

Manitoba Weekly

West Nile virus

Surveillance Report

Week 31 – (July 30 to August 5, 2017)

Communicable Disease Control

Active Living, Population and Public Health Branch

Active Living, Indigenous Relations, Population & Public
Health Division

Manitoba Health, Seniors and Active Living

Released: August 11, 2017

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

- During Week 31* (July 30 – August 5) Manitoba Health, Seniors and Active Living detected the sixteen additional WNV positive mosquito pools, bringing the total to date this season to thirty (Figure 1 & 3, Table 1). The positive *Culex tarsalis* pools were collected from eight communities spread across all four southern Manitoba Health Regions: Boissevain (1), Brandon (2), Dauphin (1), East St Paul (1), Oakbank (3), Virden (2), Winkler (1) and Winnipeg (5).
 - Adult mosquito control is not recommended at this time in the affected communities, or elsewhere in the province.
- In Week 31, *Cx. tarsalis* were collected in 28 out of the 29 sentinel communities (Table 1 & 2; Figure 2). At the provincial level, and within most (27 out of 29) sentinel communities, *Cx. tarsalis* numbers increased from the previous Week.
 - In Week 31 *Cx. tarsalis* activity was highest in the Prairie Mountain Health Region (98.71 *Cx. tarsalis*/ trap night), while infection rates were highest in the Interlake-Eastern Health Region (13.6% positive pools).
- To date there have been no WNV positive human or horse cases detected anywhere in Manitoba.

2016 Year-End WNV Surveillance Data*

- With the detection of WNV activity in Manitoba in Week 27 the 2016, the Year-End WNV Surveillance summary will no longer be included in the current, or future, weekly surveillance reports. The 2016 Year-End Surveillance summary can be found in earlier 2017 weekly surveillance reports (<http://www.gov.mb.ca/health/wnv/stats.html>).

* For a listing of CDC surveillance weeks and corresponding dates for the 2017 please see Appendix 1.

Table 1 – Average number of *Culex tarsalis* mosquitoes captured by Health Region (current to Week 31)

Health Region	CDC Week								
	23	24	25	26	27	28	29	30	31
Interlake-Eastern	0.00	1.37	0.18	0.05	0.33	2.5	3.58	4.45	47.26
Prairie Mountain	1.66	0.67	1.70	0.26	3.27	46.75	44.60	42.00	98.71
Southern	0.00	1.41	1.02	0.19	9.07	15.49	13.09	16.93	34.95
Winnipeg	0.24	2.71	0.72	0.24	4.06	10.97	6.48	10.06	57.74
Provincial Average	0.59	1.53	1.04	0.20	5.10	22.37	19.84	20.82	61.47
	Indicates that one or more positive mosquito pools were detected within the health region.								

