Manitoba Weekly West Nile virus Surveillance Report

Week 31 – (July 29 – August 4, 2018)

Communicable Disease Control

Public Health Branch

Active Living, Indigenous Relations, Population &

Public Health Care Division

Manitoba Health, Seniors and Active Living

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Manitoba

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) 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).
- **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[1] 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) or contact Health Links at 204-788-8200 (in Winnipeg) or toll free at 1-888-315-9257.

[1] For more detailed description of mosquito pools and degree days please consult **Appendix 2**.

WNV Provincial Surveillance Data

- During Week 31* (July 29 – August 4) MHSAL detected an additional twenty-one additional WNV positive *Culex tarsalis* mosquito pools, bringing the total to date this season to one-hundred and two (Figure 1 & 3, Table 1).
  - The positive pools were collected from the Interlake-Eastern (Selkirk and Stonewall), Prairie Mountain (Boissevain, Carberry, Killarney, Sioux Valley and Virden), Southern (Altona, Morris, Roseau River and Steinbach) and Winnipeg (West St. Paul and Winnipeg) Health Regions.
- In Week 31 *Cx. tarsalis* activity was recorded in all four southern Manitoba Health Regions. Activity decreased slightly in comparison to Week 29 and specimens were again collected from all but one of the 29 sentinel communities (Figure 1, Table 1).
  - *Cx. tarsalis* activity was greatest in the Winnipeg Health Region in Week 31 (34.98 *Cx. tarsalis*/ trap night). Similarly, infection rates were highest in the Winnipeg Health Region (14.5%).
- To date one WNV human case (Southern Health Region) has been reported, along with eleven WNV positive birds (Interlake-Eastern and Winnipeg Health Regions) and one WNV positive horse (Interlake-Eastern Health Region).

*2017 Year-End WNV Surveillance Data**

- *With the detection of WNV activity in Manitoba in Week 25 the 2018 season, the Year-End WNV Surveillance summary will no longer be included in the current, or future, weekly surveillance reports. The 2017 Year-End Surveillance summary can be found in the first 2018 weekly surveillance report (http://www.gov.mb.ca/health/wnv/stats.html).*

**** 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 31)

Health Region	CDC Week							
	24	25	26	27	28	29	30	31
Interlake-Eastern	2.65	8.16	7.00	23.47	54.88	182.65	58.84	19.58
Prairie Mountain	2.98	1.12	7.74	11.26	65.50	139.15	80.83	20.60
Southern	6.24	9.34	23.41	20.75	133.44	57.70	84.64	23.60
Winnipeg	3.76	17.76	5.91	12.06	75.47	64.11	96.94	34.98
Provincial Average	**4.21**	**8.42**	**12.36**	**16.19**	**89.82**	**101.60**	**83.17**	**26.10**
Historical Avg	**11.28**	**10.60**	**108.79**	**149.49**	**132.39**	**99.27**	**234.27**	**251.73**
	Indicates that one or more positive mosquito pools were detected within the health region.							

