

# **Manitoba Weekly**

## **West Nile virus**

### **Surveillance Report**

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**Week 35 – (August 26 – September 1, 2018)**

Communicable Disease Control

Public Health Branch

Active Living, Indigenous Relations, Population &

Public Health Care Division

**Manitoba Health, Seniors and Active Living**

Released: September 7, 2018

## **About the Surveillance Report**

The weekly 'West Nile Virus Surveillance Report' outlines the most current surveillance data and is posted weekly on the website ([www.gov.mb.ca/health/wnv](http://www.gov.mb.ca/health/wnv)) during the summer season. Surveillance data are subject to change and will be updated accordingly as new information becomes available.

Manitoba Health, Seniors and Active Living (MHSAL) conducts surveillance for West Nile virus (WNV) within human, mosquito & horse populations annually:

- **Mosquito:** Mosquito surveillance is conducted twice per week between mid-May and mid-September (weather dependent) in a number of southern Manitoba communities. In Manitoba WNV testing is conducted on *Culex tarsalis* mosquitoes, the principal vectors of WNV, and both mosquito numbers and infection rates (i.e. positive mosquito pools\*) are reported.
  - Communities chosen for mosquito trap placement were selected based on population density, local evidence of prior WNV activity and representative geographic distribution.
- **Human:** Human WNV surveillance is conducted throughout the year (January – December) by Cadham Provincial Laboratory and Canadian Blood Services, with all data reportable to MHSAL.
  - Human cases are included in the Weekly WNV Surveillance Report based on the date they are reported to MHSAL. Case classification information is not included in this report but can be found on the website ([www.gov.mb.ca/health/wnv/stats.html](http://www.gov.mb.ca/health/wnv/stats.html)).
- **Horse:** Surveillance of WNV in horses is conducted by Manitoba Agriculture with cases reported to MHSAL as detected.

The risk of WNV transmission is expected to be present throughout southern Manitoba each year and mosquito trapping provides a localized estimate of WNV risk. The absence of traps in a community or region does not imply that there is no risk of WNV in those locations. Further, low *Culex tarsalis* numbers and/ or infection rates should not be interpreted as zero risk. Residents and visitors are strongly encouraged to protect themselves from mosquito bites throughout the season even in areas with no mosquito traps or low WNV activity.

The accumulation of Degree Days<sup>1</sup> are recorded throughout the season as there is a general correlation between increased and/ or rapid accumulation of Degree Days and WNV transmission risk. Warmer temperatures associated with increased Degree Days serve to decrease mosquito development times, shorten the WNV incubation period and increase biting activity. All of which can increase the risk of WNV transmission, should other conditions also be favourable. Seasonally the greatest accumulation of Degree Days typically occurs in the southwestern portion of the province and along the Red River valley.

For additional West Nile virus information, including precautionary measures and symptoms, please consult the MHSAL WNV website ([www.gov.mb.ca/health/wnv](http://www.gov.mb.ca/health/wnv)) or contact Health Links at 204-788-8200 (in Winnipeg) or toll free at 1-888-315-9257.

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<sup>1</sup> For more detailed description of mosquito pools and degree days please consult **Appendix 2**.

