Manitoba Weekly West Nile virus Surveillance Report

Week 29 – (July 15 - 21, 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 29* (July 15 – 21) Manitoba Health, Seniors and Active Living detected twenty-five additional WNV positive *Culex tarsalis* mosquito pools (Figure 1 & 3, Table 1).
  - The positive pools were collected from the Interlake-Eastern (Beausejour, Selkirk and Stonewall), Prairie Mountain (Boissevain, Brandon, Killarney and Souris), Southern (Altona, Morden, Niverville, Portage, Ste. Anne and Steinbach) and Winnipeg (Winnipeg) Health Regions.
- In Week 29 *Cx. tarsalis* activity was recorded in all four southern Manitoba Health Regions. Activity increased in comparison to Week 28 and specimens were collected from all 29 sentinel communities (Figure 1, Table 1).
  - *Cx. tarsalis* activity was greatest in the Interlake-Eastern Health Region in Week 29 (182.7 *Cx. tarsalis*/ trap night).
- To date forty WNV positive mosquito pools have been detected from the Interlake-Eastern (9), Prairie Mountain (7), Southern (13) and Winnipeg (11) Health Regions (Figure 3). Four birds from the Interlake-Eastern Health Region have also tested positive for WNV.
- To date there have been no WNV positive human or horse cases detected anywhere in Manitoba.

*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 29)

Health Region	CDC Week								
	22	23	24	25	26	27	28	29	30
Interlake-Eastern	0.00	0.53	2.65	8.16	7.00	23.47	54.88	182.65	
Prairie Mountain	0.00	0.75	2.98	1.12	7.74	11.26	65.50	139.15	
Southern	0.00	1.09	6.24	9.34	23.41	20.75	133.44	57.70	
Winnipeg	0.80	0.79	3.76	17.76	5.91	12.06	75.47	64.11	
Provincial Average	**0.78**	**0.85**	**4.21**	**8.42**	**12.36**	**16.19**	**89.82**	**101.60**	
Historical Avg	**0.30**	**3.18**	**11.28**	**10.60**	**108.79**	**149.49**	**132.39**	**99.27**	
	Indicates that one or more positive mosquito pools were detected within the health region.								