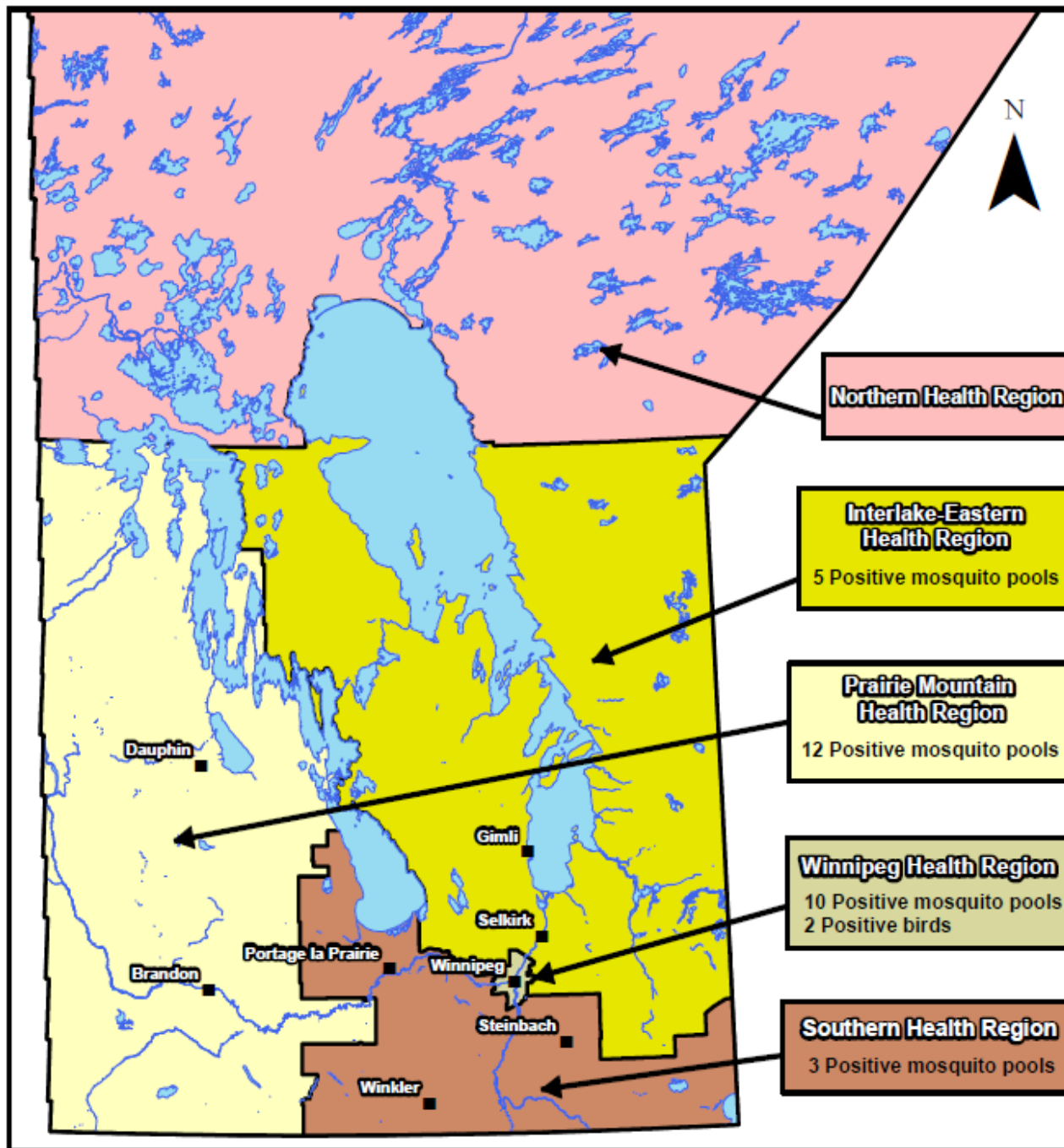


Figure 1 – WNV activity by Health Region within Manitoba (current to Week 31).

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

Health Region	Community	Week 31		Week 30	
		Avg # of <i>Cx. tarsalis</i>	Percentage of <i>Cx. tarsalis</i>	Avg # of <i>Cx. tarsalis</i>	Percentage of <i>Cx. tarsalis</i>
Interlake-Eastern	Beausejour	4.50	3.44	1.25	0.51
	Gimli	0.33	0.21	1.00	0.24
	Oakbank	167.50	69.50	9.50	14.29
	Selkirk	37.25	7.13	4.00	0.57
	Stonewall	15.00	12.40	6.50	3.78
Prairie Mountain	Boissevain	429.00	58.61	150.75	30.59
	Brandon	82.10	51.44	50.00	25.10
	Carberry	23.00	37.25	8.00	8.74
	Dauphin	28.50	7.46	7.00	1.26
	Killarney	148.00	22.45	26.00	6.62
	Minnedosa	17.00	9.15	3.50	1.42
	Sioux Valley FN	73.00	27.84	65.25	18.04
	Souris	32.25	11.85	20.75	7.62
	Virden	80.50	51.44	26.00	21.44
Southern	Altona	23.50	91.26	11.50	43.40
	Carman	3.25	8.07	0.50	0.12
	Headingley	5.50	2.86	0.00	0.00
	Morden	34.75	53.05	25.50	40.16
	Morris	10.75	16.80	9.00	5.54
	Niverville	23.33	32.71	1.25	1.68
	Portage la Prairie	66.25	8.08	51.00	2.49
	Roseau River FN	6.33	14.84	3.00	2.84
	Ste. Anne	0.00	0.00	0.25	0.65
	Sandy Bay FN	117.50	16.36	30.75	2.35
	Steinbach	4.00	66.67	0.67	6.90
	Winkler	99.50	83.09	57.25	50.00
Winnipeg	East St Paul	85.50	26.35	14.00	4.42
	West St Paul	250.50	66.27	39.00	17.57
	Winnipeg	43.03	20.39	7.87	1.36
	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.