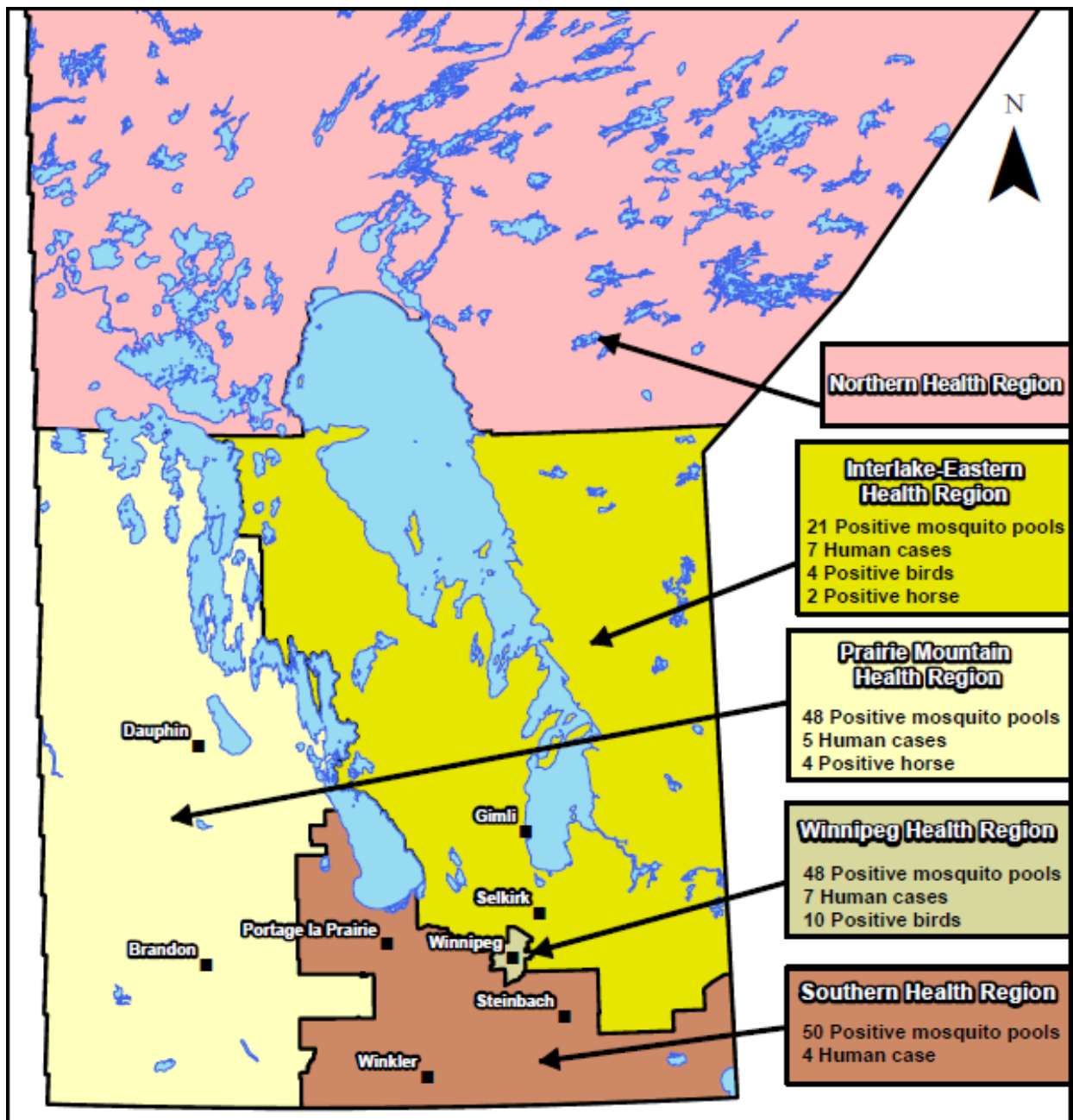
## **WNV Provincial Surveillance Data**

- During Week 35\* (August 26 – September 1) MHSAL detected three (3) additional human WNV cases, bringing the season total to date to twenty-three (23).
  - Three cases have been classified as WNV Neurological Syndrome, three as WNV Non-Neurological Syndrome, seven as Asymptomatic, while the classification of ten cases remain under investigation pending additional information.
- During Week 35, MHSAL detected one (1) additional WNV positive *Culex tarsalis* mosquito pool, bringing the total to date this season to one-hundred and sixty-seven (167) (Figure 1 & 3, Table 1).
  - The positive pool was collected from the Prairie Mountain (Boissevain) Health Region.
- In Week 35 *Cx. tarsalis* activity was recorded in all four southern Manitoba Health Regions, however activity decreased significantly in comparison to Week 34. Specimens were only collected from sixteen of the twenty-nine sentinel communities (Figure 1, Table 1).
  - *Cx. tarsalis* activity and infection rates were highest in the Prairie Mountain Health Region in Week 35, 1.08 *Cx. tarsalis*/ trap night and 7.1% respectively.
- Fourteen (14) WNV positive birds (Interlake-Eastern and Winnipeg Health Regions) and six (6) WNV positive horses (Interlake-Eastern Health Region and Prairie Mountain Health) have also been reported this season.

\* For a listing of CDC surveillance weeks and corresponding dates for 2018 please see Appendix 1.