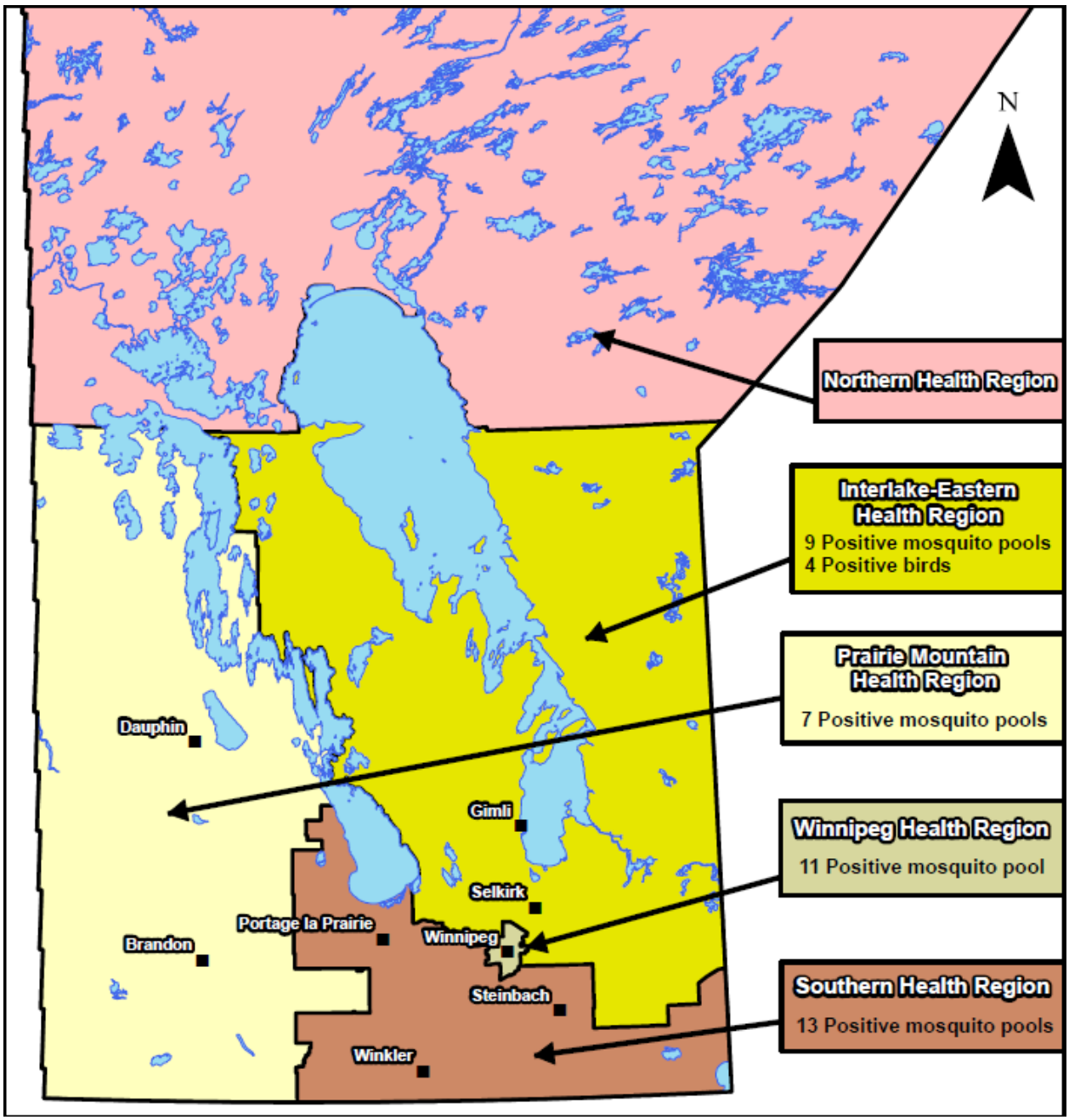


Figure 1 – WNV activity by Health Region within Manitoba (current to Week 29).

Table 2 – Average number and proportion of *Culex tarsalis* mosquitoes collected by surveillance community* in southern Manitoba – three week trend (current to Week 29).

Health Region	Community	Week 29		Week 28	
		Avg # of *Cx. tarsalis*	Proportion of *Cx. tarsalis*	Avg # of *Cx. tarsalis*	Proportion of *Cx. tarsalis*
Interlake-Eastern	Beausejour	23.00	16.39	40.50	16.51
	Gimli	9.67	10.43	10.00	9.23
	Oakbank	69.00	83.38	58.75	70.57
	Selkirk	**503.75**	78.74	48.50	20.25
	Stonewall	**238.67**	16.56	118.00	13.79
Prairie Mountain	**Boissevain**	**624.25**	70.64	98.75	27.62
	Brandon	74.30	65.64	122.70	40.18
	Carberry	161.00	89.44	48.50	39.92
	Dauphin	3.25	2.06	5.50	2.15
	Killarney	213.00	25.33	72.67	13.15
	Minnedosa	6.50	5.64	4.00	1.98
	Sioux Valley FN	67.50	11.47	32.25	14.30
	Souris	125.75	37.88	72.00	12.65
	Virden	85.00	62.27	43.67	15.06
Southern	Altona	72.25	57.68	110.25	70.67
	Carman	30.00	30.15	64.25	24.15
	Headingley	55.00	33.54	12.00	0.62
	Morden	74.50	62.47	**337.50**	69.88
	Morris	43.75	55.03	100.75	51.80
	Niverville	86.50	52.19	157.25	81.48
	Portage la Prairie	76.00	33.70	**181.75**	30.10
	Roseau River FN	29.00	72.50	53.75	62.87
	Ste. Anne	18.67	2.67	58.50	5.89
	Sandy Bay FN	83.25	19.88	86.25	36.47
	Steinbach	34.50	79.77	91.75	89.95
	Winkler	77.25	62.55	**256.25**	87.53
Winnipeg	East St Paul	22.50	16.67	14.50	17.58
	West St Paul	100.00	86.21	0.00	0.00
	Winnipeg	68.75	37.26	79.82	29.80
	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.

