

Manitoba Weekly

West Nile virus

Surveillance Report

Week 30 – (July 22 - 28, 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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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 Days¹ 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

- Manitoba Health, Seniors and Active Living (MHSAL) has identified the first human case of WNV this season. The individual, a child under 10 years of age from the Southern Health – Santé Sud Region, experienced neurological symptoms. They were likely exposed during early July. The investigation is ongoing.
- During Week 30* (July 22 – 28) MHSAL detected an additional forty-one additional WNV positive *Culex tarsalis* mosquito pools, bringing the total to date this season to eighty-one (Figure 1 & 3, Table 1).
 - The positive pools were collected from the Interlake-Eastern (Beausejour, Selkirk and Stonewall), Prairie Mountain (Boissevain, Brandon, Carberry, Killarney, Souris and Virden), Southern (Altona, Morden, Morris, Niverville, Roseau River First Nation, Sandy Bay First Nation and Winkler) and Winnipeg (East St. Paul, West St. Paul and Winnipeg) Health Regions.
- In Week 30 *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 29 sentinel communities (Figure 1, Table 1).
 - Cx. tarsalis* activity was greatest in the Winnipeg Health Region in Week 30 (96.94 *Cx. tarsalis*/ trap night), while infection rates were highest in the Interlake-Eastern Health Region (23.3%).
- Eleven WNV positive birds have been detected to date, four from the Interlake-Eastern Health Region and seven from the Winnipeg Health Region. Note regular bird surveillance was discontinued in 2006.
- A WNV positive horse was detected in the Interlake-Eastern Health Region (Week 29).

Table 1 – Average number of *Culex tarsalis* mosquitoes captured by Health Region (current to Week 30)

Health Region	CDC Week							
	23	24	25	26	27	28	29	30
Interlake-Eastern	0.53	2.65	8.16	7.00	23.47	54.88	182.65	58.84
Prairie Mountain	0.75	2.98	1.12	7.74	11.26	65.50	139.15	80.83
Southern	1.09	6.24	9.34	23.41	20.75	133.44	57.70	84.64
Winnipeg	0.79	3.76	17.76	5.91	12.06	75.47	64.11	96.94
Provincial Average	0.85	4.21	8.42	12.36	16.19	89.82	101.60	83.17
Historical Avg	3.18	11.28	10.60	108.79	149.49	132.39	99.27	234.27
	Indicates that one or more positive mosquito pools were detected within the health region.							

