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PARTNERS FOR HEALTH | PARTENAIRES POUR LA SANTÉ

West Nile Virus Weekly Surveillance Report

Surveillance Week 30 (July 26 – August 1, 2015)

Provincial Trends[1]

- **Human cases:** As of week 30, there has been two reported West Nile Virus (WNV) human cases; one each from NIA and WAT (Table 1).
- **Equine:** Currently, there are no reported horses with WNV[2].
- **Positive Mosquito Pools:** In week 30 there were six WNV positive mosquito pools (Figure 1-2). To date, there have been 11 positive mosquito pools reported for 2015 Tables 1-3). The majority of mosquitoes captured in Ontario were from the genus *Aedes, Coquillettidia*, and *Ochlerotatus* (Table 4). These genera are not major vectors of WNV in Ontario but can be a biting nuisance. The number of *Cx. pipiens/restuans* that are being captured is still relatively low across the province, with some health units starting to see increasing numbers in their trap captures (Table 5). For week 30, WNV-positive mosquito activity was higher than the activity experienced for week 30 in 2014 (Table 6).

Degree day analysis shows that the majority of the province is still cool, with areas of southwestern, central west and southeastern, Ontario the warmest (Figure 3).

[1]Note: Mosquito data is downloaded from health unit data, via The Mosquito Database, every Monday by noon. Health unit data that is not reported by then is not included in the report. Human cases are from Ontario Ministry of Health and Long-Term Care's integrated Public Health Information System (iPHIS) database, extracted by Public Health Ontario. Health unit site codes are available in the Definitions document.

Other Arboviruses and Mosquito Species of Interest

- There have been no reports of mosquitoes or horses testing positive for Eastern Equine Encephalitis (EEEV)[2].
- *Culiseta melanura* is an important mosquito vector in the transmission cycle of EEEV as it is responsible for amplifying the virus in the bird population. This species was reported in low numbers in week 30.
- Although there are large numbers of *Cq. perturbans* can be identified in Ontario, this species is not considered a competent vector species in the transmission of WNV due to the presence of a substantial salivary gland barrier (Sardelis et al. 2001)[3].

Vector-Borne Disease Activity in Other Jurisdictions

- **WNV Canada (January 1 to July 18, 2015):**
    - One mosquito pool in Manitoba, and one in Saskatchewan[4].
- **WNV United States (January 1 to July 28, 2015):**
    - **Overall:** 36 states reporting WNV activity (e.g., birds, mosquito pools, humans)[5].
    - **Human cases:** 38 human cases of WNV have been reported
    - **Positive Mosquito Pools:** WNV positive mosquito pools have been reported in at least 23 states across the US[6].

Eastern Equine Encephalitis Virus:

In the US, there has been one reported human case of EEEV in Louisiana; along with EEEV-positive sentinels (chickens) and/or horses in North Carolina, South Carolina, Florida, Texas, and Virginia[6].

Additional Information

Definitions:
http://www.publichealthontario.ca/en/DataAndAnalytics/Documents/WNV%20surveillance%20reports%20definitions.pdf
Accumulated Degree Days:
http://www.publichealthontario.ca/en/DataAndAnalytics/Documents/Accumulated_Degree_Days_2012.pdf

[2]Ontario Ministry of Agriculture and Food: http://www.omafra.gov.on.ca/english/livestock/horses/westnile.htm
[3]Sardelis M.R., M.J. Turell, D.J. Dohm and M.L. O'Guinn. 2001. Vector competence in selected North American *Culex* and *Coquillettidia* mosquitoes for West Nile Virus. Emerging Infectious Diseases, 7(6): 1018-1022.
[4]Public Health Agency of Canada's WNV National Surveillance Report http://www.phac-aspc.gc.ca/wnv-vwn/
[5]US Centers for Disease Control and Prevention http://www.cdc.gov/ncidod/dvbid/westnile/index.htm
[6]US Centers for Disease Control and Prevention: http://diseasemaps.usgs.gov/mapviewer/

TABLE 1. NUMBER OF POSITIVE MOSQUITO POOLS AND REPORTED CONFIRMED AND PROBABLE HUMAN CASES OF WEST NILE VIRUS, YEAR-TO-DATE AND YEARLY: ONTARIO, 2002-2015