**Table 1** – Average number of *Culex tarsalis* mosquitoes captured by Health Region (current to Week 35)

| Health Region      | CDC Week   |        |        |        |        |        |        |       |      |
|--------------------|--|--------|--------|--------|--------|--------|--------|-------|------|
|                    | 27   | 28     | 29     | 30     | 31     | 32     | 33     | 34    | 35   |
| Interlake-Eastern  | 23.47  | 54.88  | 182.65 | 58.84  | 19.58  | 23.74  | 20.22  | 2.10  | 0.26 |
| Prairie Mountain   | 11.26  | 65.50  | 139.15 | 80.83  | 20.60  | 57.57  | 108.19 | 20.45 | 1.08 |
| Southern           | 20.75  | 133.44 | 57.70  | 84.64  | 23.60  | 31.20  | 20.48  | 8.37  | 0.65 |
| Winnipeg           | 12.06  | 75.47  | 64.11  | 96.94  | 34.98  | 26.50  | 25.11  | 15.97 | 0.53 |
| Provincial Average | 16.19  | 89.82  | 101.60 | 83.17  | 26.10  | 36.96  | 48.35  | 12.82 | 0.69 |
| Historical Avg     | 149.49   | 132.39 | 99.27  | 234.27 | 251.73 | 118.00 | 68.70  | 34.02 | 6.40 |
|                    | Indicates that one or more positive mosquito pools were detected within the health region. |        |        |        |        |        |        |       |      |