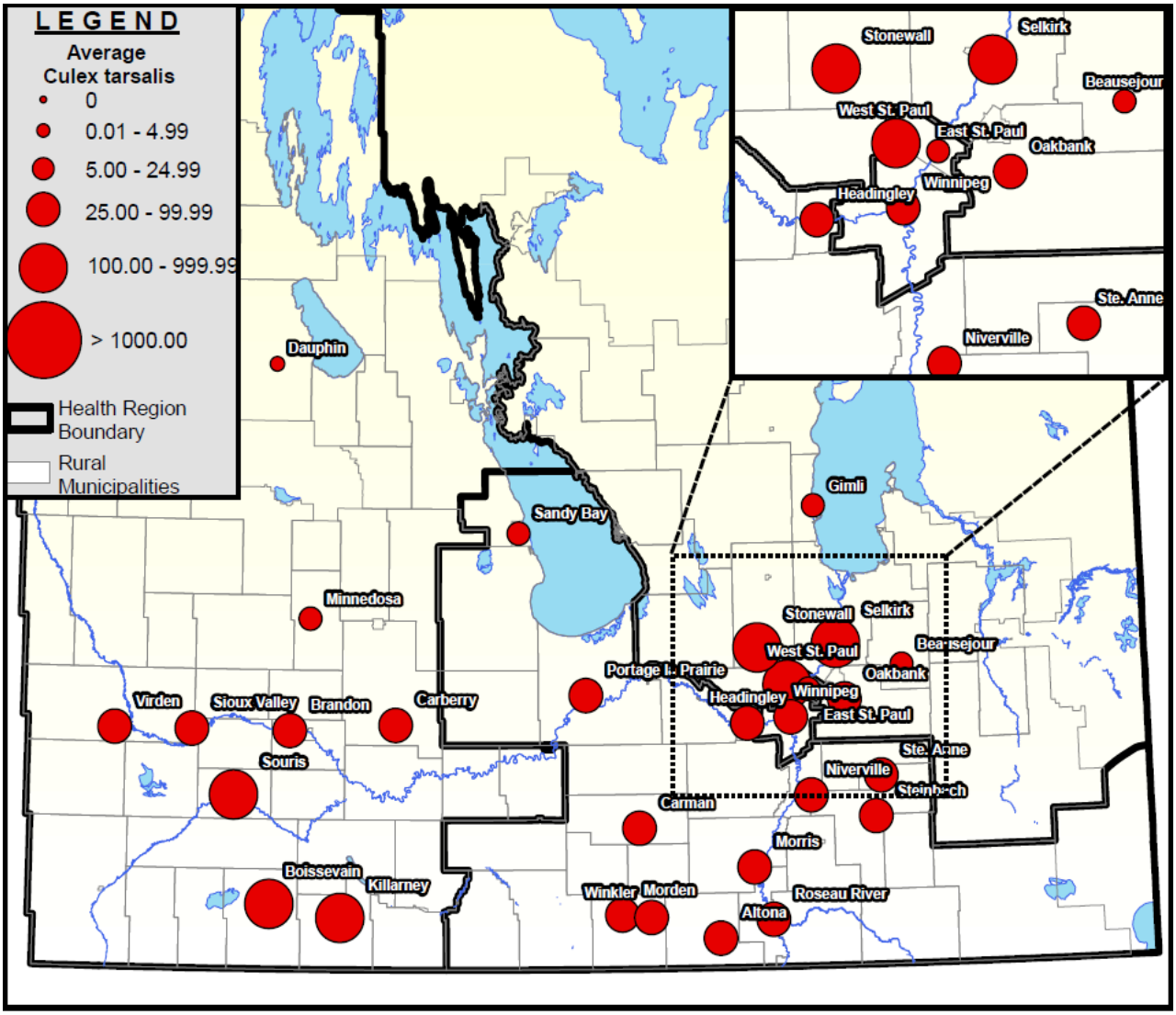


Figure 2 – Average number of *Culex tarsalis* mosquitoes collected across southern Manitoba during Week 29.