Year	# of Positive Pools		# of Positive Humans	
	Year-to-date total*	Yearly total**	Year-to-date total*	Yearly total**
2002	100	580	2	395
2003	4	122	6	95
2004	4	72	1	14
2005	29	289	7	101
2006	14	182	3	43
2007	1	51	3	18
2008	2	62	2	9
2009	0	14	0	4
2010	3	57	3	9
2011	11	286	6	81
2012	89	464	35	271
2013	22	198	10	57
2014	2	56	1	13
2015	11	TBD	2	TBD

Data sources:

Human West Nile Virus cases: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted by Public Health Ontario [2015/08/04].

Notes for data related to human cases:

*Year-to-date total: counts of reported confirmed and probable cases of WNV illness with an episode date in iPHIS between **weeks 1-30** each year.

Yearly total: counts of reported confirmed and probable cases of WNV illness with an episode date in iPHIS between **January 1 and December 31 of each year. The yearly total cells for 2015 are not comparable to previous years because data for the full year are unavailable.

The data only represent cases reported to public health units and recorded in iPHIS. Counts are subject to varying degrees of underreporting depending on the disease.

iPHIS is a dynamic disease reporting system which allows ongoing updates to data previously entered. As a result, data extracted from iPHIS represent a snap shot at the time of extraction and may differ from previous or subsequent reports.

Cases are reported based on "episode date". The Episode Date is an estimate of the onset date of disease for a case. In order to determine this date, the following hierarchy is in place in iPHIS: Onset Date > Specimen Collection Date > Lab Test Date > Reported Date.

TABLE 2. TOTAL NUMBER OF WNV POSITIVE MOSQUITO POOLS BY HEALTH UNIT.[7]

MOH Region	HU	CDC Week									Total
		22	23	24	25	26	27	28	29	30	
Central East	DUR			0	0	0	0	0	0	0	**0**
	HKP		0	0	0	0	0	0	1	0	**1**
	PEE			0	0	0	0	0	0	2	**2**
	PTC			0	0	0	0	0	0	0	**0**
	SMD			0	0	0	0	0	0	0	**0**
	TOR	0	0	0	0	0	0	0	0	0	**0**
	YRK			0	0	0	0	0	0	2	**2**
Central East Total		0	0	0	0	0	0	0	1	4	**5**
Central West	BRN	0	0	0	0	0	0	0	0	0	**0**
	HAL					0	0	0	0	0	**0**
	HAM		0	0	0	0	0	0	0	0	**0**
	HDN			0		0		0		0	**0**
	NIA	0	0	0	0	0	0	0	0	1	**1**
	WAT			0	0	0	0	0	0	1	**1**
	WDG			0	0	0	0	0	0	0	**0**
Central West Total		0	0	0	0	0	0	0	0	2	**2**
Eastern	EOH			0	0	0	0	0	0	0	**0**
	HPE					0	0	1	0	0	**1**
	KFL		0	0	0	0	0	0	0	0	**0**
	LGL				0		0		0		**0**
	OTT			0	0	0	0	0	0	0	**0**
	REN				0	0	0	0	0	0	**0**
Eastern Total		0	0	0	0	0	0	1	0	0	**1**
North East	ALG			0	0		0	0	0	0	**0**
	NPS	0	0	0	0			0	0	0	**0**
	PQP						0	0	0	0	**0**
	SUD			0	0	0	0	0	0	0	**0**
	TSK			0	0	0	0	0	0	0	**0**
North East Total		0	0	0	0	0	0	0	0	0	**0**
North West	NWR						0	0	0	0	**0**
	THB					0			0	0	**0**
North West Total		0	0	0	0	0	0	0	0	0	**0**
South West	CHK			0	0	0	0	0	0		**0**
	ELG				0		0	0	0		**0**
	HUR			0	0	0	0	0	0	0	**0**
	LAM						0	0	0	0	**0**
	MSL	0	0	0	0	0	0	0	0	0	**0**
	OXF		0	0	0		0	0	0	0	**0**
	PDH						0	0	0	0	**0**
	WEC			1	0	0	0	0	2	0	**3**
South West Total		0	0	1	0	0	0	0	2	0	**3**
Ontario Total		**0**	**0**	**1**	**0**	**0**	**0**	**1**	**3**	**6**	**11**

[7]Blank entries indicate no pools were tested or reported.

