Date: 09/17/2018. Please note that mosquito collection data covers dates 08/26/2018 to 09/08/2018 (CDC Weeks 35 and 36). Bird, human, and equine surveillance may include data from beyond these dates. All data is provisional and may change.

**Climate:** Over the past 30 days (dates 08/11/2018 to 09/09/2018), precipitation has been below normal over areas of 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 ≥10.0 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 09/09/2018) were below or near normal over most of the state with some pockets of temps above or near normal. Per the United States Drought Monitor, abnormally dry conditions were removed entirely from Nebraska. 100% of the state is now reporting no abnormally dry or drought conditions.

**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 “very high” based on historical county data. Overall in the east region, mosquito numbers continued to increase and were “very high” based on historical data from regional traps. *Aedes vexans* (inland floodwater mosquito) counts now made up the majority of trap collections (42.1%) in the region supplanting *Culex tarsalis* (primary WNV vector in Nebraska). *Culex* mosquito counts also continued to increase and were still “very high” based upon historical regional data. Individual county *Culex* collections ranged from “moderate” to “extremely high”. No invasive *Aedes albopictus* (Asian tiger mosquito) were collected from the region.

**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 decreased compared to the previous update and were considered “moderate”. *Aedes vexans* was also the most collected mosquito (37.1%) followed by *Culex tarsalis* (20.8%) from region traps. *Culex* mosquito counts decreased and were 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 decreased and were considered “low”. *Aedes vexans* was the most abundant mosquito collected in CDC light traps (64.1%). *Culex tarsalis*, was second making up 35.7% of mosquito collections. *Culex* mosquito counts continued to decrease and were “low” based upon historical regional data. Individual *Culex* counts across counties in the west region ranged from “low” to “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 26 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 2,207 *Culex* pools have been tested with 116 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 (2.33/1,000 *Culex*) and is above the 10-year median (1.88/1,000 *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 135 birds have been reported. Of the 135 birds reported, 12 have been a corvid bird (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:** 123 human clinical WNV cases have currently been reported along with 38 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, four 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 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 123 reported in Nebraska residents to date, 63 of which are the more severe neuroinvasive form. Unfortunately, four deaths related to WNV have now been reported in the state. Additionally, asymptomatic human blood donors also increased with 38 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, 116 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 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 saw an increase in overall mosquito numbers but the statewide average was still “moderate” when compared to historical data, averaging 161.54 total mosquitoes per trap night. The most abundant mosquito collected over the two week sampling period was *Aedes vexans*, accounting for 44.5% of trap collections. *Culex* mosquito counts statewide decreased and were considered “moderate” based on historical data, averaging 53.57 *Culex* per trap night.
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 (08/11/2018 to 09/09/2018) ranged from 0.1 to ≥10.0 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 09/09/2018), rainfall was below normal over areas of 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 below to near normal over most of the state with some pockets of temps above to near normal. The long range outlook as of 09/17/2018 (next 8 to 14 days), is predicting slightly 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](https://hprcc.unl.edu/index.php)

Percent of Normal Precipitation (%)
8/11/2018 – 9/9/2018

Generated 9/10/2018 at HPRCC using provisional data. 
NOAA Regional Climate Centers
Departure from Normal Temperature (F)
8/11/2018 – 9/9/2018

Generated 9/10/2018 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:


Drought Outlook

The current drought monitor on page eight (through 09/11/2018) showed elimination of abnormally dry conditions in Nebraska. Approximately 100.00% of the state is now being reported with no drought or abnormally dry conditions, and increase from last week. Currently no land area in the state is being reported with abnormal dryness or drought conditions. Last year at this time, 58.56% 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).

U.S. Monthly Drought Outlook
Drought Tendency During the Valid Period

Valid for September 2018
Released August 31, 2018

Author:
Adam Ailgood
NOAA/NWS/NCEP/Climate Prediction Center

http://go.usa.gov/3eZGd
To date, there has been 116 positive arbovirus positive mosquito pools detected in 25 different counties. All 116 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 2.33 which is above the 10-year median of 1.88 for this time of year. However, there are mosquito pools that remain to be tested and these results could change.

### Table 1. Arboviral Detections

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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.
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**

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<th>WNV^ (Asymptomatic Blood Donors)</th>
<th>SLE^</th>
<th>WEE^</th>
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^These are endemic viruses that have been historically transmitted by mosquitoes in Nebraska and may be 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).
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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.
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

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27
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

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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. **123 human clinical cases have been reported in Nebraska residents to date along with 38 positive asymptomatic human blood donors.** Additionally, **116 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 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 on 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 repellant (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](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](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/](https://www.cdc.gov/westnile/) (CDC West Nile Virus web site).