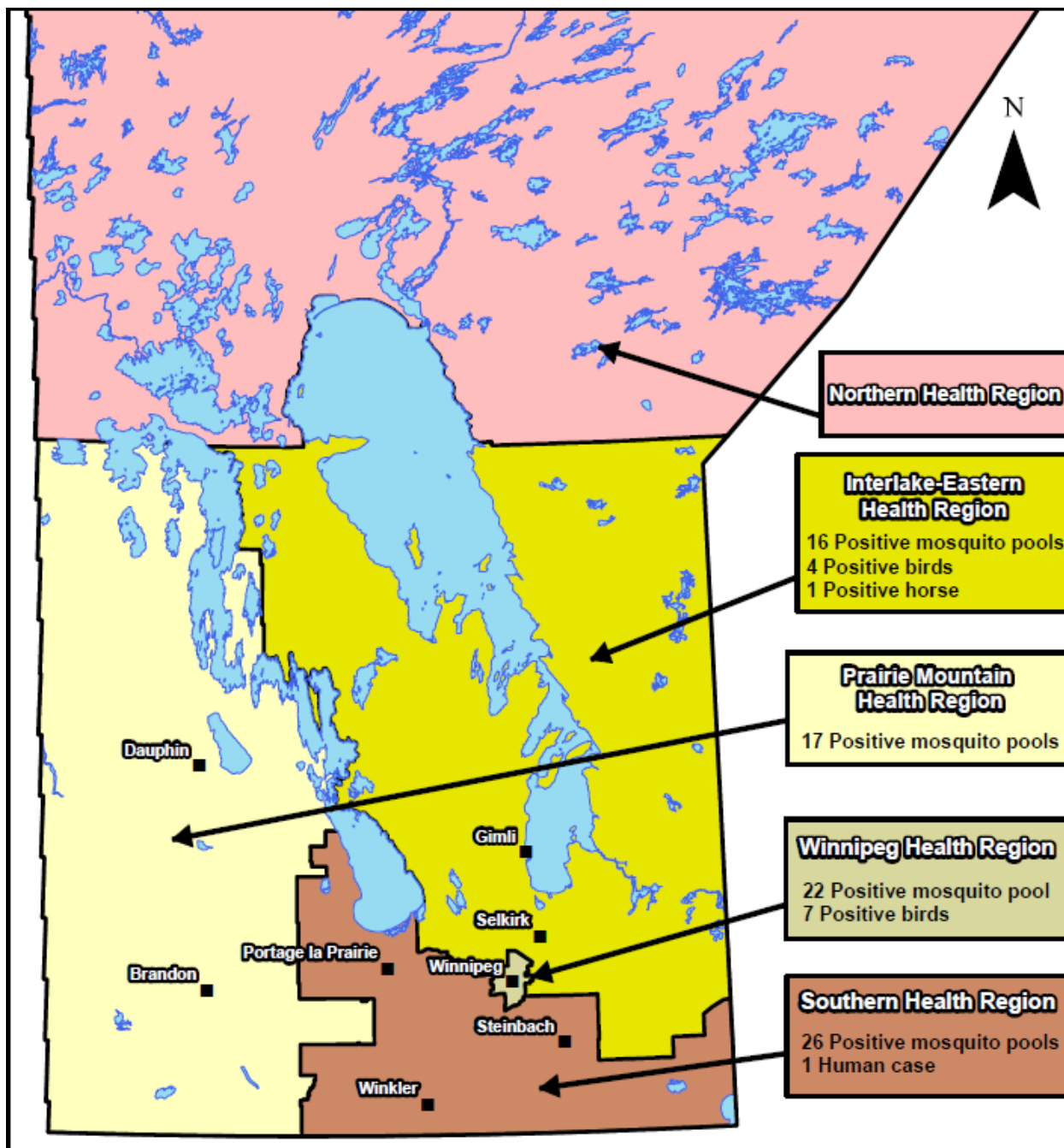


Figure 1 – WNV activity by Health Region within Manitoba (current to Week 30).

Table 2 – Average number and proportion of *Culex tarsalis* mosquitoes collected by surveillance community* in southern Manitoba – three week trend (current to Week 30).

Health Region	Community	Week 30		Week 29	
		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	32.50	42.76	23.00	16.39
	Gimli	13.33	12.31	9.67	10.43
	Oakbank	16.50	24.63	69.00	83.38
	Selkirk	58.75	22.66	503.75	78.74
	Stonewall	161.75	25.39	238.67	16.56
Prairie Mountain	Boissevain	335.00	84.60	624.25	70.64
	Brandon	59.60	67.65	74.30	65.64
	Carberry	30.75	56.16	161.00	89.44
	Dauphin	3.50	5.65	3.25	2.06
	Killarney	171.00	60.05	213.00	25.33
	Minnedosa	2.25	1.37	6.50	5.64
	Sioux Valley FN	64.00	12.39	67.50	11.47
	Souris	37.75	46.60	125.75	37.88
	Virден	55.50	71.84	85.00	62.27
Southern	Altona	82.00	51.09	72.25	57.68
	Carman	28.00	57.14	30.00	30.15
	Headingley	4.50	16.07	55.00	33.54
	Morden	208.25	71.32	74.50	62.47
	Morris	61.50	78.85	43.75	55.03
	Niverville	163.00	71.02	86.50	52.19
	Portage la Prairie	88.75	44.77	76.00	33.70
	Roseau River FN	26.25	49.30	29.00	72.50
	Ste. Anne	12.00	9.94	18.67	2.67
	Sandy Bay FN	25.50	15.67	83.25	19.88
	Steinbach	23.75	83.33	34.50	79.77
	Winkler	240.50	81.53	77.25	62.55
Winnipeg	East St Paul	65.00	56.03	22.50	16.67
	West St Paul	704.50	93.25	100.00	86.21
	Winnipeg	60.97	48.65	68.75	37.26
	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.