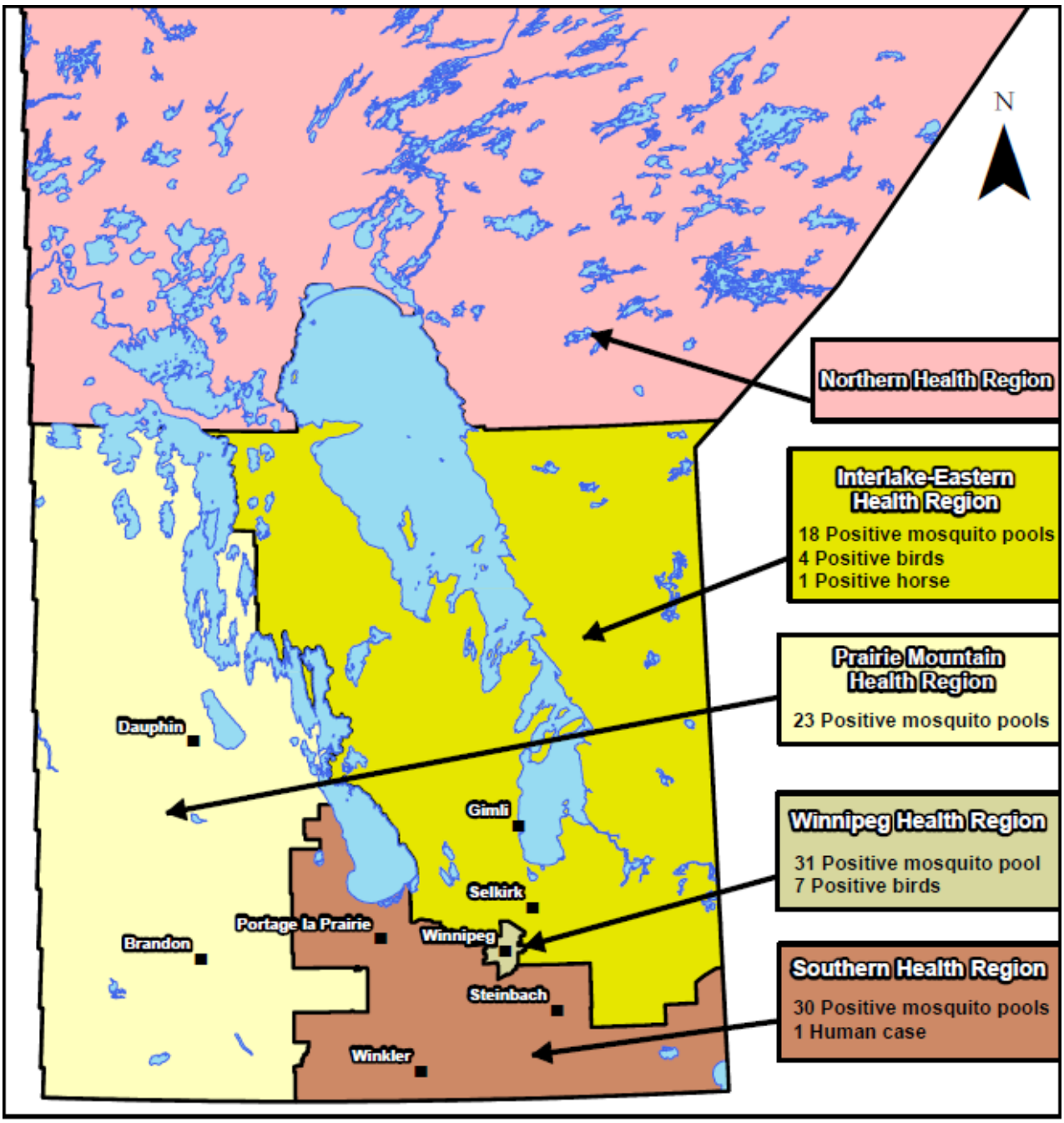


Figure 1 – WNV activity by Health Region within Manitoba (current to Week 31).

Table 2 – Average number and proportion of *Culex tarsalis* mosquitoes collected by surveillance community* in southern Manitoba – three week trend (current to Week 31).

Health Region	Community	Week 31		Week 30	
		Avg # of *Cx. tarsalis*	Proportion of *Cx. tarsalis*	Avg # of *Cx. tarsalis*	Proportion of *Cx. tarsalis*
Interlake-Eastern	Beausejour	12.00	21.30	32.50	42.76
	Gimli	4.75	19.39	13.33	12.31
	Oakbank	2.00	10.53	16.50	24.63
	Selkirk	45.50	29.35	58.75	22.66
	Stonewall	31.75	16.67	161.75	25.39
Prairie Mountain	**Boissevain**	**92.50**	75.66	**335.00**	84.60
	Brandon	7.10	24.74	59.60	67.65
	Carberry	8.75	33.33	30.75	56.16
	Dauphin	0.50	1.35	3.50	5.65
	Killarney	53.75	36.82	171.00	60.05
	Minnedosa	0.00	0.00	2.25	1.37
	Sioux Valley FN	5.75	7.28	64.00	12.39
	Souris	17.25	39.66	37.75	46.60
	Virden	10.00	30.30	55.50	71.84
Southern	Altona	25.25	32.17	82.00	51.09
	Carman	3.25	5.00	28.00	57.14
	Headingley	1.00	3.75	4.50	16.07
	Morden	63.75	45.86	208.25	71.32
	Morris	21.75	27.19	61.50	78.85
	Niverville	17.25	31.80	163.00	71.02
	Portage la Prairie	46.25	31.52	88.75	44.77
	Roseau River FN	9.75	34.82	26.25	49.30
	Ste. Anne	1.25	2.18	12.00	9.94
	Sandy Bay FN	0.50	0.44	25.50	15.67
	Steinbach	13.50	68.35	23.75	83.33
	Winkler	**74.00**	61.03	**240.50**	81.53
Winnipeg	East St Paul	13.67	18.64	65.00	56.03
	West St Paul	**199.67**	43.79	**704.50**	93.25
	Winnipeg	25.63	38.85	60.97	48.65
	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.