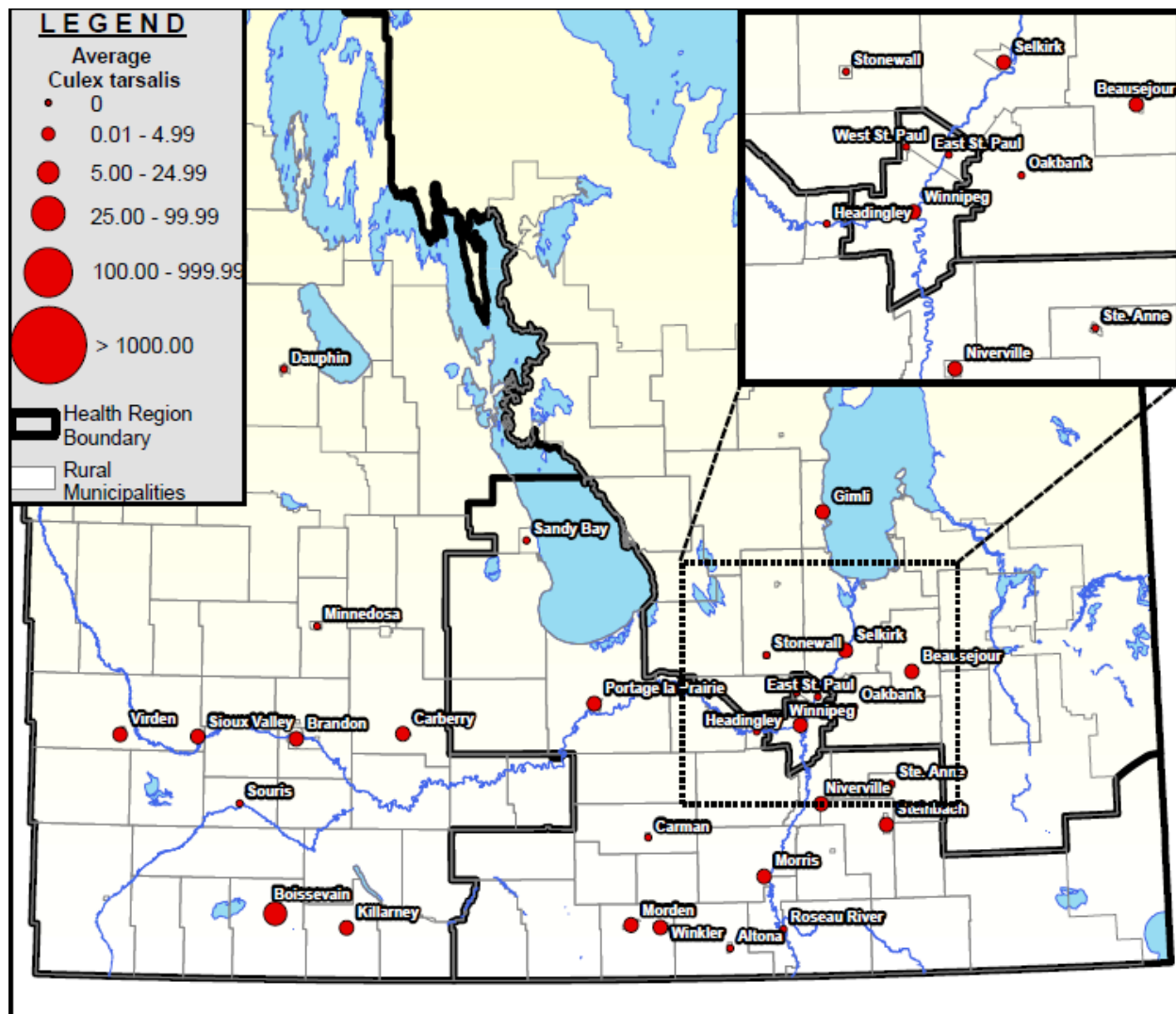


**Figure 1 – WNV activity by Health Region within Manitoba (current to Week 35).**

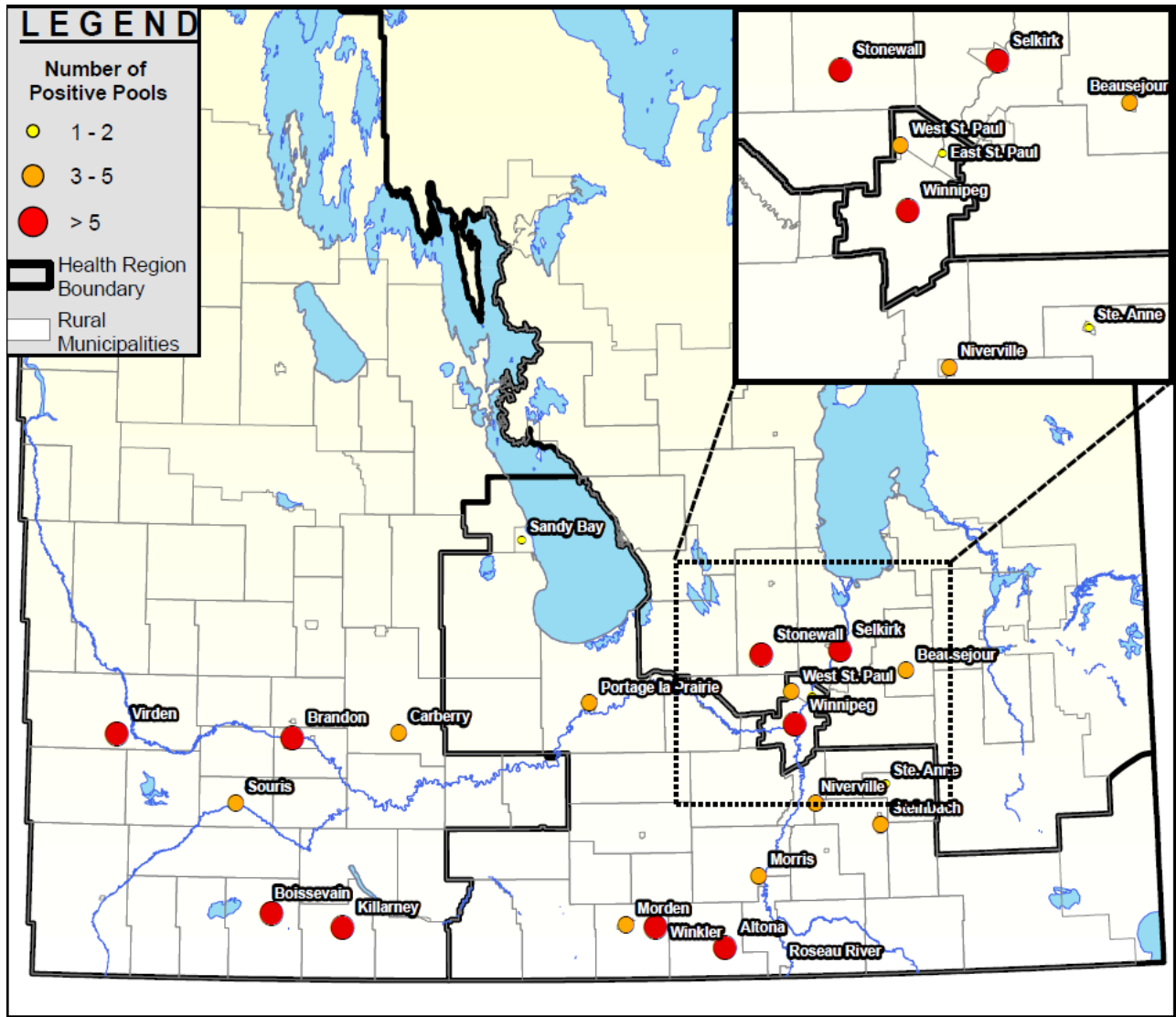
**Table 2 – Average number and proportion of *Culex tarsalis* mosquitoes collected by surveillance community\* in southern Manitoba – three week trend (current to Week 35).**

