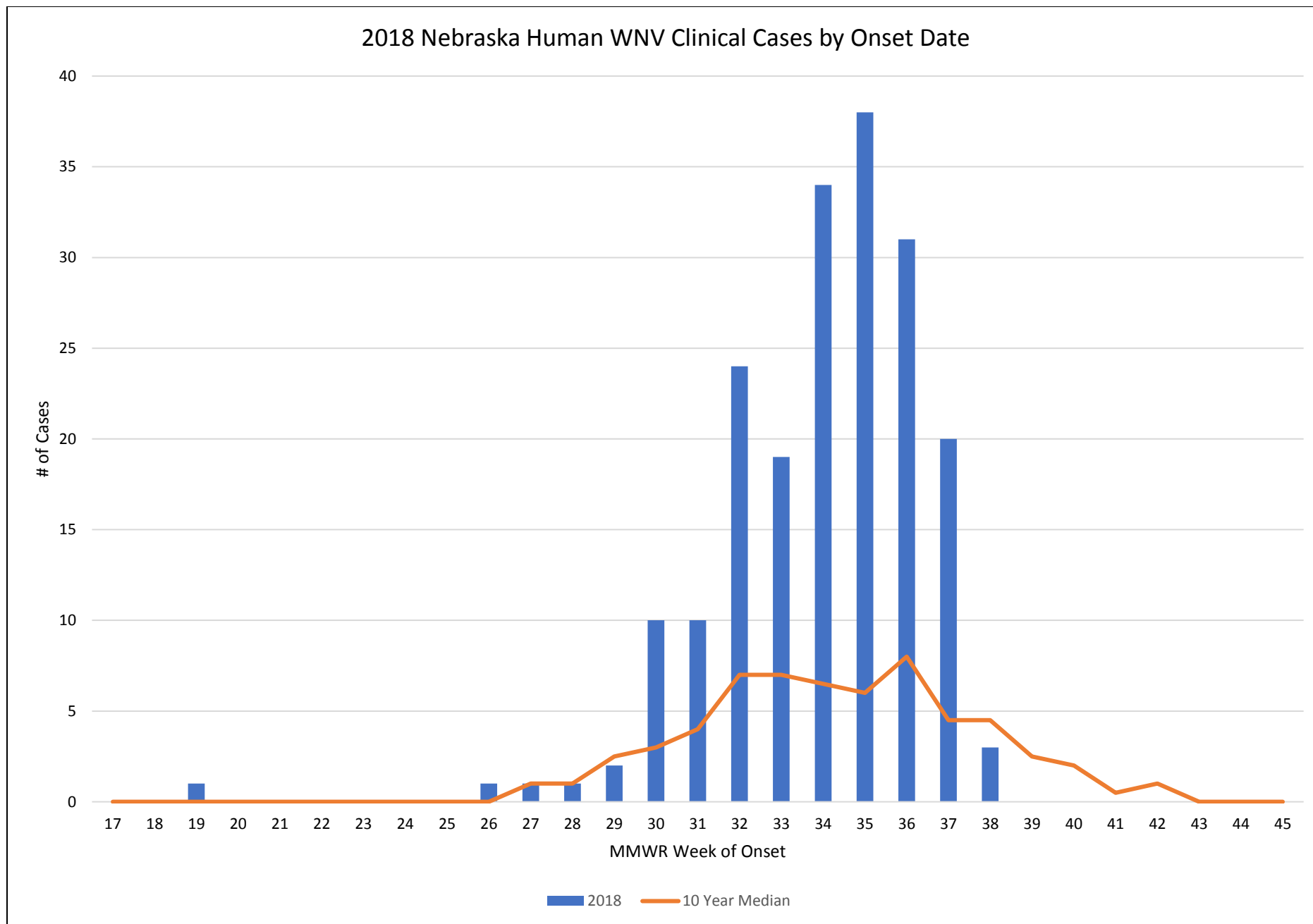


Figure 4. Epi-curve of human WNV clinical cases and 10 yr. median by onset date, Nebraska 2018.

