MANITOBA HEALTH, SENIORS AND ACTIVE LIVING

WEEKLY WEST NILE VIRUS SURVEILLANCE REPORT (WEEK 33)

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* 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.

**** For a more detailed description off mosquito pools & degree days consult Appendix 2.***

- WNV Provincial Surveillance Data -

- Manitoba Health, Seniors and Active Living (MHSAL) identified four additional human cases of WNV in Week 33* (August 7 – 13), bringing the seasonal total to date to seven. Human cases have now been identified in all four southern Manitoba Health Regions (Interlake-Eastern, Prairie Mountain, Southern and Winnipeg).
- During Week 33 MHSAL detected fifteen WNV positive mosquito pools. The positive pools were collected from communities in the Prairie Mountain, Southern and Winnipeg Health Regions. A total of thirty-seven (37) WNV positive mosquito pools have been detected this season (Figure 1).
- During Week 33 *Culex tarsalis* activity decreased at both the Health Region and Provincial levels (Table 1 & 2, Figure 2). *Culex tarsalis* ctivity was detected in 26 out of 29 sentinel communities and numbers declined in all but four communities.
- *Culex tarsalis* numbers were highest in the Southern Health Region, while infection rates were highest in the Prairie Mountain Health Region.

**** For a listing of CDC surveillance weeks and corresponding dates for the 2016 please see Appendix 1.***

2015 Year-End WNV Surveillance Data*

- *With the detection of WNV activity in Manitoba in Week 29 the 2015, the Year-End WNV Surveillance summary will no longer be included in the current, or future, weekly surveillance reports. The 2015 Year-End Surveillance summary can be found in earlier 2016 weekly surveillance reports (http://www.gov.mb.ca/health/wnv/stats.html) .*

Table 1 – Average number of *Culex tarsalis* mosquitoes captured by Health Region (current to Week 33)

Health Region	CDC Week									
	25	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**
Interlake-Eastern	1.50	3.73	2.06	5.37	6.70	21.25	50.26	21.40	8.00	
Prairie Mountain	1.41	0.63	5.85	13.10	23.53	70.59	248.05	139.05	38.79	
Southern	3.57	4.68	6.36	31.60	50.79	127.59	281.73	95.82	51.15	
Winnipeg	0.88	2.58	9.11	14.20	9.71	93.88	224.79	113.35	43.75	
Provincial Average	**2.05**	**2.80**	**6.20**	**18.01**	**26.05**	**87.38**	**222.82**	**101.59**	**39.17**	
	Indicates that one or more positive mosquito pools were detected within the health region.									