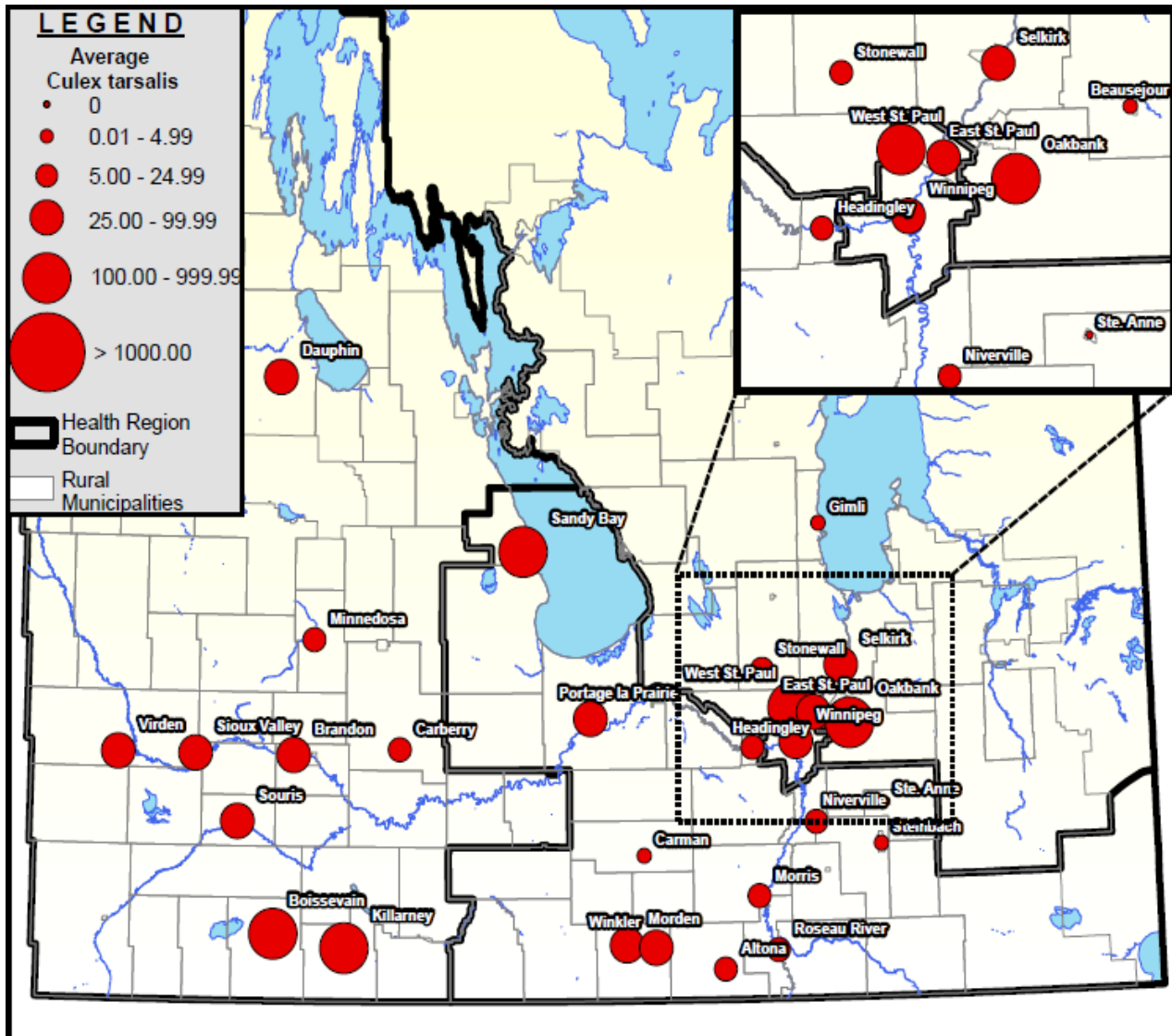


Figure 2 – Average number of *Culex tarsalis* mosquitoes collected across southern Manitoba during Week 31.