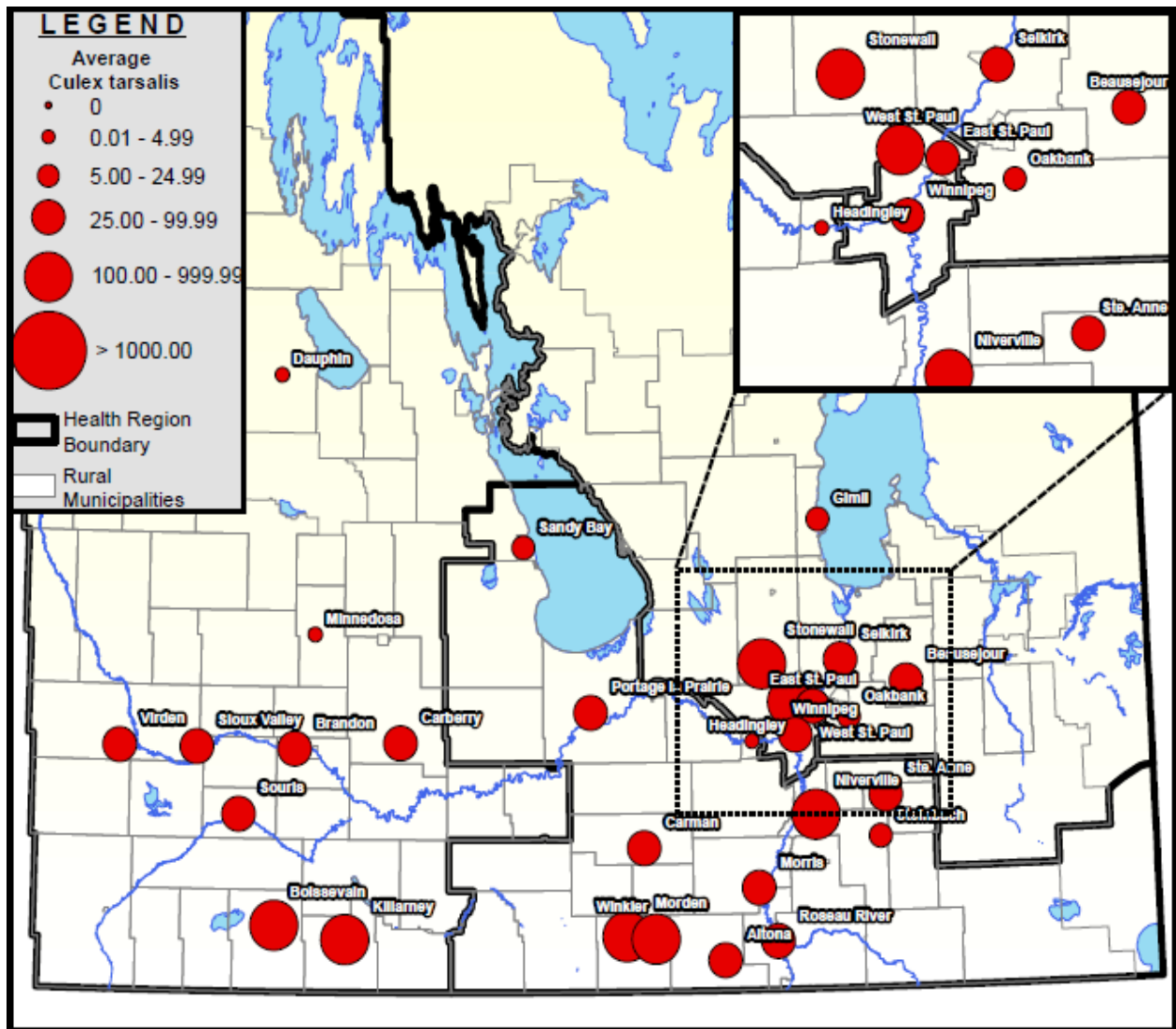


Figure 2 – Average number of *Culex tarsalis* mosquitoes collected across southern Manitoba during Week 30.