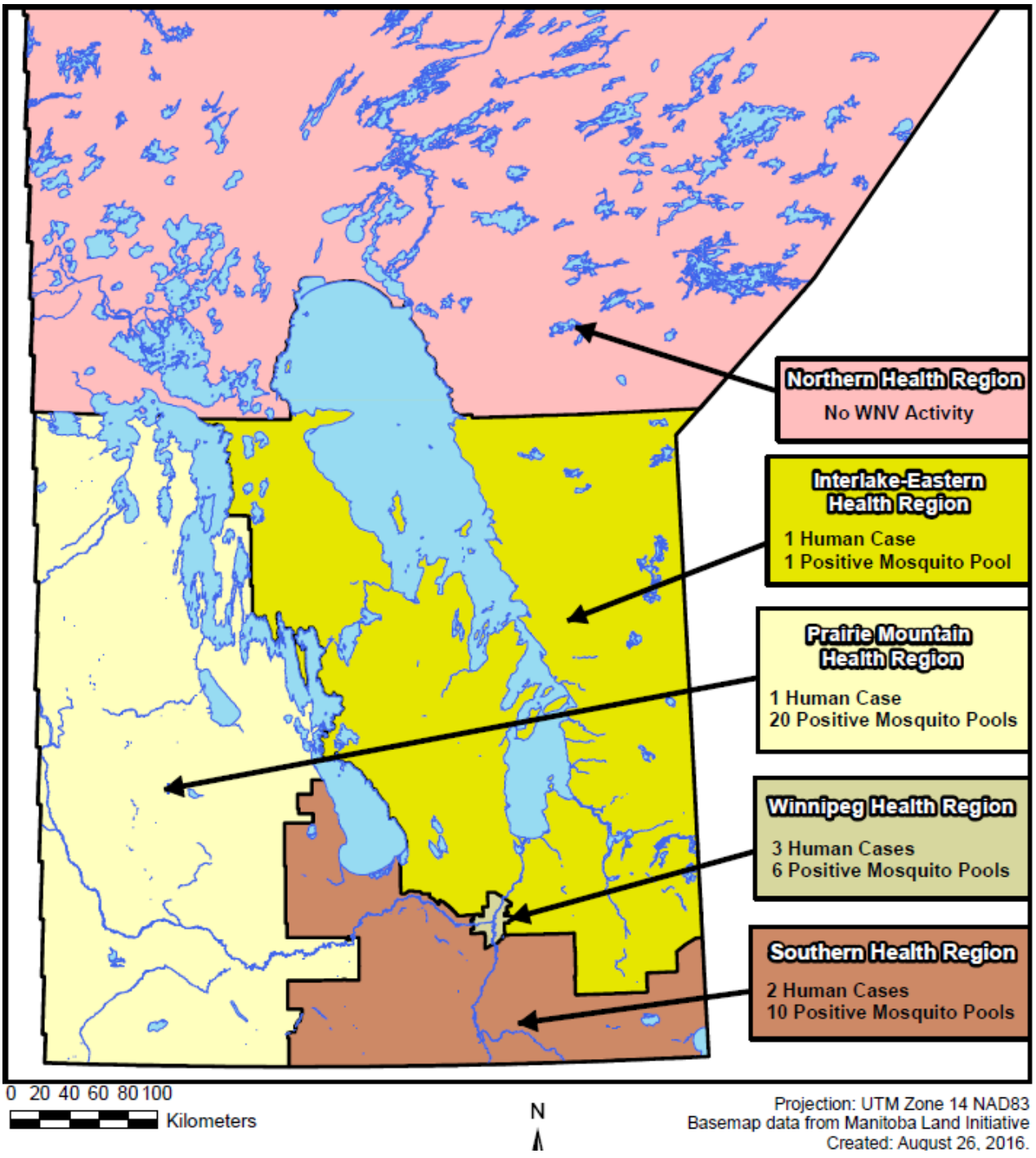


Figure 1 – WNV activity by Health Region within Manitoba (current to Week 33).

Table 2 – Average number of *Culex tarsalis* mosquitoes collected by surveillance community* in southern Manitoba – three week trend (current to Week 33).

Health Region	Community	Week 33	Week 32	Week 31
Interlake-Eastern	Beausejour	1.50	4.25	26.00
	Gimli	0.00	3.50	21.25
	Oakbank	11.50	27.75	0.33
	Selkirk	15.50	4.25	35.00
	Stonewall	11.50	67.25	156.25
Prairie Mountain	**Boissevain**	**189.00**	**445.33**	245.75
	Brandon	52.78	**238.90**	350.33
	Carberry	24.75	124.75	268.00
	Dauphin	0.00	5.50	1.00
	Killarney	12.33	203.33	**710.00**
	Minnedosa	0.25	4.50	3.75
	Sioux Valley FN	16.25	74.75	172.50
	Souris	15.50	49.75	104.00
	Virden	51.75	47.50	249.25
Southern	Altona	27.00	**290.50**	2.50
	Carman	**63.00**	55.50	112.00
	Headingley	5.50	6.50	14.50
	Morden	**307.25**	79.75	156.25
	Morris	14.33	209.50	24.00
	Niverville	13.67	48.50	169.25
	Portage la Prairie	46.75	156.50	303.25
	Roseau River FN	11.25	40.50	130.00
	Ste. Anne	4.75	19.00	15.50
	Sandy Bay FN	0.25	39.67	0.00
	Steinbach	31.33	84.00	89.75
	Winkler	39.25	61.25	**1,637.50**
Winnipeg	East St Paul	0.00	176.00	**449.00**
	West St Paul	19.50	59.50	130.00
	Winnipeg	46.93	112.70	215.86
	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.
** Adult mosquito trapping started during CDC Week 21.