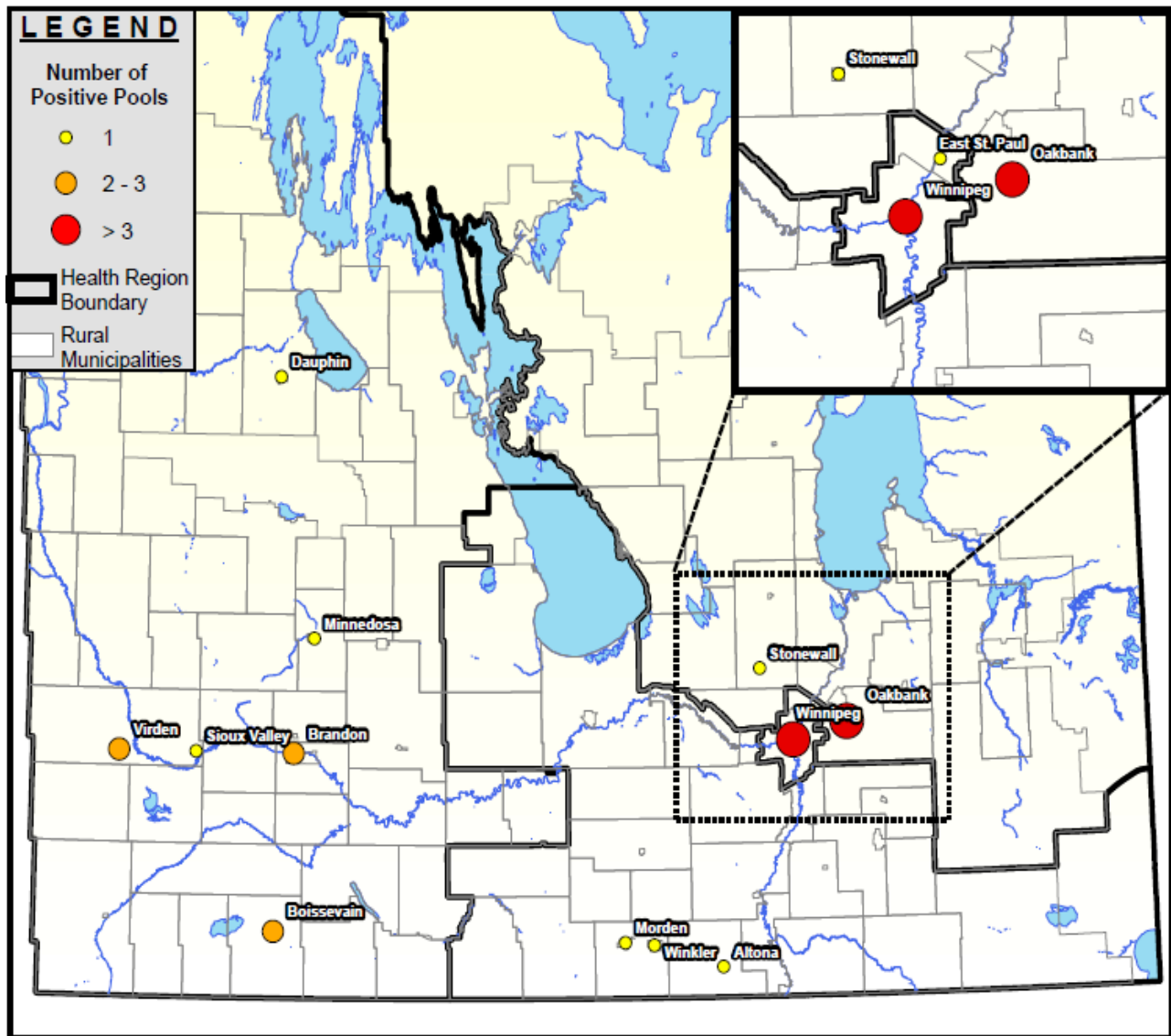


Figure 3 – Distribution of WNV positive *Culex tarsalis* mosquito pools collected in southern Manitoba (current to Week 31).