| Health Region     | Community  | Week 35                      |                                   | Week 34                      |                                   |
|-------------------|--|------------------------------|-----------------------------------|------------------------------|-----------------------------------|
|                   |  | Avg # of <i>Cx. tarsalis</i> | Proportion of <i>Cx. tarsalis</i> | Avg # of <i>Cx. tarsalis</i> | Proportion of <i>Cx. tarsalis</i> |
| Interlake-Eastern | Beausejour   | 0.25                         | 2.78                              | 2.75                         | 18.97                             |
|                   | Gimli  | 0.25                         | 5.56                              | 1.25                         | 8.77                              |
|                   | Oakbank  | 0.00                         | 0.00                              | <b>3.00</b>                  | 36.36                             |
|                   | Selkirk  | 1.00                         | 21.43                             | 3.00                         | 7.84                              |
|                   | Stonewall  | 0.00                         | 0.00                              | 0.50                         | 0.08                              |
| Prairie Mountain  | <b>Boissevain</b>  | <b>6.00</b>                  | 75.00                             | <b>135.00</b>                | 78.95                             |
|                   | Brandon  | 0.60                         | 17.14                             | 4.11                         | 44.05                             |
|                   | Carberry   | 1.00                         | 22.22                             | 11.25                        | 66.18                             |
|                   | Dauphin  | No Trapping                  | No Trapping                       | 0.75                         | 12.00                             |
|                   | Killarney  | 0.50                         | 33.33                             | <b>13.75</b>                 | 63.95                             |
|                   | Minnedosa  | 0.00                         | 0.00                              | 0.50                         | 2.90                              |
|                   | Sioux Valley FN  | 0.50                         | 12.50                             | <b>15.75</b>                 | 34.43                             |
|                   | Souris   | 0.00                         | 0.00                              | <b>17.67</b>                 | 61.63                             |
|                   | Virден   | 0.75                         | 42.86                             | 5.00                         | 55.56                             |
| Southern          | Altona   | 0.00                         | 0.00                              | <b>24.75</b>                 | 70.21                             |
|                   | Carman   | 0.00                         | 0.00                              | 0.33                         | 4.55                              |
|                   | Headingley   | 0.00                         | 0.00                              | 0.00                         | 0.00                              |
|                   | Morden   | 1.50                         | 18.18                             | 6.50                         | 37.68                             |
|                   | Morris   | 0.25                         | 3.57                              | <b>7.25</b>                  | 37.18                             |
|                   | <b>Niverville</b>  | <b>2.00</b>                  | 46.15                             | 11.75                        | 55.29                             |
|                   | <b>Portage la Prairie</b>  | <b>1.75</b>                  | 16.28                             | <b>11.25</b>                 | 32.61                             |
|                   | Roseau River FN  | 0.00                         | 0.00                              | 4.00                         | 15.09                             |
|                   | Ste. Anne  | 0.00                         | 0.00                              | <b>0.25</b>                  | 4.55                              |
|                   | Sandy Bay FN   | 0.00                         | 0.00                              | 6.50                         | 36.62                             |
|                   | Steinbach  | 1.50                         | 75.00                             | 6.50                         | 70.27                             |
|                   | Winkler  | 0.50                         | 4.55                              | 13.00                        | 27.66                             |
| Winnipeg          | East St Paul   | 0.00                         | 0.00                              | 3.00                         | 9.38                              |
|                   | West St Paul   | 0.00                         | 0.00                              | <b>19.50</b>                 | 26.53                             |
|                   | Winnipeg   | 0.60                         | 7.79                              | <b>16.64</b>                 | 45.82                             |
|                   | Indicates that one or more positive mosquito pools were detected within the community. |                              |                                   |                              |                                   |