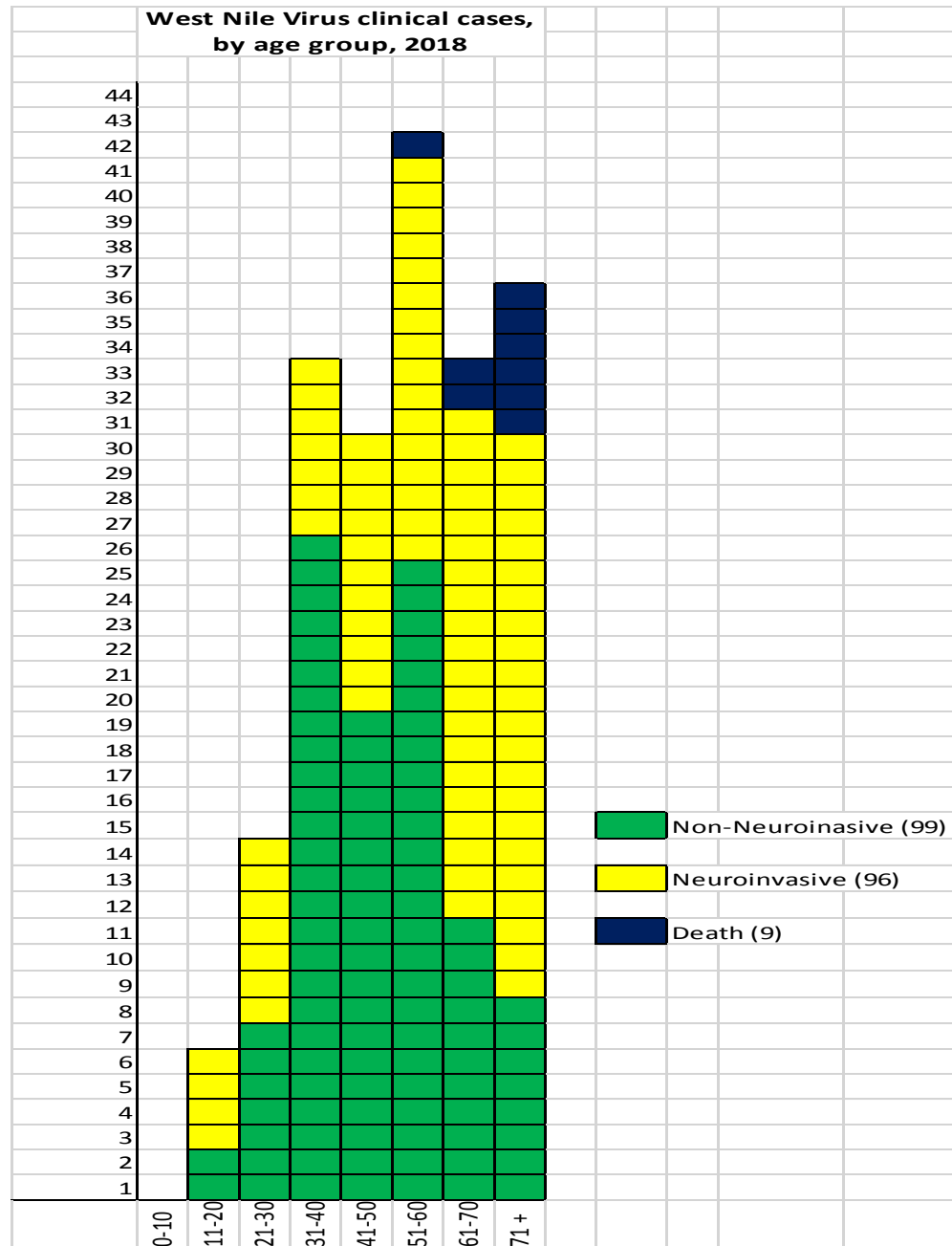


Figure 5. WNV human clinical cases by 10 year age groups, 2018.

Human Clinical Positives for West Nile Virus, Nebraska, 2018, (n = 195)