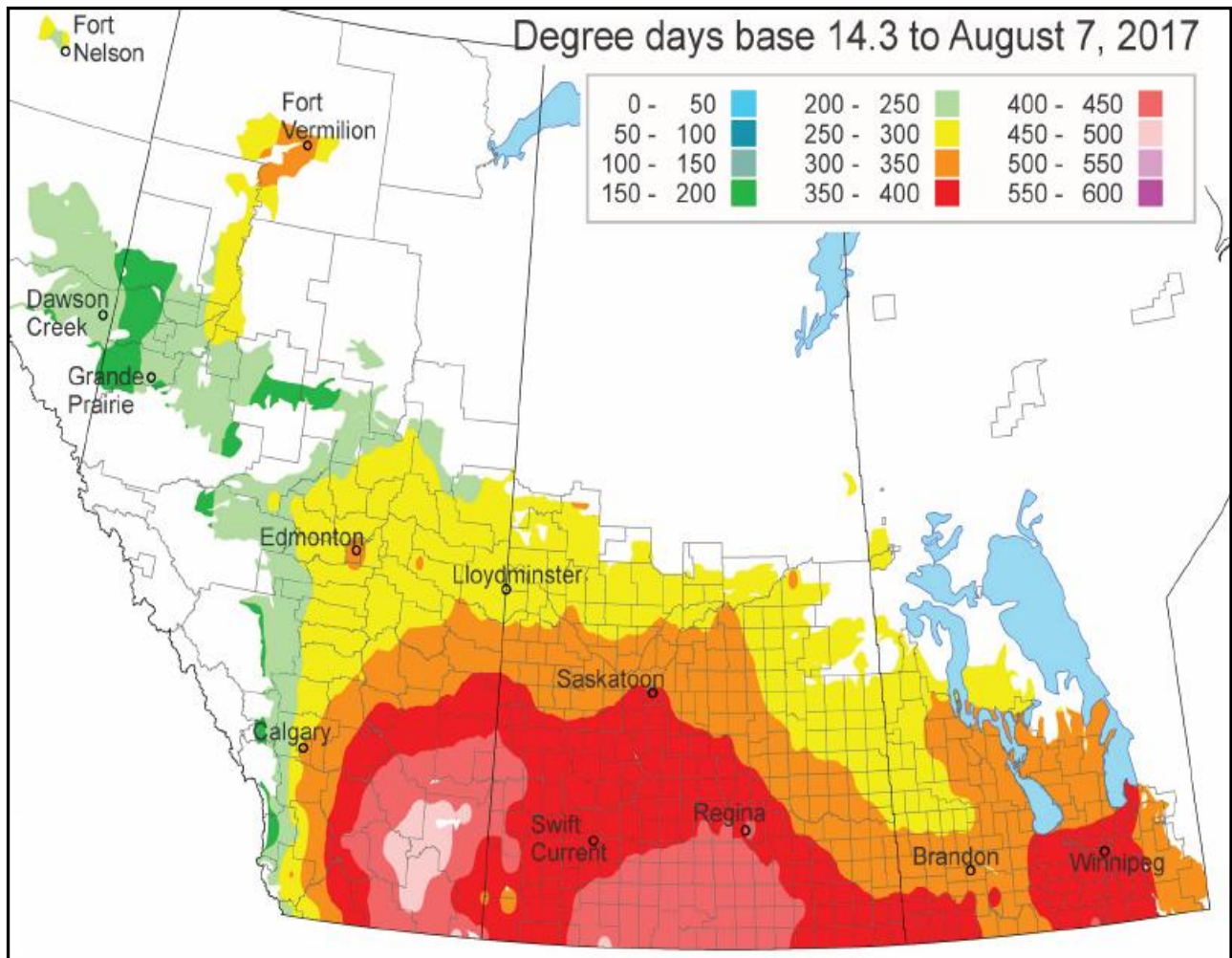


Figure 4 - Degree day accumulations, as of Week 31, across the Prairie Provinces (*Map produced by Agriculture and Agri-Food Canada's Prairie Pest Monitoring Network*).