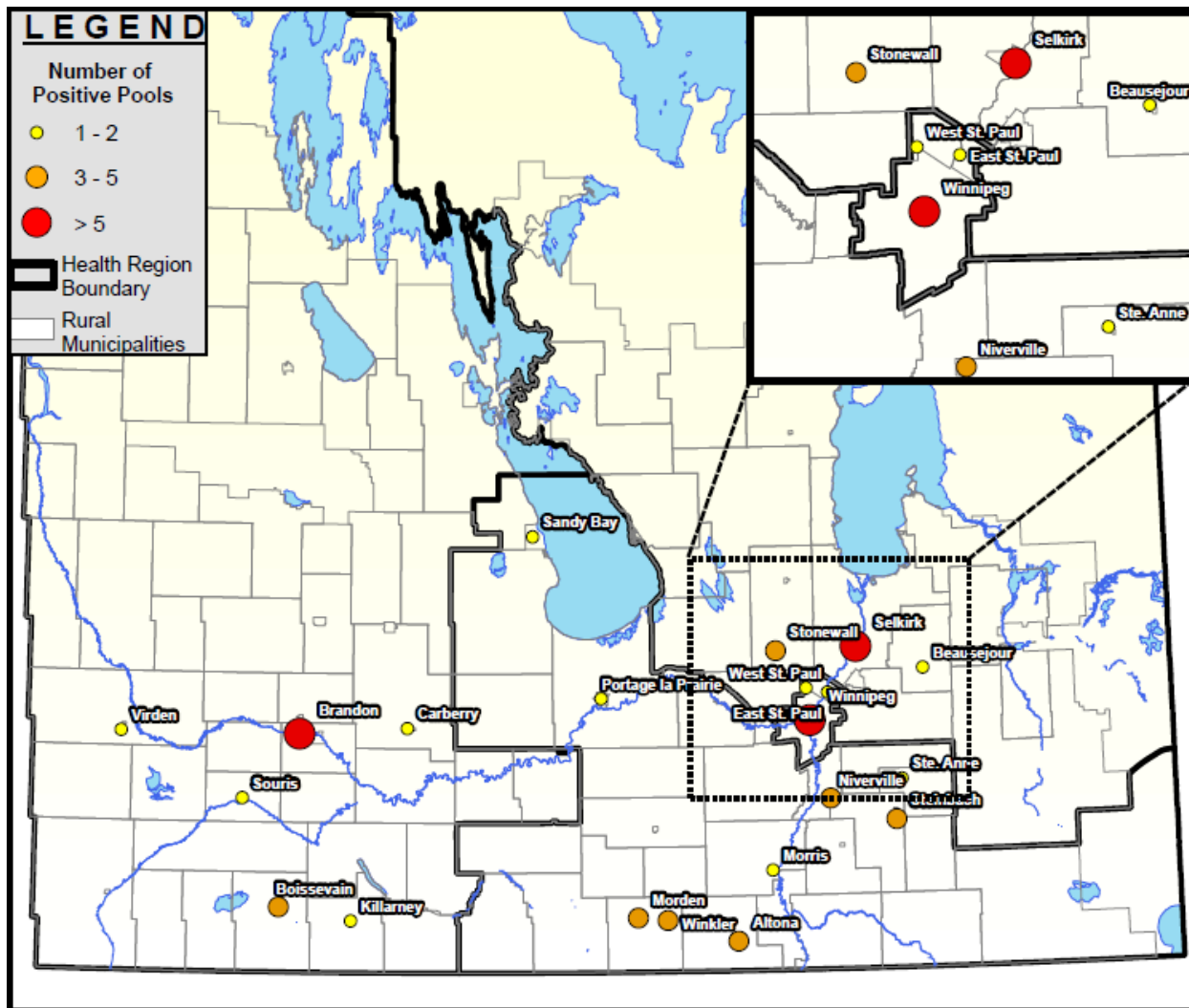
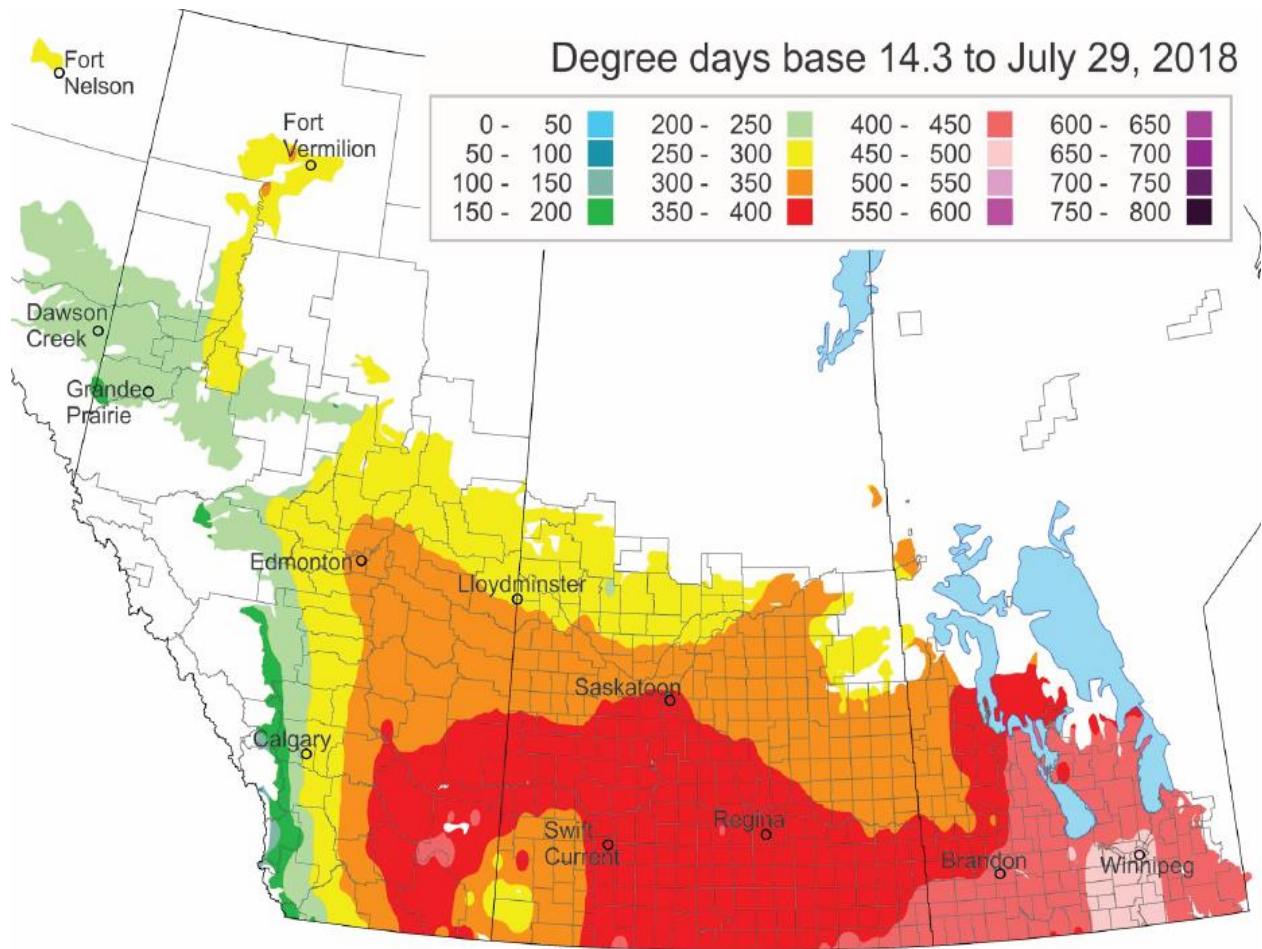