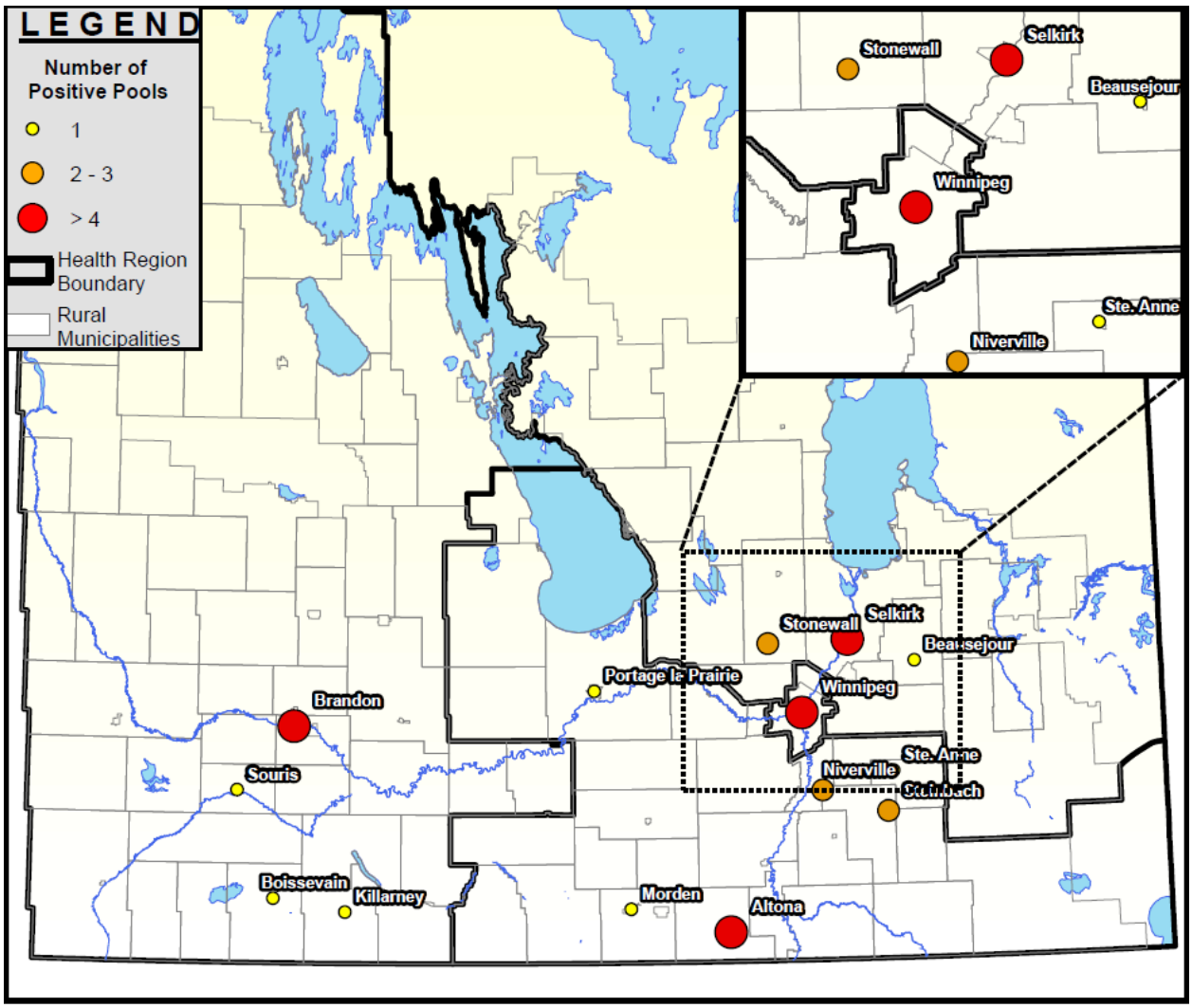