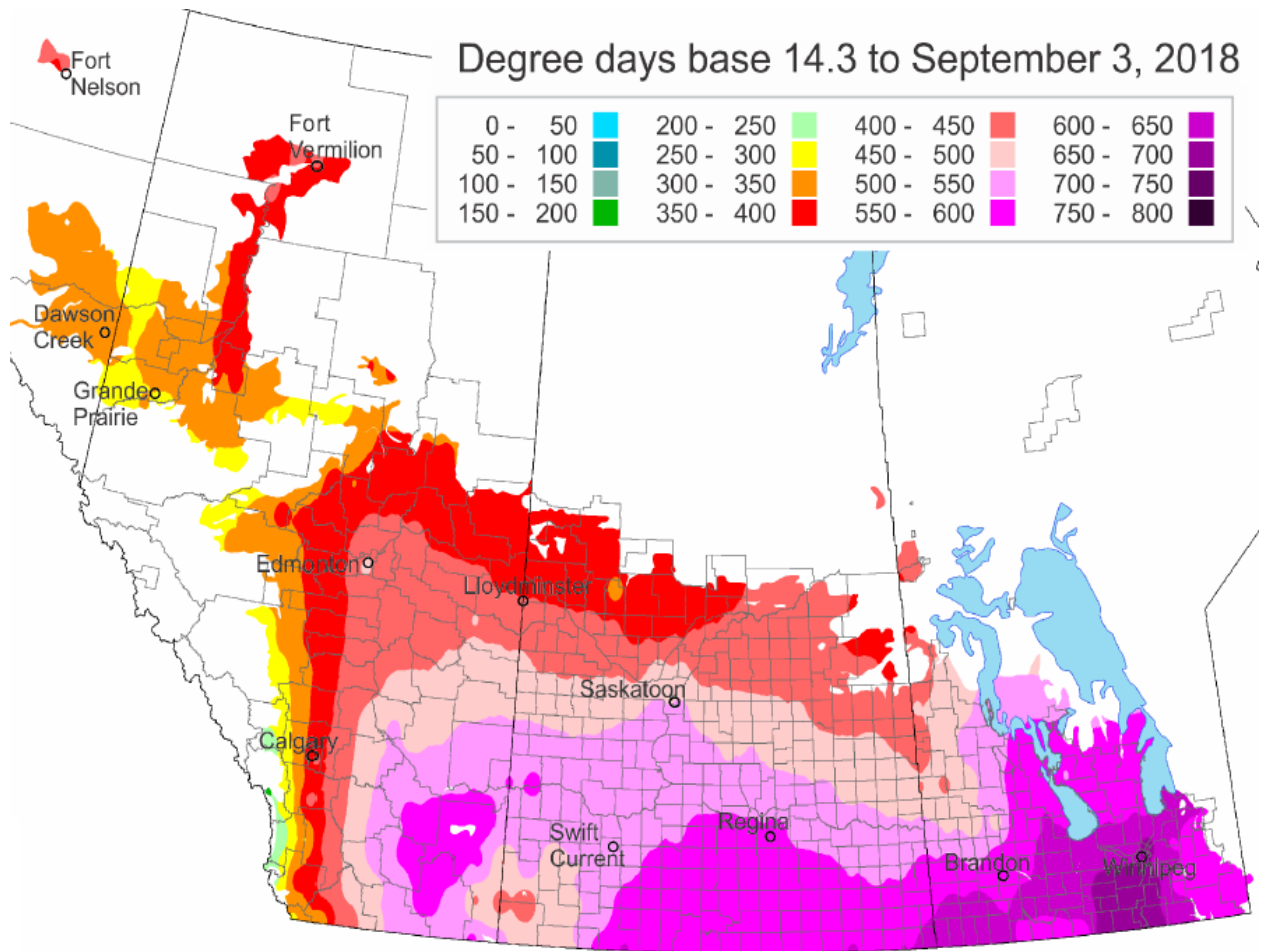
\* Top three communities with the highest weekly average of *Culex tarsalis* are indicated in bold.



**Figure 2** – Average number of *Culex tarsalis* mosquitoes collected across southern Manitoba during Week 35.



**Figure 3** – Distribution of WNV positive *Culex tarsalis* mosquito pools collected in southern Manitoba (current to Week 35).



Source: Map produced courtesy of Agriculture and Agri-Food Canada's Prairie Pest Monitoring Network.

Figure 4 - Degree day accumulations, as of Week 35, across the Prairie Provinces

Table 3 – Total number of human WNV cases\*, by Health Region of residence, reported to Manitoba Health, Seniors and Active Living by laboratories (current to Week 35).

| Health Region     | CDC Week |          |          |          |          |          |          |           |          | Totals    |
|-------------------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|
|                   | 27       | 28       | 29       | 30       | 31       | 32       | 33       | 34        | 35       |           |
| Interlake-Eastern | 0        | 0        | 0        | 0        | 0        | 0        | 3        | 3         | 1        | 7         |
| Prairie Mountain  | 0        | 0        | 0        | 1        | 0        | 0        | 1        | 2         | 1        | 5         |
| Southern          | 0        | 1        | 0        | 0        | 0        | 0        | 0        | 3         | 0        | 4         |
| Winnipeg          | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 6         | 1        | 7         |
| <b>Totals</b>     | <b>0</b> | <b>1</b> | <b>0</b> | <b>1</b> | <b>0</b> | <b>0</b> | <b>4</b> | <b>14</b> | <b>3</b> | <b>23</b> |

\* Note that cases are presented by week reported to MHSAL, adjustments may be made as more details (such as exposure CDC week) become available through follow-up investigation.