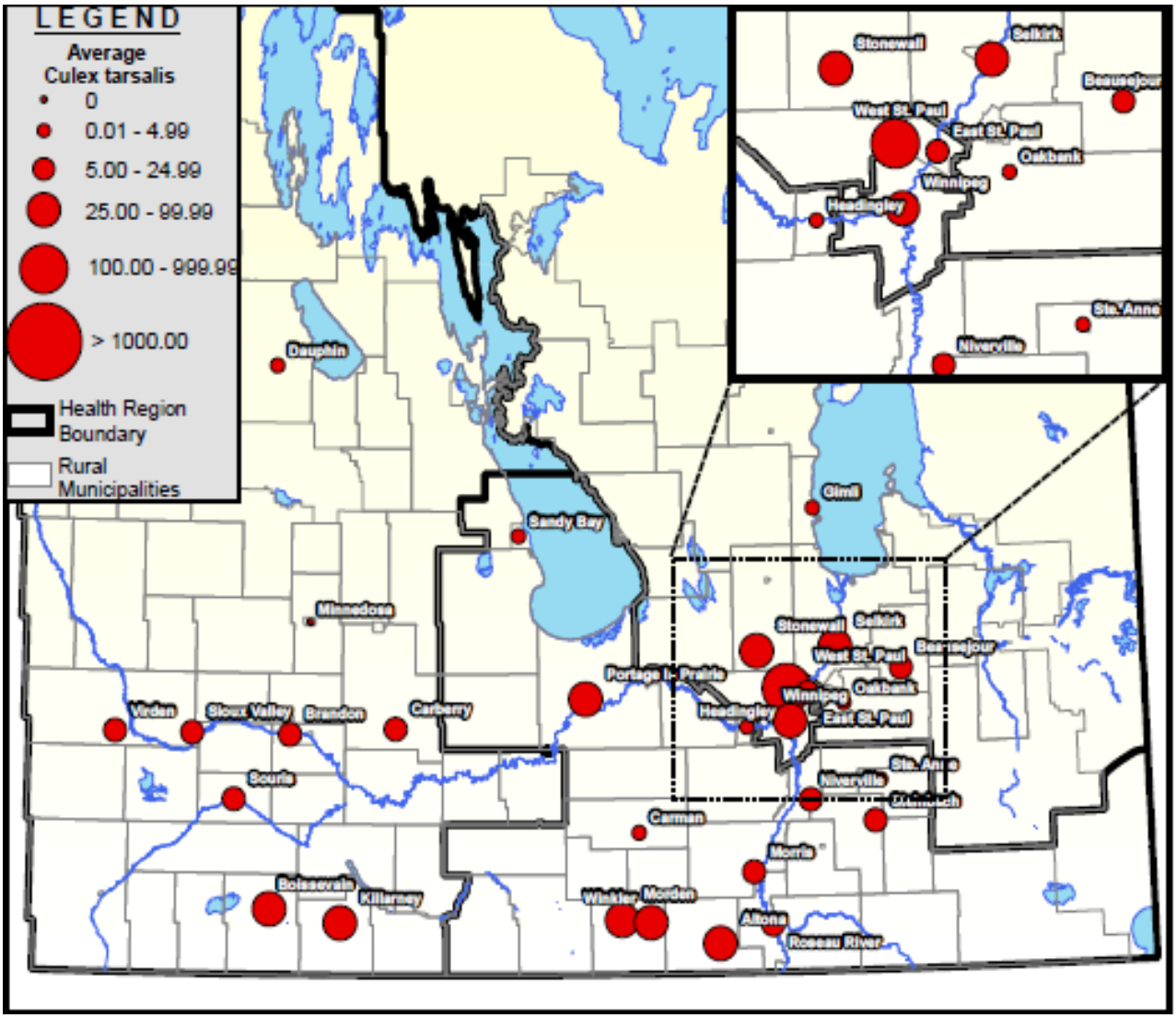


Figure 2 – Average number of *Culex tarsalis* mosquitoes collected across southern Manitoba during Week 31.