As of September 29

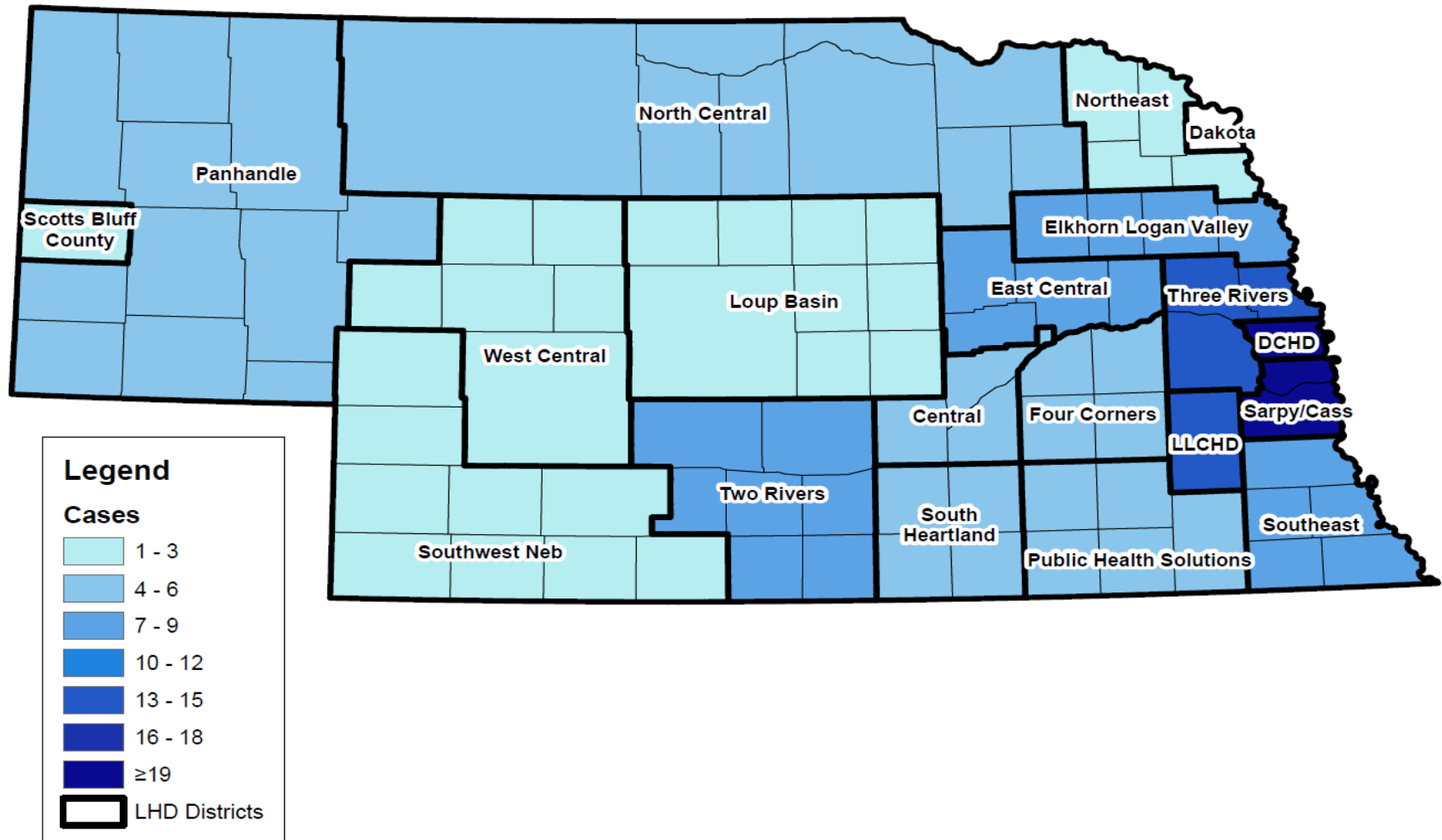


Figure 6. Nebraska human clinical WNV cases by local health jurisdiction, 2018.

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	36	37	38	39	40	
Local Health Dept. Jurisdiction																									Total
Central District Health Dept.	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	3	0	0	0	0	6
Dakota County Health Dept.	0	0	0	0	0	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	2	12	9	14	11	6	4	0	0	0	60
East Central District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	4	2	0	0	0	8
Elkhorn-Logan Valley Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	3	1	2	0	0	0	8
Four Corners Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	1	0	0	0	5
Lincoln-Lancaster County Health Dept.	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	2	1	3	4	2	0	0	0	15
Loup Basin Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
North Central District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	1	1	0	0	0	0	5
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	1	0	0	0	1
Panhandle Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	2	0	0	0	0	0	5
Public Health Solutions	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	4
Sarpy-Cass Dept. of Health and Wellness	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	6	2	7	9	3	2	3	0	0	38
Scotts Bluff County Health Dept.	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
South Heartland District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	4
Southeast District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3	1	0	0	0	7
Southwest Nebraska Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2
Three Rivers Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	2	3	4	2	1	0	0	0	15
Two Rivers Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	3	1	0	1	0	0	0	7
West Central District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	2
Statewide Total	0	0	1	0	0	0	0	0	0	1	1	1	2	10	10	24	19	34	38	31	20	3	0	0	195

Human Blood Donor Positives for West Nile Virus, Nebraska, 2018, (n = 44)