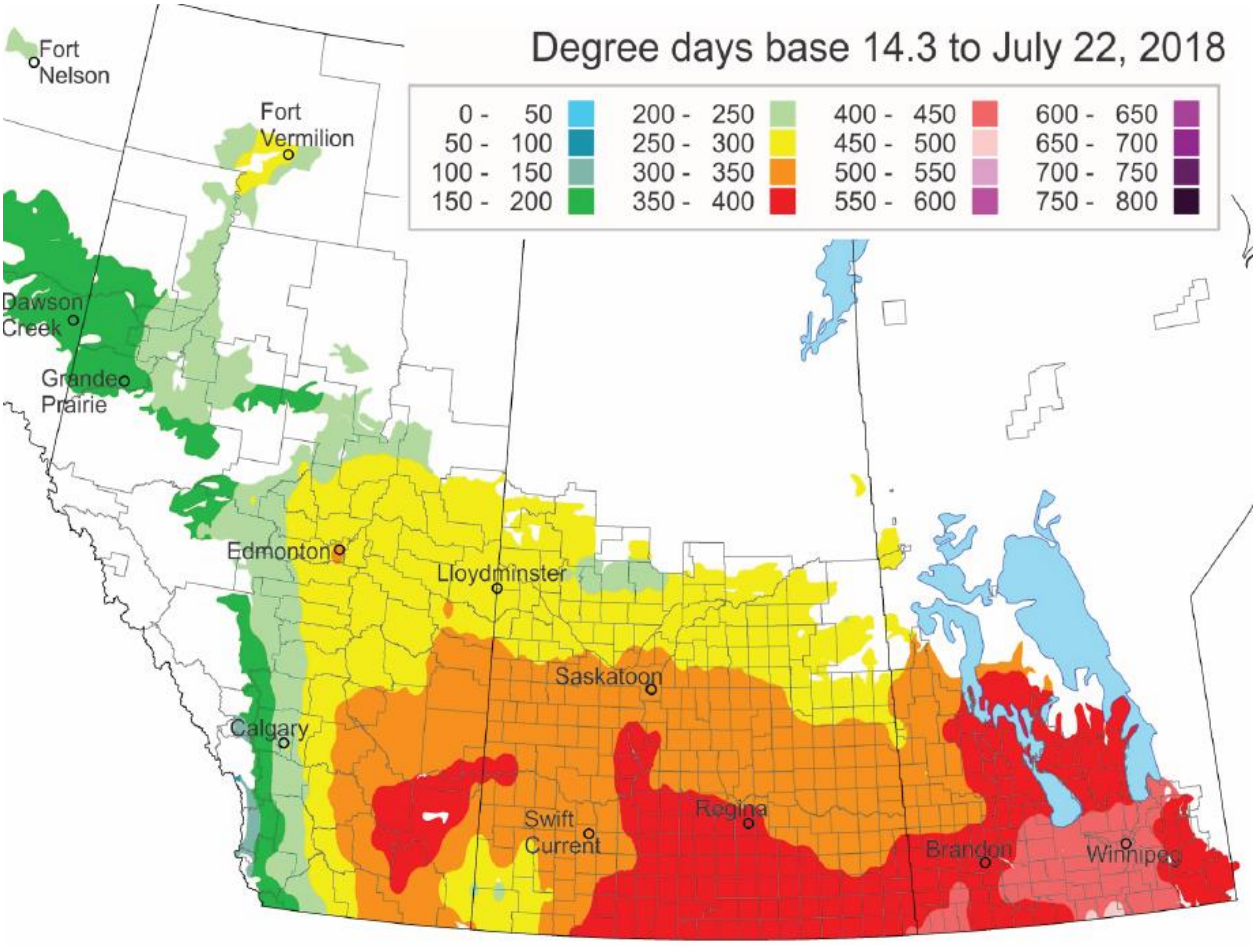