FIGURE 1. TOTAL NUMBER OF WNV POSITIVE MOSQUITO POOLS BY WEEK COMPARED TO HIGHEST AND LOWEST YEARS

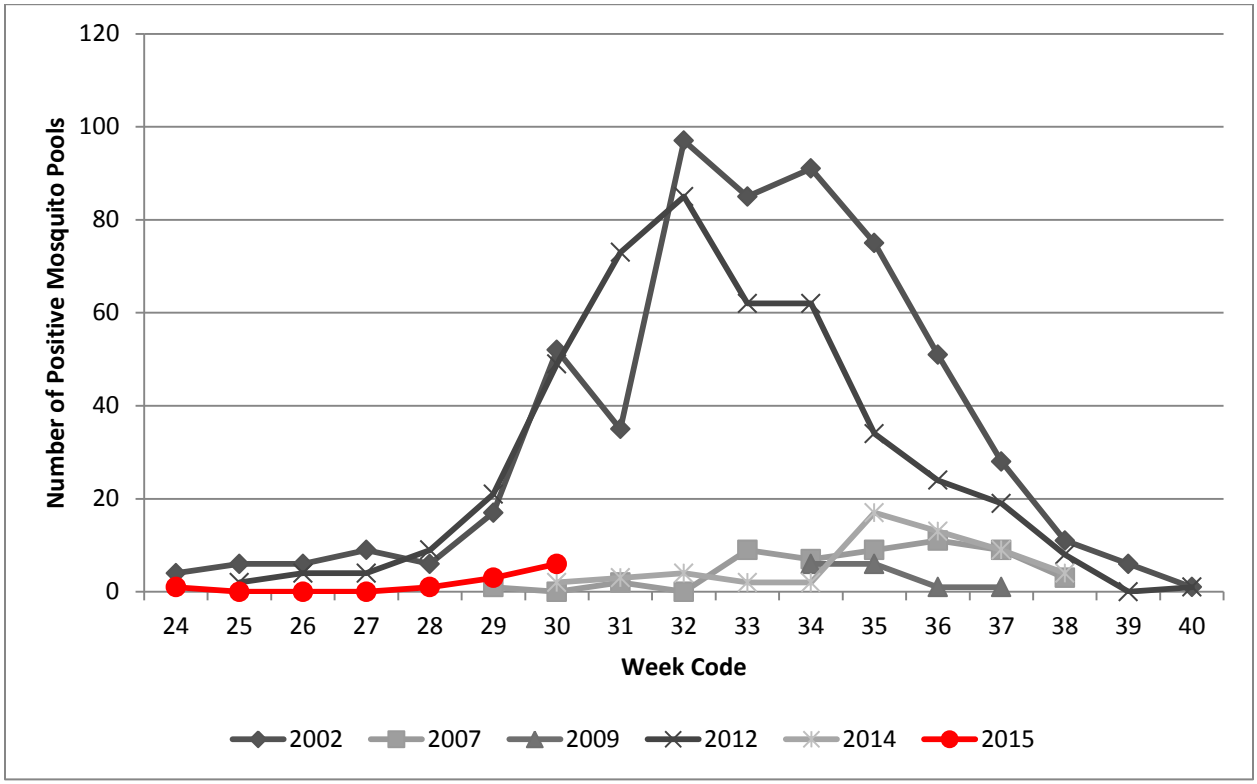

TABLE 3. AVERAGE INFECTION RATE AND VECTOR INDEX OF *CX. PIPIENS/RESTUANS* BY HEALTH UNIT, WEEK 30, 2015.