As of September 29

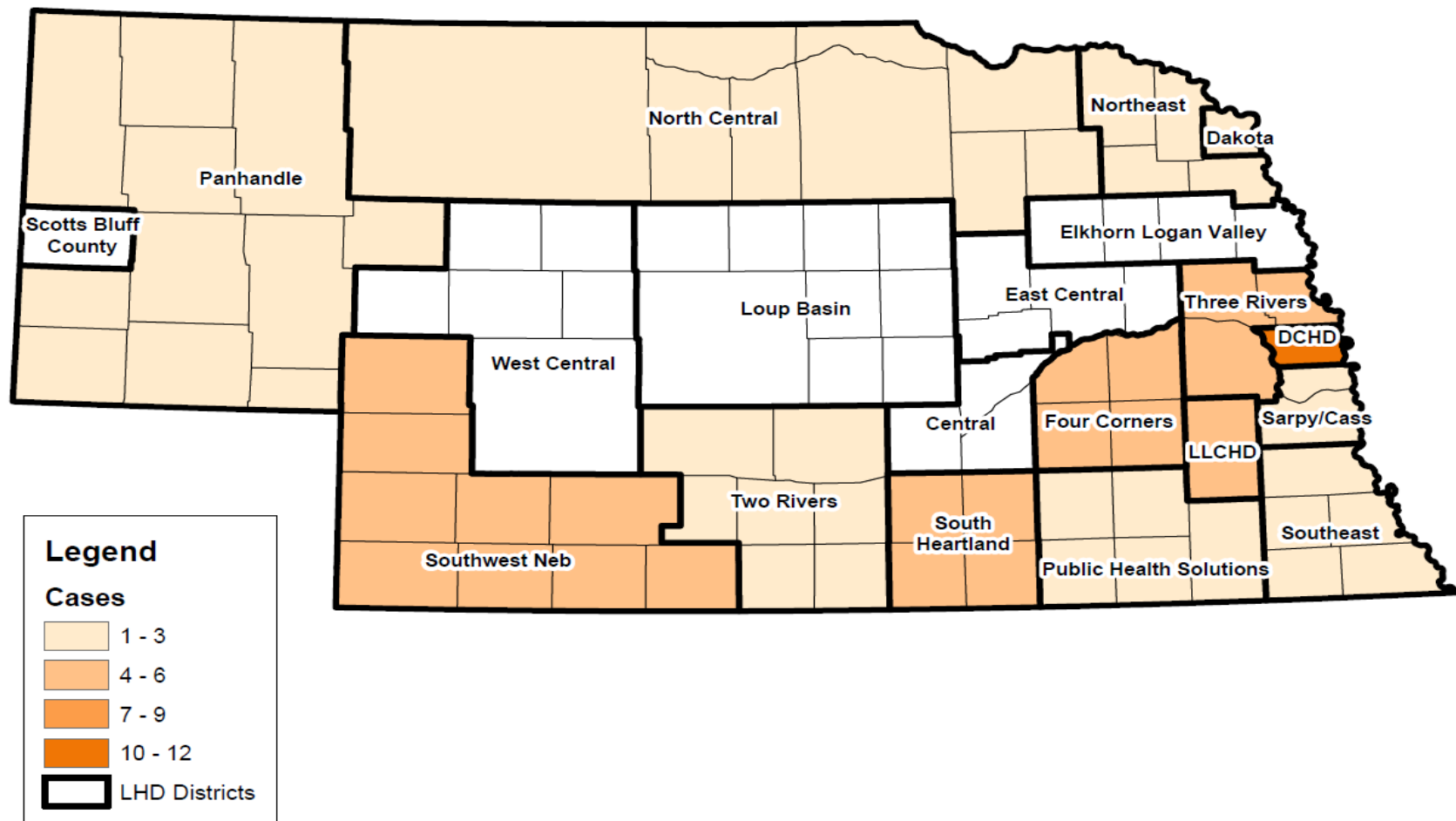


Figure 7. Nebraska asymptomatic WNV blood donors by local health jurisdiction, 2018.

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

CDC Wk.	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
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	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	0	0	0	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	1	1	2	0	0	12
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	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	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	0	0	0	0	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	1	0	0	1	0	4
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	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	0	0	0	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	0	0	0	1	1
Panhandle Public Health Dept.	0	0	0	0	0	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	1	0	0	0	1	0	0	0	0	2
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	0	0	0	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	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	1	0	0	1	0	4
Southeast District Health Dept.	0	0	0	0	0	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	1	0	1	0	0	0	0	1	2	0	0	0	5
Three Rivers Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	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	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	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	5	3	3	2	1	44

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. **195 human clinical cases have been reported in Nebraska residents to date along with 44 positive asymptomatic human blood donors.** Additionally, **121 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 fall months. However, there will still be some risk to becoming infected with WNV until the first hard freeze 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), five cases of malaria and one case of dengue 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 37/38	
Region/County	Total Mosquito	Total Culex
West Region	45.64	14.14
Box Butte	9.83	6.17
Chase	ND	ND
Cherry	10.00	3.17
Dawes	33.50	14.33
Garden	176.17	26.83
Lincoln	ND	ND
Red Willow	16.00	2.50
Scotts Bluff	44.83	22.83
	CDC Weeks 37/38	
Region/County	Total Mosquito	Total Culex

Central Region	82.51	42.49
Adams	249.00	236.67
Buffalo	ND	ND
Dawson	51.50	24.50
Garfield	63.67	4.83
Hall	43.83	6.17
Holt	31.00	3.17
Phelps	129.83	111.33
Webster	92.00	7.83
	CDC Weeks 37/38	
Region/County	Total Mosquito	Total Culex
East Region	157.08	39.63
Dixon	44.33	24.00
Dodge	86.40	28.80
Douglas	428.00	95.17
Gage	226.00	21.00
Jefferson	127.75	50.75
Lancaster	72.17	28.50
Madison	259.17	9.50
Platte	136.20	7.40
Richardson	119.67	92.17
Seward	ND	ND
Wayne	47.33	18.67
York	ND	ND