**Table 4 – Total number of *Culex tarsalis* mosquito pools tested during the 2018 season by health region (current to Week 35)**

| Health Region        | CDC Week   |            |            |            |            |            |            |            |           | Totals      |
|----------------------|------------|------------|------------|------------|------------|------------|------------|------------|-----------|-------------|
|                      | 27         | 28         | 29         | 30         | 31         | 32         | 33         | 34         | 35        |             |
| Interlake-Eastern    | 20         | 23         | 41         | 30         | 19         | 20         | 14         | 10         | 4         | 228         |
| Prairie Mountain     | 36         | 55         | 78         | 62         | 43         | 56         | 73         | 38         | 14        | 547         |
| Southern             | 42         | 106        | 73         | 88         | 45         | 57         | 39         | 35         | 11        | 633         |
| Winnipeg             | 24         | 57         | 48         | 67         | 62         | 39         | 37         | 29         | 10        | 471         |
| <b>Weekly Totals</b> | <b>122</b> | <b>241</b> | <b>240</b> | <b>247</b> | <b>169</b> | <b>172</b> | <b>163</b> | <b>112</b> | <b>39</b> | <b>1879</b> |

**Table 5\* – Total number and percentage of WNV positive *Culex tarsalis* mosquito pools by Health Region (current to Week 35)**

| Health Region        | CDC Week           |                     |                      |                      |                      |                      |                      |                      |                | Totals           |
|----------------------|--------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------|------------------|
|                      | 27                 | 28                  | 29                   | 30                   | 31                   | 32                   | 33                   | 34                   | 35             |                  |
| Interlake-Eastern    | 3<br>(15.0)        | 0 (0)               | 6 (14.6)             | 7 (23.3)             | 2 (10.5)             | 0 (0)                | 2<br>(14.3)          | 1 (10.0)             | 0 (0.0)        | 21 (9.2)         |
| Prairie Mountain     | 0 (0)              | 2 (3.6)             | 5 (6.4)              | 10<br>(16.1)         | 6 (14.0)             | 8 (14.3)             | 13<br>(17.8)         | 3 (7.9)              | 1 (7.1)        | 48 (8.8)         |
| Southern             | 0 (0)              | 5 (4.7)             | 8 (11.0)             | 13<br>(14.8)         | 4 (8.9)              | 13 (22.8)            | 2 (5.1)              | 5 (14.3)             | 0 (0.0)        | 50 (7.9)         |
| Winnipeg             | 0 (0)              | 4 (7.0)             | 6 (12.5)             | 11<br>(16.4)         | 9 (14.5)             | 6 (15.4)             | 6<br>(16.2)          | 5 (17.2)             | 0 (0.0)        | 48 (10.2)        |
| <b>Weekly Totals</b> | <b>3<br/>(2.5)</b> | <b>11<br/>(4.6)</b> | <b>25<br/>(10.4)</b> | <b>41<br/>(16.6)</b> | <b>21<br/>(12.4)</b> | <b>27<br/>(15.7)</b> | <b>23<br/>(14.1)</b> | <b>14<br/>(12.5)</b> | <b>1 (2.6)</b> | <b>167 (8.9)</b> |

\* Note that numbers outside brackets represent positive pools, numbers within represent the percentage of total pools that tested positive for WNV.

**Table 6 – Comparison of year-to-date cumulative and year-end total West Nile virus in Manitoba (current to Week 35)**

| Year        | Cumulative (Year-to-Date) Amount |                 | Year End Totals         |                 |
|-------------|----------------------------------|-----------------|-------------------------|-----------------|
|             | Positive Mosquito Pools          | Human WNV Cases | Positive Mosquito Pools | Human WNV Cases |
| <b>2018</b> | <b>167</b>                       | <b>23</b>       | <b>TBD</b>              | <b>TBD</b>      |
| 2017        | 41                               | 5               | 41                      | 5               |
| 2016        | 39                               | 22              | 39                      | 24              |
| 2015        | 29                               | 5               | 30                      | 5               |
| 2014        | 22                               | 4               | 24                      | 5               |
| 2013        | 19                               | 3               | 19                      | 3               |
| 2012        | 116                              | 39              | 116                     | 39              |
| 2011        | 0                                | 0               | 0                       | 0               |
| 2010        | 20                               | 0               | 20                      | 0               |
| 2009        | 2                                | 2               | 2                       | 2               |
| 2008        | 40                               | 12              | 41                      | 12              |
| 2007        | 943                              | 540             | 948                     | 587             |
| 2006        | 171                              | 47              | 171                     | 51              |
| 2005        | 192                              | 51              | 193                     | 58              |
| 2004        | 57                               | 3               | 57                      | 3               |
| 2003        | 284                              | 132             | 290                     | 143             |

## **WNV Activity in Canada and the United States**

### **Canada:**

- As of Week 35 there have been:
  - 96 WNV human cases (3 in Alberta, 23 in Manitoba, 35 in Ontario (including 2 travel-related cases), 22 in Quebec and 13 in Saskatchewan),
  - 512 WNV positive mosquito pools (166 in Manitoba, 261 in Ontario, 34 in Quebec and 51 in Saskatchewan),
  - 73 WNV positive birds (14 in Manitoba, 25 in Ontario, 31 in Quebec and 3 in Saskatchewan), and
  - 46 WNV positive horses (21 in Alberta, 6 in Manitoba and 19 in Saskatchewan) reported in Canada.
  