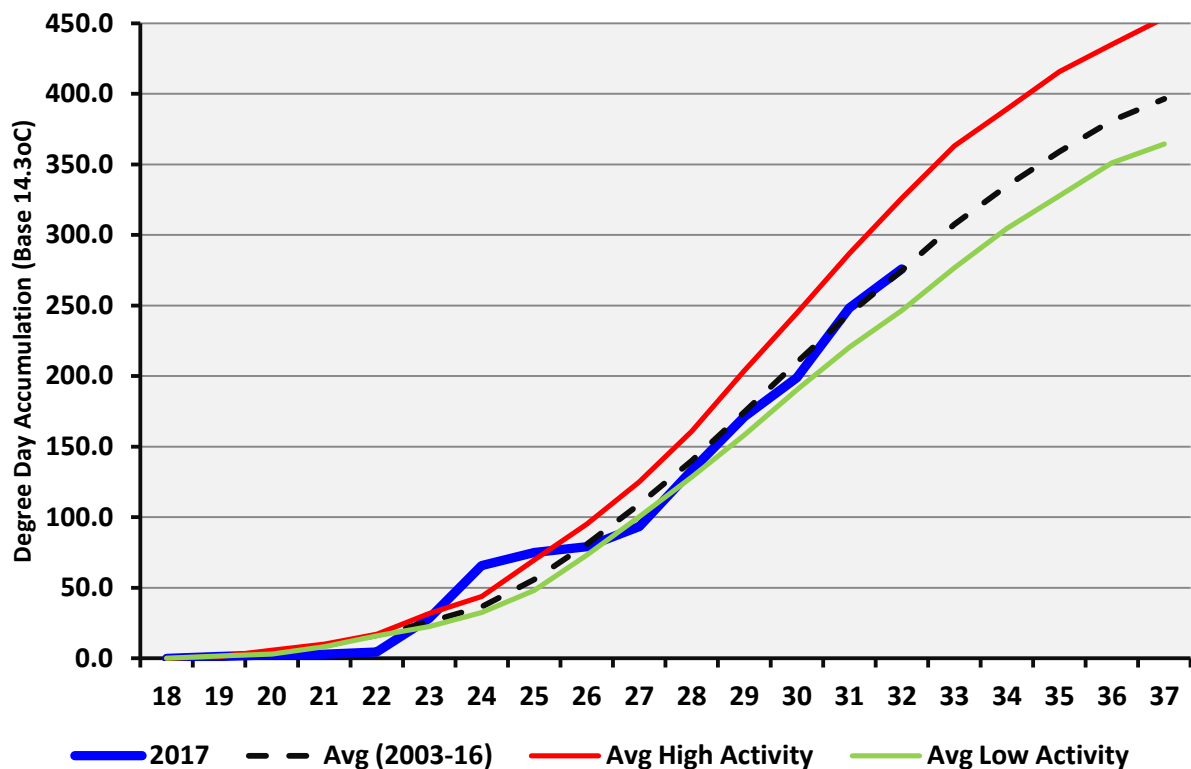


Figure 5 – Comparison of degree day accumulation, at the provincial level*, between 2017, the historical average, and high and low activity seasons (see Appendix 2 for further details).

* Note that the accumulation patterns may vary at a regional level.

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	0	0	0
Winnipeg	0	0	0	0	0	0	0	0	0	0
Totals	0	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 2017 season by health region (current to Week 31).

RHA	CDC Week							Totals
	25	26	27	28	29	30	31	
Interlake -Eastern	3	1	2	6	8	17	22	63
Prairie Mountain	23	5	24	34	43	48	61	265
Southern	14	5	19	32	25	29	46	185
Winnipeg	8	5	15	21	20	19	49	151
Weekly Totals	48	16	60	93	96	113	178	664

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)	0 (0)	1 (16.7)	0 (0)	1 (5.9)	3 (13.6)	5 (7.9)
Prairie Mountain	0 (0)	0 (0)	0 (0)	0 (0)	5 (11.6)	1 (2.1)	6 (9.8)	12 (4.5)
Southern	0 (0)	0 (0)	1 (5.3)	1 (3.1)	0 (0)	0 (0)	1 (2.2)	3 (1.6)
Winnipeg	0 (0)	0 (0)	1 (6.7)	1 (4.8)	1 (5.0)	1 (5.3)	6 (12.2)	10 (6.6)
Weekly Totals	0 (0)	0 (0)	2 (3.3)	3 (3.2)	6 (6.3)	3 (2.7)	16 (9.0)	30 (4.5)