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

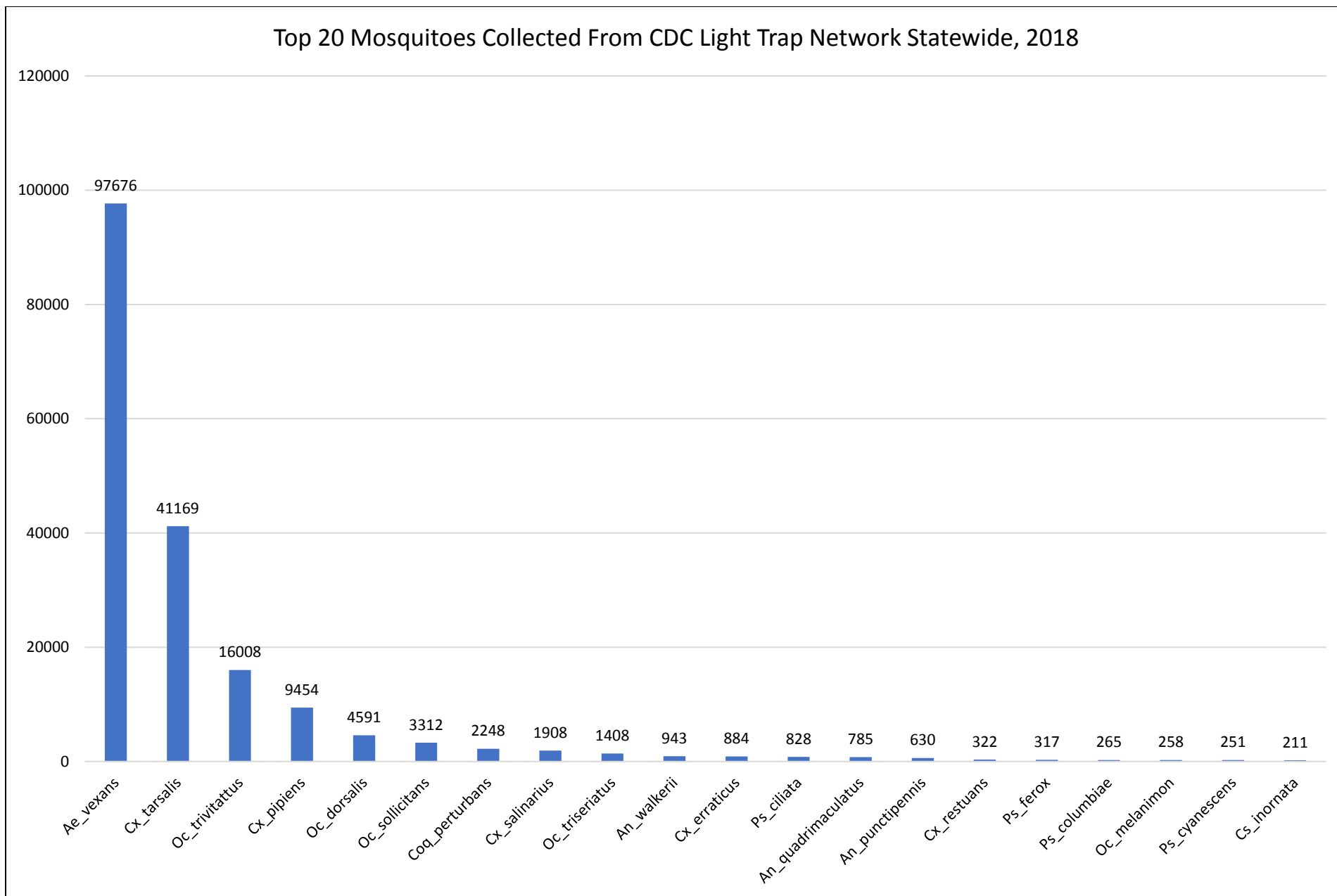


Figure 8. Top 20 cumulative mosquitoes collected statewide from CDC light trap network, 2018. Note that the first part of the mosquito species name has been abbreviated. Ae= *Aedes*, An= *Anopheles*, Cs= *Culex*, Cx= *Culex*, Oc= *Ochlerotatus*, Ps= *Psorophora*, Unid'd= Unidentified.