- Additional Canadian WNV information can be obtained by consulting the Public Health Agency of Canada West Nile virus website at <https://www.canada.ca/en/public-health/services/diseases/west-nile->

[virus/surveillance-west-nile-virus.html](#), or by consulting the respective provincial department websites.

**United States:**

- As of September 4, 2018 the US CDC is reporting WNV activity from 45 states (includes human cases, positive mosquito pools and positive birds). A total of 559 human cases along with 136 presumptive blood donors have been reported to date, of which 56% have been classified as West Nile neuroinvasive disease. The US CDC is also reporting eighteen (18) WNV related deaths this year.
- WNV activity has been reported from:
  - Minnesota (20 human cases (including 16 presumptive viremic blood donors) and numerous positive mosquito pools),
  - North Dakota (107 human cases (including 21 viremic blood donors), 88 WNV positive mosquito pools, 4 WNV positive horse and 12 WNV positive birds), and
  - South Dakota (77 human cases (including 2 WNV associated mortality and 17 presumptive viremic blood donors) and numerous mosquito pools).
- Up to date U.S. WNV information can be obtained by visiting the United States Centers for Disease Control and Prevention – West Nile virus Website' at <https://www.cdc.gov/westnile/statsmaps/preliminarymapsdata2018/index.html>, or by consulting state specific Public Health websites.

## Appendix 1

**Table 8 – 2018 CDC surveillance weeks**

| CDC Week Number | Dates             | CDC Week Number | Dates                       |
|-----------------|-------------------|-----------------|-----------------------------|
| 21              | May 20 – May 26   | 30              | July 22 - July 28           |
| 22              | May 27 – June 2   | 31              | July 29 - August 4          |
| 23              | June 3 - June 9   | 32              | August 5 - August 11        |
| 24              | June 10 - June 16 | 33              | August 12 - August 18       |
| 25              | June 17 - June 23 | 34              | August 19 - August 25       |
| 26              | June 24 – June 30 | 35              | August 26 - September 1     |
| 27              | July 1 - July 7   | 36              | September 2 - September 8   |
| 28              | July 8 - July 14  | 37              | September 9 - September 15  |
| 29              | July 15 - July 21 | 38              | September 16 - September 22 |

## Appendix 2

**Average number of *Culex tarsalis*** – This weekly value provides an estimate of the *Culex tarsalis* numbers and activity. The potential risk of WNV transmission is greater when more *Culex tarsalis* are present – should the virus itself be present and other conditions prove favorable. It is calculated by dividing the total number of *Culex tarsalis* mosquitoes captured in the specified area by the total number of trap nights for the week (a trap night is recorded for each night that a trap was operational).

**EXAMPLE:** 120 *Culex tarsalis* collected; 2 traps operating on 2 nights (= 4 trap nights);  
Average number = 120 (*Culex tarsalis*) / 4 trap nights = 30.0

**Degree Day** – Degree days are a measurement of heat accumulation. The threshold temperature below which West Nile virus development does not occur (when in mosquitoes) is 14.3°C. Degree days are calculated by taking the daily mean temperature and subtracting the cut-off threshold:

**EXAMPLE:** Mean Temperature = 19.3°C; Degree Day threshold = 14.3°C; 19.3 – 14.3 = 5.0 Degree Days.

During the season a running total of accumulated Degree Days is recorded. It is generally assumed that a total of 109 Degree Days are required for virus development to be completed and potential transmission to occur. The risk of transmission increases with increasing Degree Day accumulation. Moreover, consistently warmer temperatures will significantly shorten virus development time thereby increasing the potential risk of WNV transmission – should the virus itself be present and other conditions prove to be favorable.

**Mosquito Pool** – Mosquitoes of the same species, collected from the same trap on the same date are pooled together for the purposes of laboratory testing. *Culex tarsalis* mosquitoes collected from one trap on a given night are placed in pools of 1 – 50 mosquitoes for WNV testing. When more than 50 *Culex tarsalis* mosquitoes are collected from the same trap multiple pools are tested. Thus a positive pool refers to the detection of WNV in between 1 – 50 *Culex tarsalis* mosquitoes collected from a given trap.