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


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:

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<tr>
<th>0 to 40th percentile</th>
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<th>61st to 80th percentile</th>
<th>81st to 97th percentile</th>
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<td>Very High</td>
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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

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<tr>
<td>Region/County</td>
<td>Total Mosquito</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td>East Region</td>
<td></td>
</tr>
<tr>
<td>Dixon</td>
<td>298.87</td>
</tr>
<tr>
<td>Dodge</td>
<td>201.00</td>
</tr>
<tr>
<td>Douglas</td>
<td>1070.00</td>
</tr>
<tr>
<td>Gage</td>
<td>ND</td>
</tr>
<tr>
<td>Jefferson</td>
<td>401.25</td>
</tr>
<tr>
<td>Lancaster</td>
<td>211.67</td>
</tr>
<tr>
<td>Madison</td>
<td>50.33</td>
</tr>
<tr>
<td>Platte</td>
<td>32.40</td>
</tr>
<tr>
<td>Richardson</td>
<td>ND</td>
</tr>
<tr>
<td>Seward</td>
<td>ND</td>
</tr>
<tr>
<td>Wayne</td>
<td>279.00</td>
</tr>
<tr>
<td>York</td>
<td>ND</td>
</tr>
</tbody>
</table>

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*= *Culesita*, *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.
Top 10 Mosquitoes Collected From CDC Light Trap Network Central Region, 2018

<table>
<thead>
<tr>
<th>Species</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ae. aegypti</td>
<td>27054</td>
</tr>
<tr>
<td>Cx. tarsalis</td>
<td>6961</td>
</tr>
<tr>
<td>Oc. triseratus</td>
<td>3610</td>
</tr>
<tr>
<td>Cx. pipiens</td>
<td>3255</td>
</tr>
<tr>
<td>An. waikeri</td>
<td>491</td>
</tr>
<tr>
<td>Ps. cillata</td>
<td>289</td>
</tr>
<tr>
<td>Oc. triseratus</td>
<td>271</td>
</tr>
<tr>
<td>Oc. sollicitans</td>
<td>234</td>
</tr>
<tr>
<td>Co. partitans</td>
<td>127</td>
</tr>
<tr>
<td>Unid'd Culex</td>
<td>98</td>
</tr>
</tbody>
</table>

**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 Depart., 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 164,201 mosquitoes were captured with 162 (0.099%) *Aedes albopictus* collected.

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

<table>
<thead>
<tr>
<th>County</th>
<th>Trap Type</th>
<th>Total Mosquitoes</th>
<th>Total Culex</th>
<th>Total Ae_albopictus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cass</td>
<td>CDC Light</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>BG Sentinel 2</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td><strong>Cass Co. Overall Total</strong></td>
<td></td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Douglas</td>
<td>CDC Light</td>
<td>14036</td>
<td>5023</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>BG Sentinel 2</td>
<td>1098</td>
<td>361</td>
<td>0</td>
</tr>
<tr>
<td><strong>Douglas Co. Overall Total</strong></td>
<td></td>
<td>15134</td>
<td>5384</td>
<td>0</td>
</tr>
<tr>
<td>Lancaster</td>
<td>CDC Light</td>
<td>3997</td>
<td>989</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>BG Sentinel 2</td>
<td>246</td>
<td>110</td>
<td>0</td>
</tr>
<tr>
<td><strong>Lancaster Co. Overall Total</strong></td>
<td></td>
<td>4243</td>
<td>1099</td>
<td>0</td>
</tr>
<tr>
<td>Nemaha</td>
<td>CDC Light</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>BG Sentinel 2</td>
<td>8</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td><strong>Nemaha Co. Overall Total</strong></td>
<td></td>
<td>8</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Otoe</td>
<td>CDC Light</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>BG Sentinel 2</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Otoe Co. Overall Total</strong></td>
<td></td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Richardson</td>
<td>CDC Light</td>
<td>1791</td>
<td>1121</td>
<td>104</td>
</tr>
<tr>
<td></td>
<td>BG Sentinel 2</td>
<td>153</td>
<td>83</td>
<td>58</td>
</tr>
<tr>
<td><strong>Richardson Co. Overall Total</strong></td>
<td></td>
<td>1944</td>
<td>1204</td>
<td>162</td>
</tr>
<tr>
<td>Sarpy</td>
<td>CDC Light</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>BG Sentinel 2</td>
<td>89</td>
<td>79</td>
<td>0</td>
</tr>
<tr>
<td><strong>Sarpy Co. Overall Total</strong></td>
<td></td>
<td>89</td>
<td>79</td>
<td>0</td>
</tr>
<tr>
<td>Overall Total</td>
<td>21436</td>
<td>7780</td>
<td>162</td>
<td></td>
</tr>
</tbody>
</table>

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

**Bird and Equine Surveillance**

**Dead bird reporting:** For the season, 135 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.
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!!