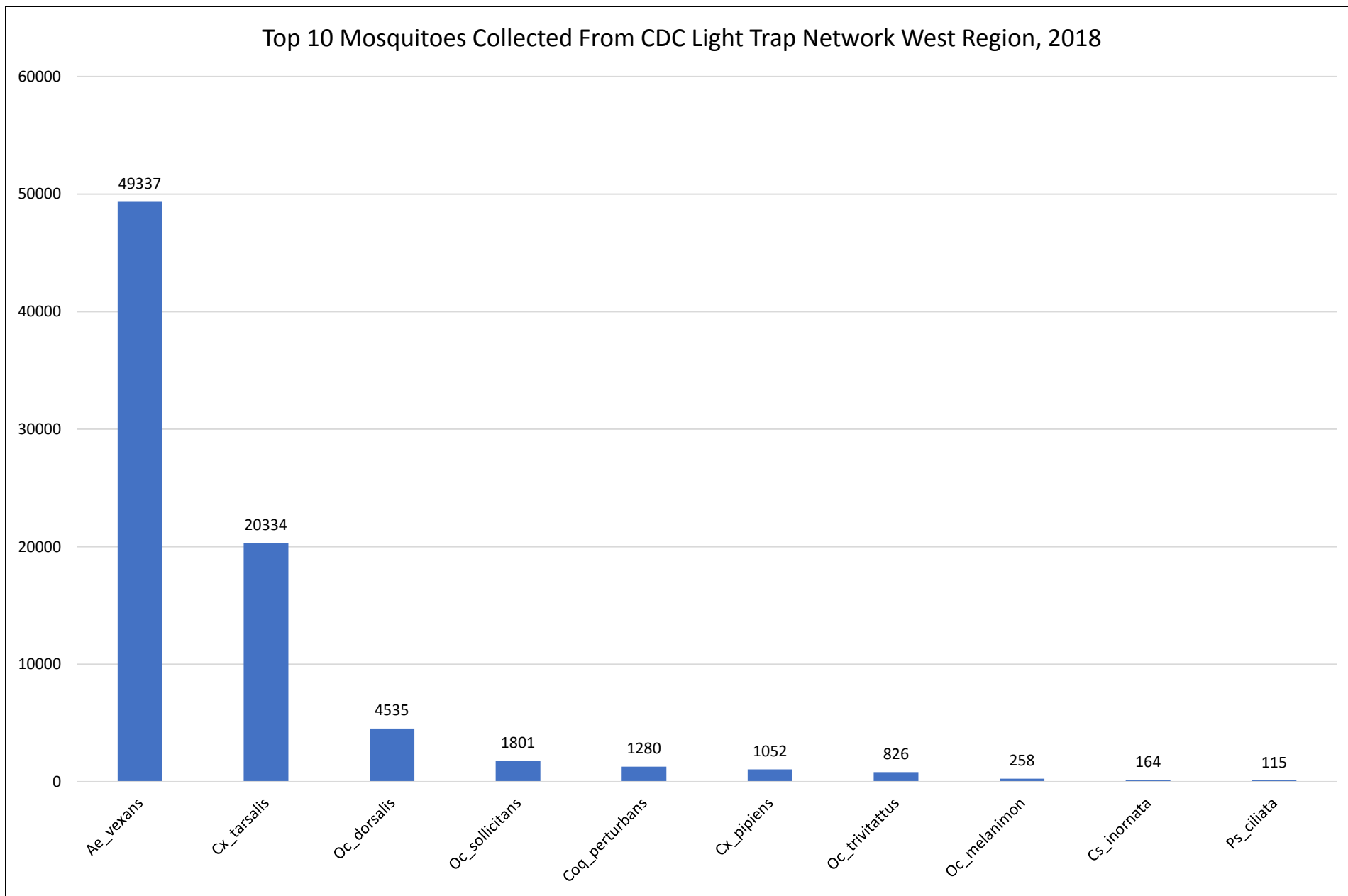


Figure 9. Top 10 cumulative mosquitoes collected in West region of the state from CDC light trap network, 2018. Note that the first part of the mosquito species name has been abbreviated. Ae= *Aedes*, An= *Anopheles*, Cs= *Culesita*, Cx= *Culex*, Oc= *Ochlerotatus*, Ps= *Psorophora*, and Unid'd= Unidentified.