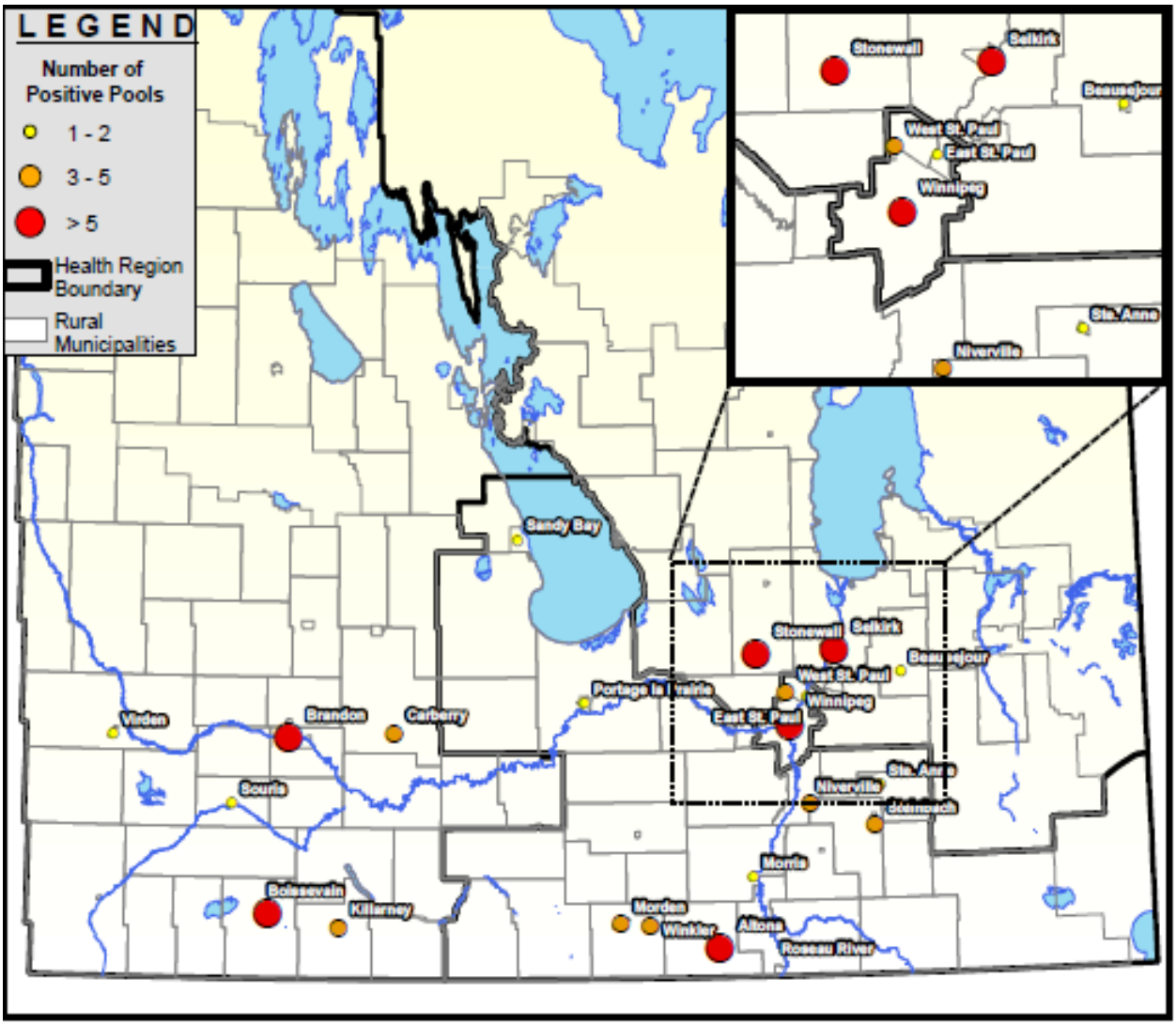
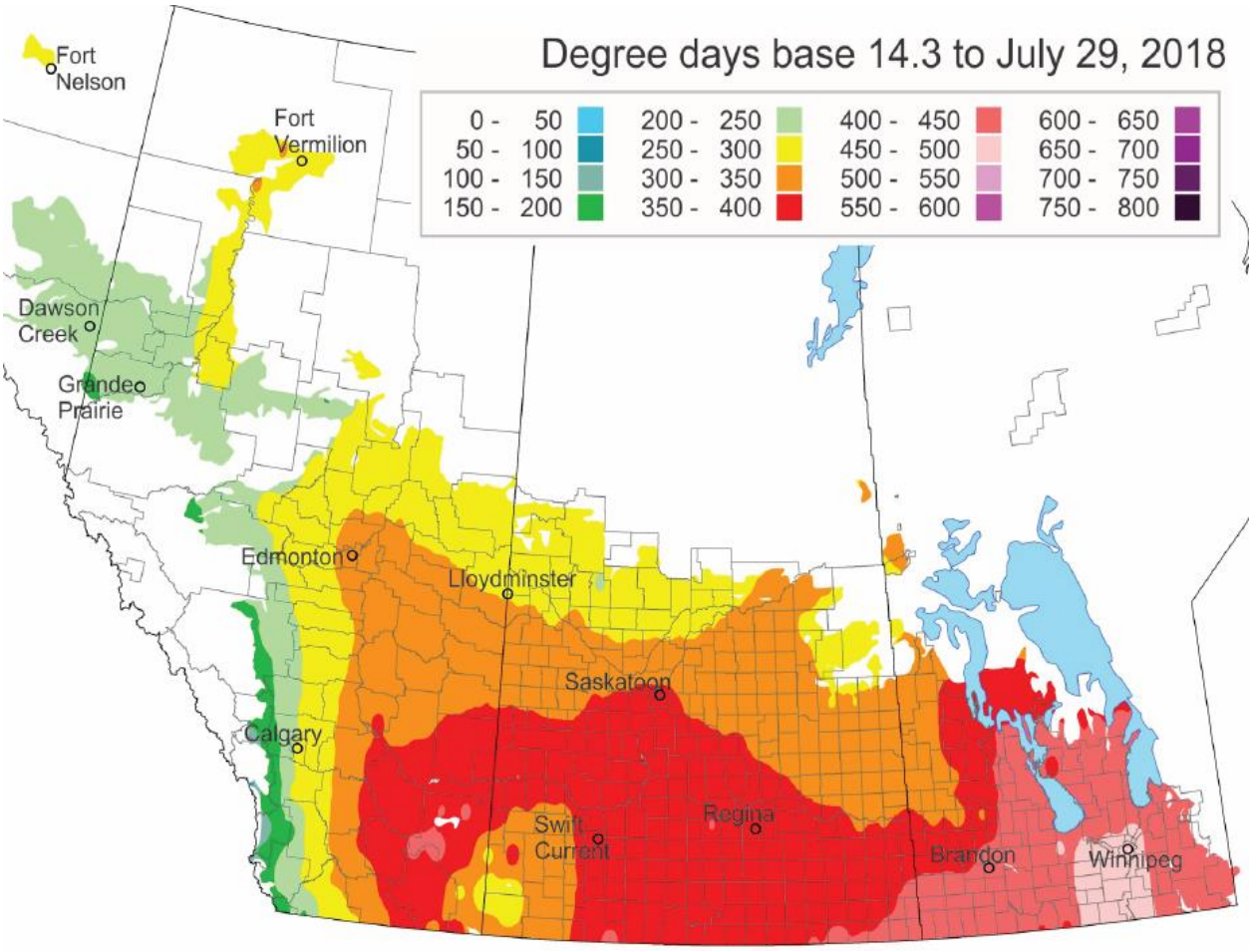


Figure 3 – Distribution of WNV positive *Culex tarsalis* mosquito pools collected in southern Manitoba (current to Week 31).