Figure 3 – Distribution of WNV positive *Culex tarsalis* mosquito pools collected in southern Manitoba (current to Week 30).



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.

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 30).

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	0
Prairie Mountain	0	0	0	0	0	0	0	0	0	0
Southern	0	0	0	0	0	0	0	0	1	1
Winnipeg	0	0	0	0	0	0	0	0	0	0
Totals	0	0	0	0	0	0	0	0	1	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 2016 season by health region (current to Week 30)

RHA	CDC Week								Totals
	23	24	25	26	27	28	29	30	
Interlake-Eastern	5	7	19	16	20	23	41	30	161
Prairie Mountain	12	29	20	31	36	55	78	62	323
Southern	11	33	40	53	42	106	73	88	446
Winnipeg	11	20	28	24	24	57	48	67	294
Weekly Totals	39	89	107	124	122	241	240	247	1,224

Table 5* – Total number and percentage of WNV positive *Culex tarsalis* mosquito pools by Health Region (current to Week 30)

Health Region	CDC Week							Totals
	24	25	26	27	28	29	30	
Interlake-Eastern	0 (0)	0 (0)	0 (0)	3 (15.0)	0 (0)	6 (14.6)	7 (23.3)	16 (9.9)
Prairie Mountain	0 (0)	0 (0)	0 (0)	0 (0)	2 (3.6)	5 (6.4)	10 (16.1)	17 (5.3)
Southern	0 (0)	0 (0)	0 (0)	0 (0)	5 (4.7)	8 (11.0)	13 (14.8)	26 (5.8)
Winnipeg	0 (0)	1 (3.6)	0 (0)	0 (0)	4 (7.0)	6 (12.5)	11 (16.4)	22 (7.5)
Weekly Totals	0 (0)	1 (0.9)	0 (0)	3 (2.5)	11 (4.6)	25 (10.4)	41 (16.6)	81 (6.6)

* 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 30)

Year	Cumulative (Year-to-Date) Amount		Year End Totals	
	Positive Mosquito Pools	Human WNV Cases	Positive Mosquito Pools	Human WNV Cases
2018	81	1	TBD	TBD
2017	14	0	41	5
2016	11	6	39	24
2015	8	1	30	5
2014	2	0	24	5
2013	10	1	19	3
2012	48	20	116	39
2011	0	0	0	0
2010	4	0	20	0
2009	0	0	2	2
2008	7	4	41	12
2007	322	77	948	587
2006	78	20	171	51
2005	50	14	193	58
2004	16	3	57	3
2003	35	6	290	143

WNV Activity in Canada and the United States

Canada:

- As of Week 30 there have been 5 WNV human cases (1 in Manitoba, 3 in Ontario and 1 in Quebec), 113 WNV positive mosquito pools (81 in Manitoba, 28 in Ontario and 4 in Saskatchewan) 17 WNV positive birds (11 in Manitoba, 4 in Ontario and 2 in Quebec) 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 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 (4 human cases, 17 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.