Figure 3 – Distribution of WNV positive *Culex tarsalis* mosquito pools collected in southern Manitoba (current to Week 29).



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

Figure 4 - Degree day accumulations, as of Week 29, 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 29).

Health Region	CDC Week									Totals
	22	23	24	25	26	27	28	29	30	
Interlake-Eastern	0	0	0	0	0	0	0	0		**0**
Prairie Mountain	0	0	0	0	0	0	0	0		**0**
Southern	0	0	0	0	0	0	0	0		**0**
Winnipeg	0	0	0	0	0	0	0	0		**0**
Totals	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		**0**

* 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 2016 season by health region (current to Week 29)

RHA	CDC Week								Totals
	23	24	25	26	27	28	29	30	
Interlake-Eastern	5	7	19	16	20	23	41		**131**
Prairie Mountain	12	29	20	31	36	55	78		**261**
Southern	11	33	40	53	42	106	73		**358**
Winnipeg	11	20	28	24	24	57	48		**227**
Weekly Totals	**39**	**89**	**107**	**124**	**122**	**241**	**240**		**977**

Table 5* – Total number and percentage of WNV positive *Culex tarsalis* mosquito pools by Health Region (current to Week 29)

Health Region	CDC Week							Totals
	23	24	25	26	27	28	29	
Interlake-Eastern	0 (0)	0 (0)	0 (0)	0 (0)	3 (15.0)	0 (0)	6 (14.6)	**9 (6.9)**
Prairie Mountain	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (3.6)	5 (6.4)	**7 (2.7)**
Southern	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	5 (4.7)	8 (11.0)	**13 (3.6)**
Winnipeg	0 (0)	0 (0)	1 (3.6)	0 (0)	0 (0)	4 (7.0)	6 (12.5)	**11 (4.8)**
Weekly Totals	**0 (0)**	**0 (0)**	**1 (0.9)**	**0 (0)**	**3 (2.5)**	**11 (4.6)**	**25 (10.4)**	**40 (2.0)**

***** 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 29)

	Cumulative (Year-to-Date) Amount		Year End Totals	
Year	**Positive Mosquito Pools**	**Human WNV Cases**	**Positive Mosquito Pools**	**Human WNV Cases**
2018	***40***	***0***	***TBD***	***TBD***
2017	11	0	41	5
2016	4	3	39	24
2015	1	0	30	5
2014	0	0	24	5
2013	3	0	19	3
2012	20	9	116	39
2011	0	0	0	0
2010	2	0	20	0
2009	0	0	2	2
2008	0	1	41	12
2007	232	54	948	587
2006	28	12	171	51
2005	27	8	193	58
2004	1	0	57	3
2003	24	4	290	143

WNV Activity in Canada and the United States

Canada:

- As of Week 29 there have been 3 WNV human cases (2 in Ontario and 1 in Quebec), 55 WNV positive mosquito pools (40 in Manitoba, 12 in Ontario and 3 in Saskatchewan) and 10 WNV positive birds (4 in Manitoba, 4 in Ontario and 2 in Quebec) 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 July 24, 2018 the US CDC is reporting WNV activity from 36 states (includes human cases, positive mosquito pools and positive birds). A total of 39 human cases have been reported to date, of which 59% have been classified as West Nile neuroinvasive disease.
- WNV activity has been reported from Minnesota (positive mosquito pools), North Dakota (3 human cases, 10 WNV positive mosquito pools, 1 WNV positive horse and 8 WNV positive birds) and South Dakota (6 human cases (includes 4 viremic blood donors) 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.