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

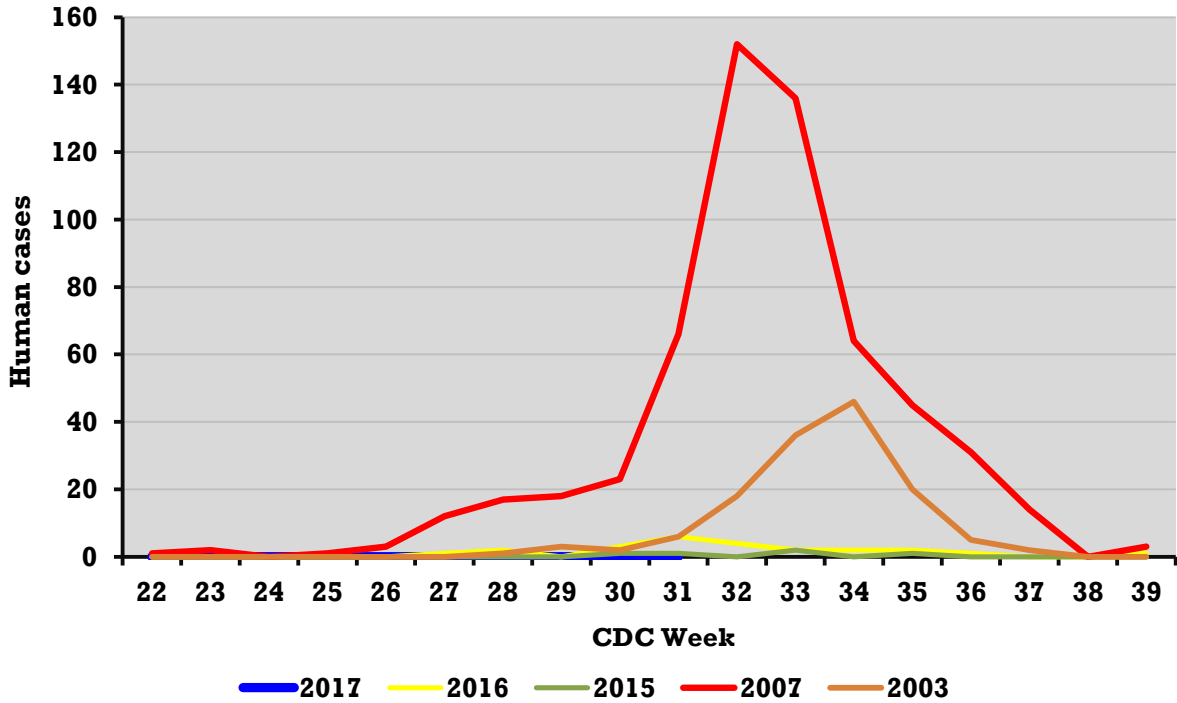


Figure 6 – West Nile virus human cases by week* for selected years (2017 data current to Week 31).**

* Week reflects the earliest likely date (i.e. exposure week, specimen date, report date).

** Selection of 2015 & 2016 represents recent WNV trends, while data from 2003 & 2007 reflect the highest activity seasons recorded to date (> 100 human cases and > 200 positive mosquito pools).