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

Figure 4 - Degree day accumulations, as of Week 30, across the Prairie Provinces (*Week 31 update not available*).

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 31).

Health Region	CDC Week									Totals
	23	24	25	26	27	28	29	30	31	
Interlake-Eastern	0	0	0	0	0	0	0	0	0	**0**
Prairie Mountain	0	0	0	0	0	0	0	0	0	**0**
Southern	0	0	0	0	0	0	0	1	0	**1**
Winnipeg	0	0	0	0	0	0	0	0	0	**0**
Totals	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**

* 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 31)

RHA	CDC Week							Totals
	25	26	27	28	29	30	31	
Interlake-Eastern	19	16	20	23	41	30	19	**180**
Prairie Mountain	20	31	36	55	78	62	43	**366**
Southern	40	53	42	106	73	88	45	**491**
Winnipeg	28	24	24	57	48	67	62	**356**
Weekly Totals	**107**	**124**	**122**	**241**	**240**	**247**	**169**	**1,393**

Table 5* – Total number and percentage of WNV positive *Culex tarsalis* mosquito pools by Health Region (current to Week 31)

Health Region	CDC Week							Totals
	25	26	27	28	29	30	31	
Interlake-Eastern	0 (0)	0 (0)	3 (15.0)	0 (0)	6 (14.6)	7 (23.3)	2 (10.5)	**18 (10.0)**
Prairie Mountain	0 (0)	0 (0)	0 (0)	2 (3.6)	5 (6.4)	10 (16.1)	6 (14.0)	**23 (6.3)**
Southern	0 (0)	0 (0)	0 (0)	5 (4.7)	8 (11.0)	13 (14.8)	4 (8.9)	**30 (6.1)**
Winnipeg	1 (3.6)	0 (0)	0 (0)	4 (7.0)	6 (12.5)	11 (16.4)	9 (14.5)	**31 (8.7)**
Weekly Totals	**1 (0.9)**	**0 (0)**	**3 (2.5)**	**11 (4.6)**	**25 (10.4)**	**41 (16.6)**	**21 (12.4)**	**102 (7.3)**

***** 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 31)

	Cumulative (Year-to-Date) Amount		Year End Totals	
Year	**Positive Mosquito Pools**	**Human WNV Cases**	**Positive Mosquito Pools**	**Human WNV Cases**
2018	***102***	***1***	***TBD***	***TBD***
2017	30	1	41	5
2016	16	12	39	24
2015	14	2	30	5
2014	7	3	24	5
2013	14	1	19	3
2012	71	28	116	39
2011	0	0	0	0
2010	11	0	20	0
2009	0	0	2	2
2008	21	7	41	12
2007	558	143	948	587
2006	120	21	171	51
2005	88	20	193	58
2004	23	3	57	3
2003	65	12	290	143

WNV Activity in Canada and the United States

Canada:

- As of Week 31 there have been 6 WNV human cases (1 in Manitoba and 5 in Ontario), 179 WNV positive mosquito pools (102 in Manitoba, 65 in Ontario, 3 in Quebec and 9 in Saskatchewan), 26 WNV positive birds (11 in Manitoba, 10 in Ontario, 3 in Quebec and 2 in Saskatchewan) and 1 WNV positive horse (Manitoba) reported in Canada. There have been no other positive WNV surveillance indicators reported in Canada to date.

➢ 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 August 7, 2018 the US CDC is reporting WNV activity from 40 states (includes human cases, positive mosquito pools and positive birds). A total of 106 human cases have been reported to date, of which 58% have been classified as West Nile neuroinvasive disease. The US CDC is also reporting four WNV related deaths this year.
- WNV activity has been reported from Minnesota (8 human cases (including 4 presumptive viremic blood donors) and numerous positive mosquito pools), North Dakota (18 human cases, 34 WNV positive mosquito pools, 1 WNV positive horse and 10 WNV positive birds) and South Dakota (27 human cases (including 1 WNV associated mortality) and 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.