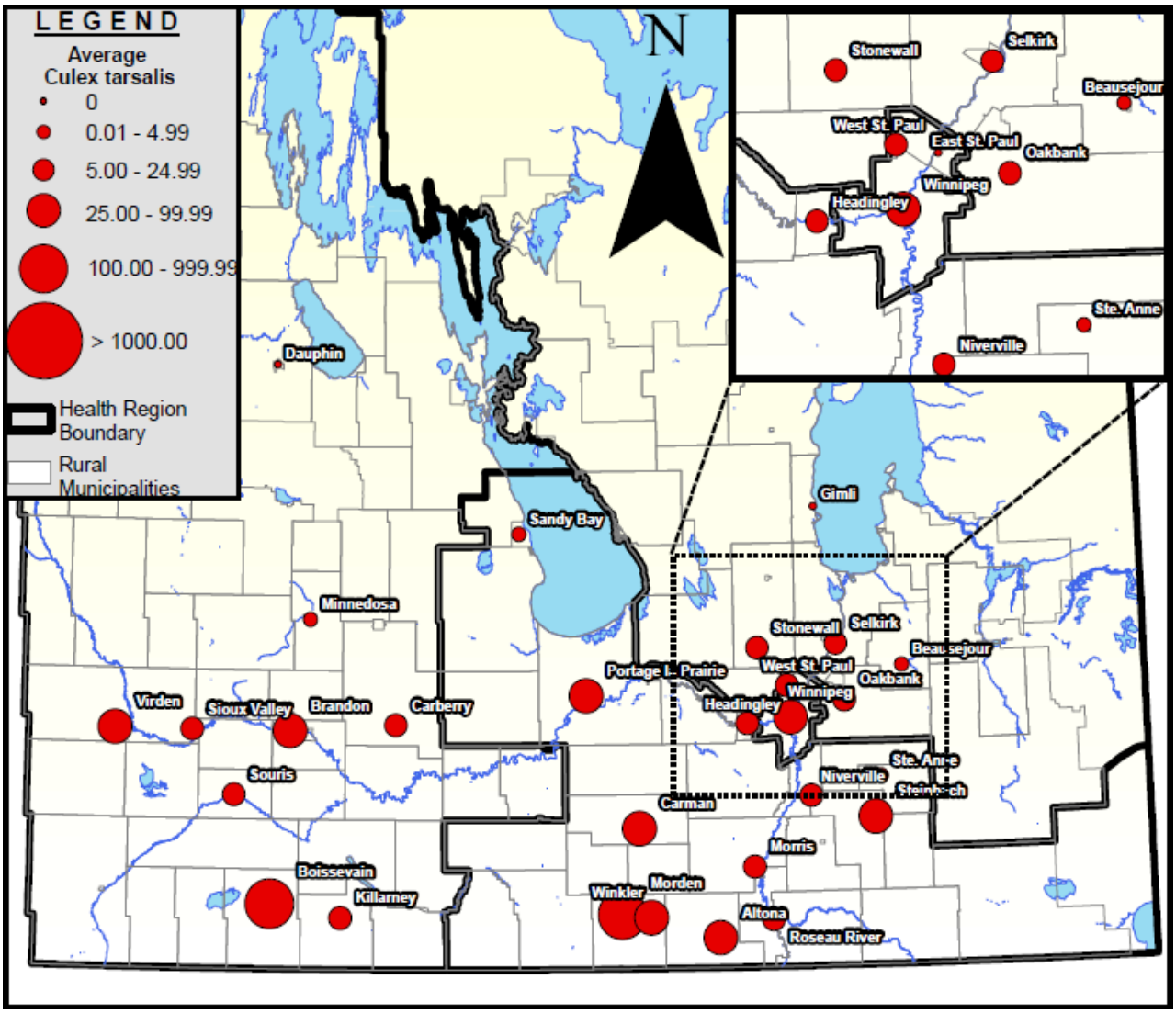
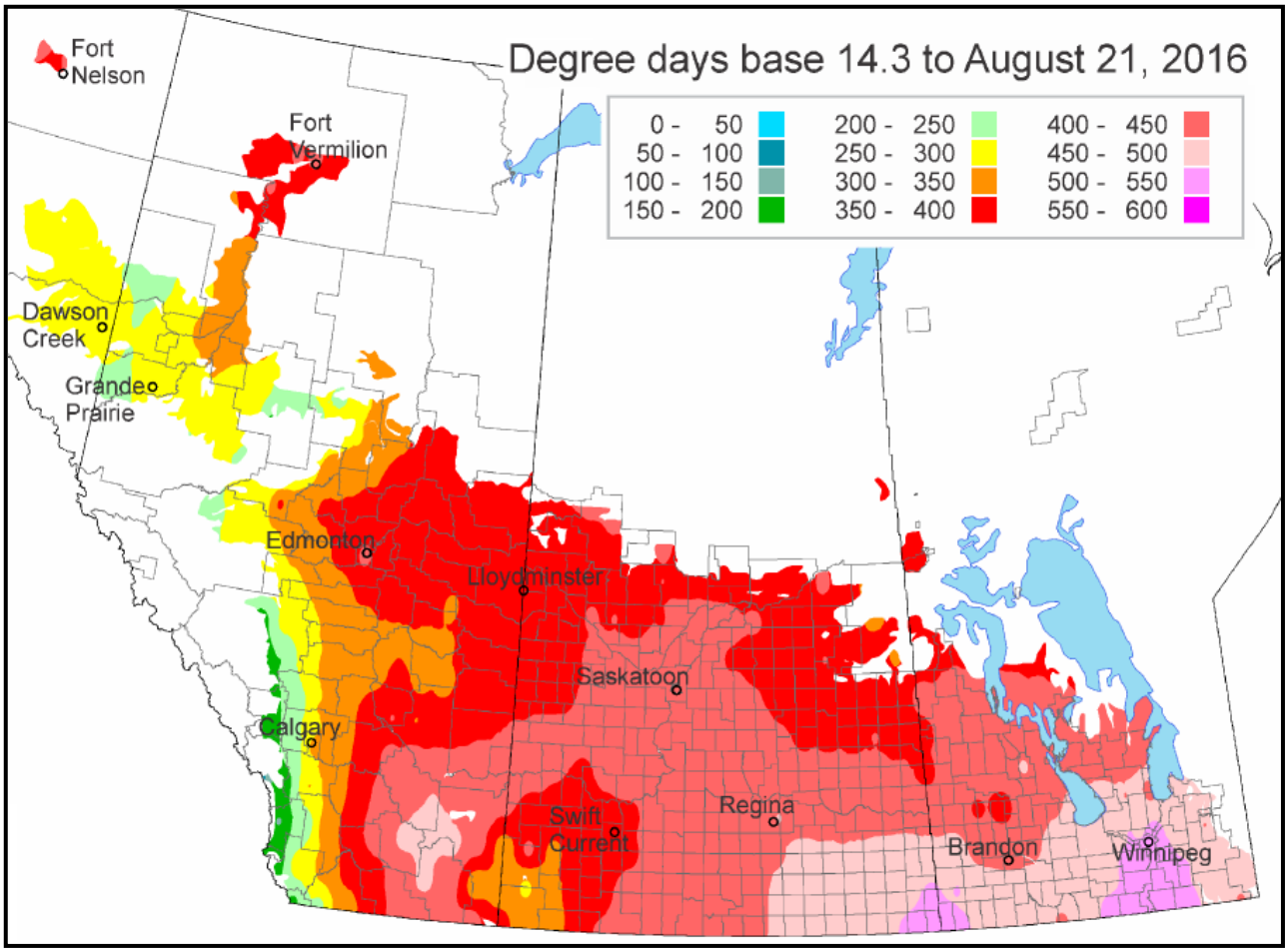