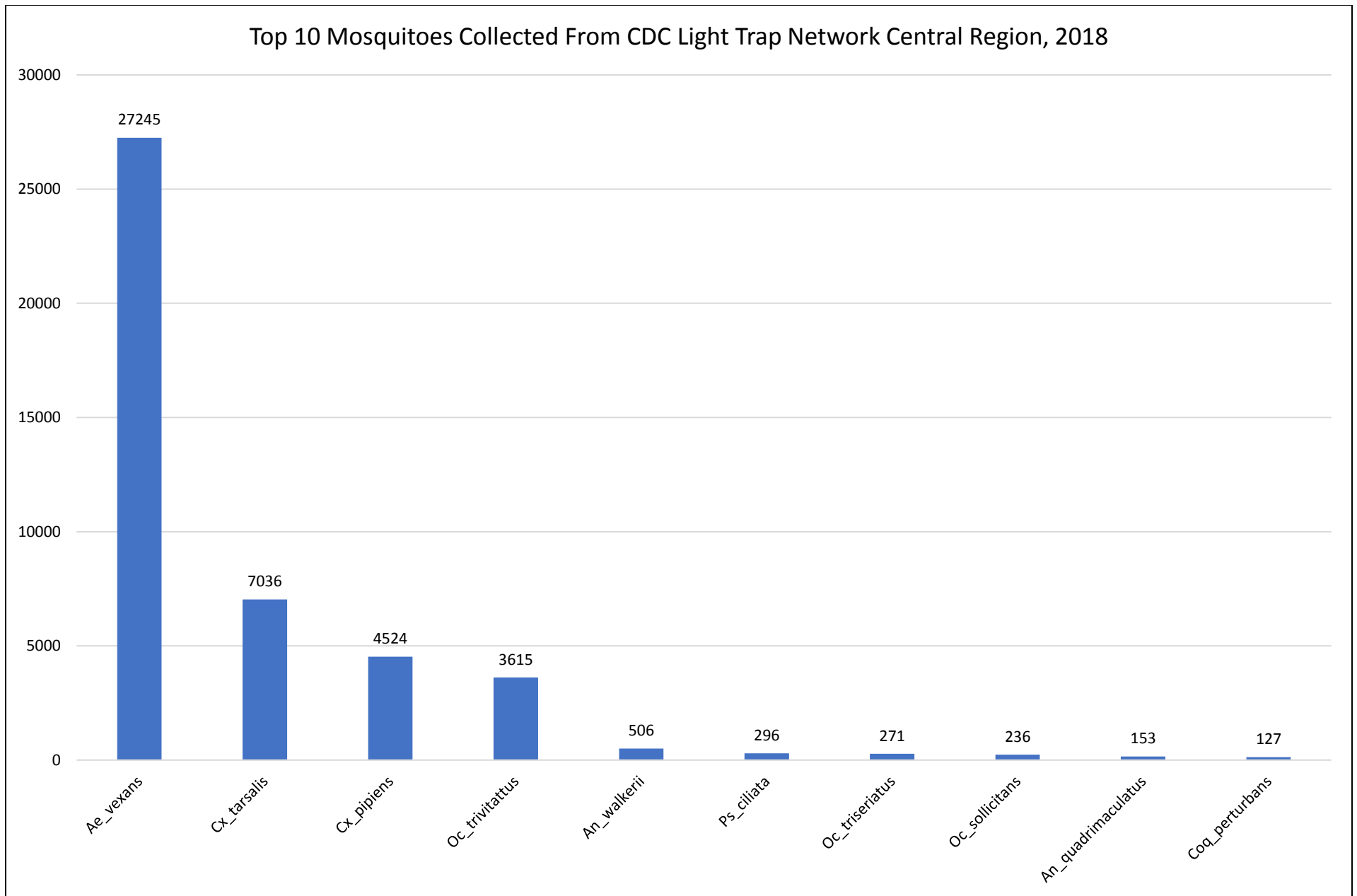


Figure 10. Top 10 cumulative mosquitoes collected in Central region of the state from CDC light trap network, 2018. Note that the first part of the mosquito species name has been abbreviated. Ae= *Aedes*, An= *Anopheles*, Cs= *Culex*, Cx= *Culex*, Oc= *Ochlerotatus*, Ps= *Psorophora*, and Unid'd= Unidentified.

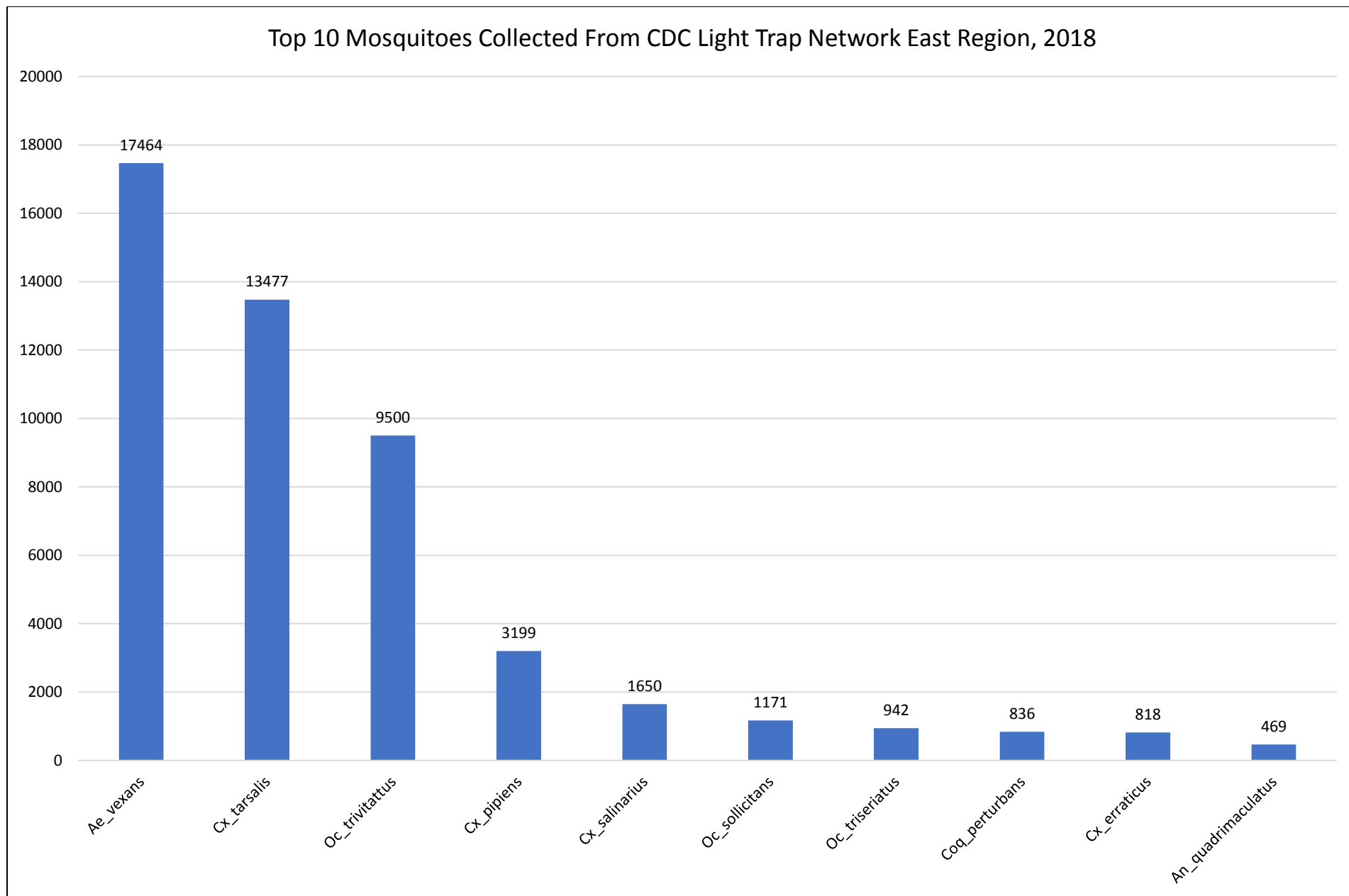


Figure 11. Top 10 cumulative mosquitoes collected in East region of the state from CDC light trap network, 2018. Note that the first part of the mosquito species name has been abbreviated. Ae= *Aedes*, An= *Anopheles*, Cs= *Culex*, Cx= *Culex*, Oc= *Ochlerotatus*, Ps= *Psorophora*, and Unid'd= Unidentified.