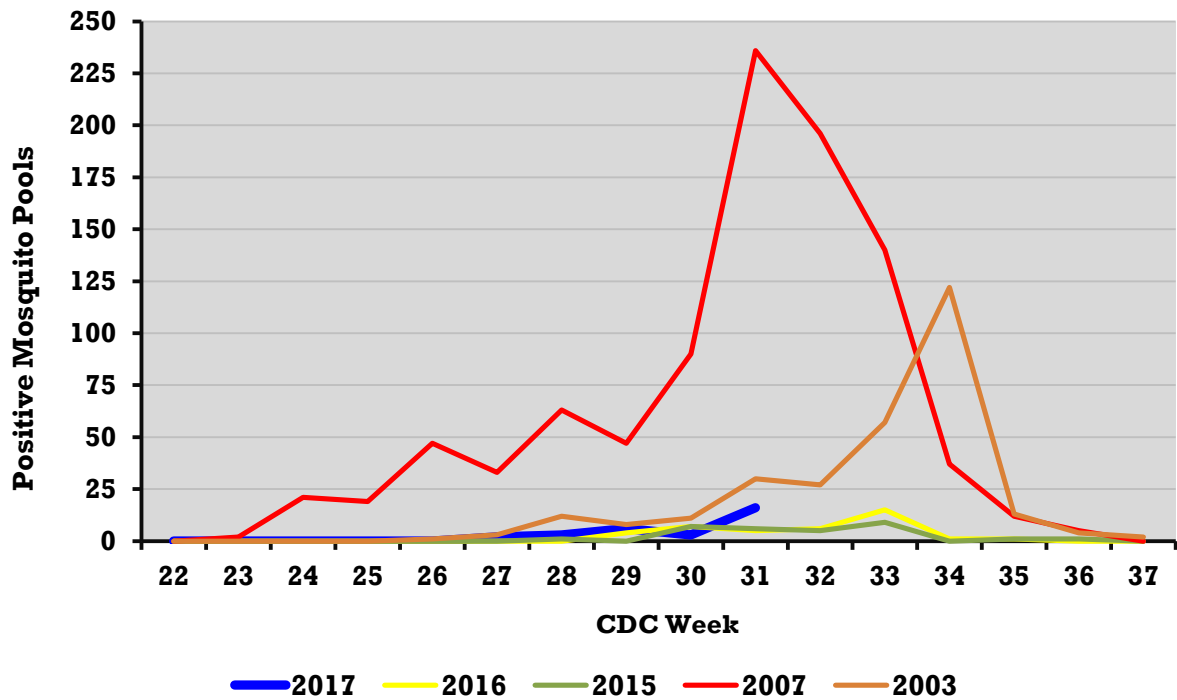


Figure 7 – WNV positive mosquito pools reported by week for selected years (2017 data current to Week 31).

WNV Activity in Canada and the United States

Canada:

- As of Week 31 there have been seven (7) WNV human cases (Ontario), one-hundred and fifty-four (154) WNV positive mosquito pools (30 in Manitoba, 113 in Ontario, 9 in Quebec and 2 in Saskatchewan) and twenty-two (22) WNV positive birds (2 in Manitoba, 7 in Ontario and 13 in Quebec) reported in Canada.
- Additional Canadian WNV information can be obtained by consulting the Public Health Agency of Canada's West Nile virus website at 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 Week 31 a total of 167 WNV human cases have been reported from 28 states including: Alabama, Arizona, California, Colorado, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Louisiana, **Minnesota (3)**, Mississippi, Missouri, Nebraska, Nevada, New Mexico, New York, **North Dakota (7)**, Oklahoma, Oregon, Pennsylvania, South Carolina, **South Dakota (19)**, Tennessee, Texas, Virginia and Washington. In addition, there has been six WNV related fatalities (Mississippi and Nevada, Texas) and 42 presumptive viremic blood donors reported (**including 7 in Minnesota, 1 in North Dakota and 2 in South Dakota**).
- States with non-human WNV activity (i.e. positive mosquito pools, positive birds, positive horses, or sentinel animals) recorded as of Week 31 include: Arizona, California, Colorado, Connecticut, Delaware, District of Columbia, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Jersey, New York, **North Dakota (5 WNV positive birds, 9 WNV positive mosquito pools)**, Oklahoma, Oregon, Pennsylvania, South Carolina, **South Dakota (multiple WNV positive mosquito pools)**, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin and Wyoming.
- 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 <http://www.cdc.gov/westnile/statsmaps/preliminarymapsdata/histatedate.html>, or by consulting state specific Public Health websites.

Appendix 1

Table 6 – 2017 CDC surveillance weeks

CDC Week Number	Dates	CDC Week Number	Dates
21	May 21 - May 27	30	July 23 - July 29
22	May 28 - June 3	31	July 30 - August 5
23	June 4 - June 10	32	August 6 - August 12
24	June 11 - June 17	33	August 13 - August 19
25	June 18 - June 24	34	August 20 - August 26
26	June 25 - July 1	35	August 27 - September 2
27	July 2 - July 8	36	September 3 - September 9
28	July 9 - July 15	37	September 10 - September 16
29	July 16 - July 22	38	September 17 - September 23

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.

High Activity Season – A high WNV activity season is defined, internally, as one where 30 or more human cases AND 100 or more WNV positive mosquito pools were detected. Seasons meeting the ‘high activity’ definition include: 2003, 2005, 2006, 2007 and 2012. For actual numbers please see: <http://www.gov.mb.ca/health/wnv/stats.html>.

Low Activity Season – A low WNV activity season is defined, internally, as one where less than 30 AND/OR less than 100 WNV positive mosquito pools were detected. Seasons meeting the ‘low activity’ definition include: 2004, 2008, 2009, 2010, 2011, 2013, 2014, 2015 and 2016. For actual numbers please see: <http://www.gov.mb.ca/health/wnv/stats.html>.