Figure 2 – Average number of *Culex tarsalis* mosquitoes collected across southern Manitoba during Week 33.



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

Figure 3 - Degree day accumulations, as of Week 33, 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 33).

Health Region	CDC Week										Totals
	25	26	27	28	29	30	31	32	33	34	
Interlake-Eastern	0	0	0	0	0	0	0	0	1		**1**
Prairie Mountain	0	0	0	0	0	0	0	1	0		**1**
Southern	0	0	0	1	0	0	0	1	0		**2**
Winnipeg	0	0	0	0	0	0	0	0	3		**3**
Totals	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**4**		**7**

***** 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 33)

RHA	CDC Week										Totals
	25	26	27	28	29	30	31	32	33	34	
Interlake-Eastern	6	3	5	10	14	17	24	17	10		**107**
Prairie Mountain	16	14	19	31	38	59	74	102	49		**403**
Southern	25	22	29	35	36	65	66	66	51		**408**
Winnipeg	9	19	16	24	25	51	77	61	33		**332**
Weekly Totals	**56**	**58**	**69**	**100**	**113**	**192**	**241**	**246**	**143**		**1250**

Table 5* – Total number and percentage of WNV positive *Culex tarsalis* mosquito pools by Health Region (current to Week 33)

Health Region	CDC Week									Totals
	25	26	27	28	29	30	31	32	33	
Interlake-Eastern	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (5.9)	0 (0)	0 (0)	0 (0)	**1 (0.9)**
Prairie Mountain	0 (0)	0 (0)	0(0)	0(0)	0 (0)	4 (6.8)	4 (5.4)	4 (3.9)	8 (16.3)	**20 (5.0)**
Southern	0 (0)	0 (0)	0 (0)	0 (0)	3 (8.6)	1 (1.5)	1 (1.5)	0 (0)	5 (9.8)	**10 (2.5)**
Winnipeg	0 (0)	0 (0)	0 (0)	0 (0)	1 (4.0)	1 (2.0)	0 (0)	2 (3.3)	2 (6.1)	**6 (1.8)**
Weekly Totals	**0 (0)**	**0 (0)**	**0 (0)**	**0 (0)**	**4 (3.6)**	**7 (3.6)**	**5 (2.1)**	**6 (2.4)**	**15 (10.5)**	**37 (3.0)**