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 186,608 mosquitoes were captured with 177 (0.095%) *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	10	7	0
Cass Co. Overall Total		10	7	0
Douglas	CDC Light	16604	5594	1
	BG Sentinel 2	1518	436	0
Douglas Co. Overall Total		18122	6030	1
Lancaster	CDC Light	4430	1160	0
	BG Sentinel 2	462	116	0
Lancaster Co. Overall Total		4892	1276	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	8	2	0
Otoe Co. Overall Total		8	2	0
Richardson	CDC Light	2509	1674	106
	BG Sentinel 2	186	88	70
Richardson Co. Overall Total		2695	1762	176
Sarpy	CDC Light	NA	NA	NA
	BG Sentinel 2	104	88	0
Sarpy Co. Overall Total		104	88	0

Overall Total		25839	9170	177
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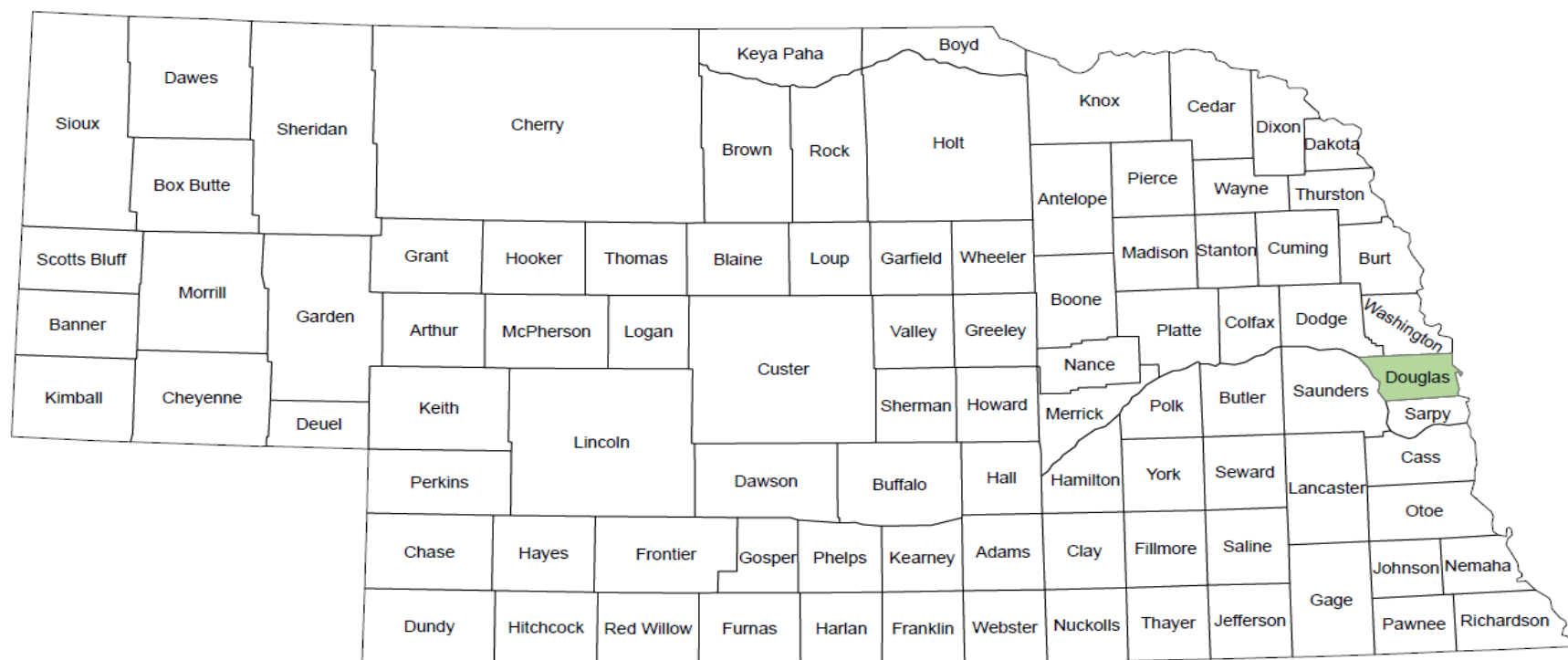
Note: ND= No data, NA = Not applicable.

Bird and Equine Surveillance

Dead bird reporting: For the season, 138 dead birds have been reported to the Nebraska DHHS dead bird database. Of these, eight have met the established criteria for WNV testing. One WNV positive has been reported from Douglas County (see Figure 12 below). Additionally, five have been negative and two were unsuitable for testing.

West Nile Virus Dead Bird Surveillance 2017

As of September 29



Legend

Positive

Positive / Tested Totals

Birds: 1 / 8

Figure 12. Positive WNV birds detected in the Nebraska, 2018.

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



Fight the Bite!!