***** 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 33)

	Cumulative (Year-to-Date) Amount		Year End Totals	
Year	**Positive Mosquito Pools**	**Human WNV Cases**	**Positive Mosquito Pools**	**Human WNV Cases**
2016	***37***	***7***	***TBD***	***TBD***
2015	**28**	**4**	30	5
2014	14	0	24	5
2013	17	3	19	3
2012	108	33	116	39
2011	0	0	0	0
2010	19	0	20	0
2009	2	2	2	2
2008	31	10	41	12
2007	894	431	948	587
2006	161	41	171	51
2005	187	40	193	58
2004	54	3	57	3
2003	149	66	290	143

- WNV Activity in Canada and the U.S. -

Canada:

- As of Week 33 there have been 179 WNV positive mosquito pools (37 in Manitoba, 94 in Ontario, 8 in Quebec and 40 in Saskatchewan), 10 WNV human cases (7 in Manitoba, 1 in Ontario and 2 each in Quebec) WNV human cases and 2 WNV positive birds (Ontario) reported in Canada (Manitoba) (Table 7).

➢ Additional up to date Canadian WNV information can be obtained by consulting the Public Health Agency of Canada West Nile virus website at http://healthycanadians.gc.ca/diseases-conditions-maladies-affections/disease-maladie/west-nile-nil-occidental/surveillance-eng.php, or by consulting the respective provincial department websites.

United States:

- As of August 23, 2016 a total of 365 WNV human cases have been reported in the US, including 64 viremic blood donors and seven WNV related deaths (Arizona, California, Colorado, Kansas, Nevada and Washington) (Table 7).
    - As of August 23, 2016 Minnesota is reporting four (4) WNV human cases, ten (10) WNV positive mosquito pools and one (1) WNV positive horse (Table 7).

- As of August 19, 2016 North Dakota is reporting twenty-one (21) WNV human cases, fifteen (15) WNV positive mosquito pools, six (6) WNV positive birds and two (2) WNV positive veterinary cases (includes one horse) (Table 7).
- As of August 23, 2016 South Dakota is reporting seventy-four (74) WNV human cases (includes 10 viremic blood donors) (Table 7).

➢ Additional up to date U.S. WNV information can be obtained by visiting the United States Geological Survey's 'Arbonet – Website' at http://diseasemaps.usgs.gov/mapviewer/

Table 7 – Positive human, mosquito, horse and bird West Nile Virus surveillance indicators across Canada and neighbouring US states as of Week 33.

Province/ State	Human Cases*	Positive Mosquito Pools	Veterinary ***	Birds
Manitoba	7	37	0	0
Saskatchewan	0	40	0	0
Alberta	0	N/A**	0	N/A
North Dakota	21	15	2	6
South Dakota	74	9	0	0
Minnesota	4	10	1	0
Ontario	1	94	0	2
British Columbia	0	N/A	0	0
Quebec	2	8	0	0
Maritimes	0	N/A	0	N/A
TOTAL	**109**	**213**	**3**	**8**

* Table numbers include travel related cases.
** Jurisdictions with N/A (not applicable) do not maintain regular surveillance.
*** Veterinary cases are primarily, but not all, horse cases.

- APPENDIX 1 -

Table 8 – 2016 CDC surveillance weeks

CDC Week Number	Dates	CDC Week Number	Dates
21	May 22 - May 28	30	July 24 - July 30
22	May 29 - June 4	31	July 31 - August 6
23	June 5 - June 11	32	August 7 - August 13
24	June 12 - June 18	33	August 14 - August 20
25	June 19 - June 25	34	August 21 - August 27
26	June 26 - July 2	35	August 28 - September 3
27	July 3 - July 9	36	September 4 - September 10
28	July 10 - July 16	37	September 11 - September 17
29	July 17 - July 23	38	September 18 - September 24

- 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^{o}C. Degree days are calculated by taking the daily mean temperature and subtracting the cut-off threshold:

EXAMPLE: *Mean Temperature* = 19.3^{o}C; *Degree Day threshold* = 14.3^{o}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.