MOH Region	HU	Number of Sites	Pools tested	Number tested	Positive pools	Average infection rate (/1000 mosq)	Average vector index
Central East	DUR	12	9	90	0	0	0
	HKP	20	8	21	0	0	0
	PEE	31	33	569	2	3.59	0.06
	PTC	5	4	24	0	0	0
	SMD	13	6	13	0	0	0
	TOR	40	38	471	0	0	0
	YRK	37	24	114	1	8.89	0.04
Central West	BRN	10	9	105	0	0	0
	HAL	16	16	326	0	0	0
	HAM	30	28	515	0	0	0
	HDN	8	7	43	0	0	0
	NIA	22	20	170	1	6.02	0.05
	WAT	17	11	46	1	25.97	0.11
	WDG	8	1	6	0	0	0
Eastern	EOH	6	6	105	0	0	0
	HPE	17	14	185	0	0	0
	KFL	7	3	8	0	0	0
	OTT	29	20	153	0	0	0
	REN	5	3	15	0	0	0
North East	ALG	3	0	0	0	0	0
	NPS	7	3	3	0	0	0
	PQP	20	10	22	0	0	0
	SUD	21	2	5	0	0	0
	TSK	6	4	40	0	0	0
North West	NWR	5	1	1	0	0	0
	THB	12	3	4	0	0	0
South West	ELG	5	0	0	0	0	0
	HUR	10	5	14	0	0	0
	LAM	12	9	86	0	0	0
	MSL	23	17	92	0	0	0
	OXF	10	10	77	0	0	0
	PDH	8	7	38	0	0	0
	WEC	20	20	331	0	0	0

TABLE 4. AVERAGE NUMBER OF MOSQUITOES PER SPECIES PER TRAP PER NIGHT BY HEALTH UNIT IN WEEK 30, 2015.

MOH Region	HU	Number of Sites	*Cx. pipiens/restuans*	*Ae. vexans/cantator*	*Cq. perturbans*	*Anopheles species*	*Cs. melanura*	*Culiseta species*	*Culex species*	*Oc. japonicus*	*Oc. triseriatus/hendersoni*	*Oc. trivittatus*	*Oc. stimulans/excrucians*	*Oc. broad-banded*	*Oc. canadensis*	*Oc. black legged*	*Oc. sollicitans*	*Ae. cinereus*	Other species
Central East	DUR	12	7.5	29	36.6	3.5	0	0	0	2.3	0.7	6.2	2.2	1.7	0.1	1.2	0	2.3	2.5
	HKP	20	1.1	16	45.9	4.4	0	0.1	0	1.4	0.7	6.1	3.3	0	0.4	6.5	0	0.1	5.3
	PEE	31	19	39	31.7	5.4	0	0	0.5	3.3	1.4	3	1.5	0.1	1	0	0	0.5	2.5
	PTC	5	4.8	6.2	90.4	15	0	0	0	0.6	0.4	0	0.2	1	0	0	0	0	0.4
	SMD	13	1	13	10.6	0.8	0	0	0	0.8	0.1	0.4	0	0.3	0.5	0.9	0	0.2	0.8
	TOR	40	12	37	14.4	2.3	0	0	0	2.4	0.9	2	0.2	0.7	0.6	1.6	0	0.2	3.5
	YRK	37	3.1	22	21.5	2.6	0	0	0	1.3	0.8	3.5	0.4	0.2	0.9	0.2	0	0.4	0.6
Central West	BRN	10	11	16	10.7	2.4	0	0	0	2.5	2.5	9.6	0.2	0	0.2	0.3	0	0.1	6.7
	HAL	16	20	39	19.8	7.8	0	0	0	8.8	7.1	5.1	0.4	1.3	3.6	2.3	0.1	0.3	1.5
	HAM	30	17	27	10.5	2.7	0	0	0.3	2.7	0.7	0.7	0.2	0.4	0.1	0	0	0	1.3
	HDN	8	5.4	53	5.9	24	0	0	0	3	2.9	1.8	0.5	0	0	1.3	0	0.3	5.3
	NIA	22	7.7	40	5.8	5.2	0	0	0	1.3	0.4	4.1	0.7	0	0.1	0.6	0	0.1	6.9
	WAT	17	2.7	19	21.1	2.6	0.1	0	0.2	0.6	1.5	7	3.1	0	1	0.5	0	1.5	0.1
	WDG	8	0.8	7	24.8	0.1	0	0	0	1.3	0.4	7.4	1.1	1.6	0.9	3.6	0	1.3	0.6
Eastern	EOH	6	18	32	39	3.7	0.2	0	0	0.7	3.2	13	0.7	0	0	0.2	0	0.7	0.3
	HPE	17	11	31	50.2	3.2	0	0	0.1	0.5	0.3	2.9	0.6	0	0.2	0	0	0.5	0.8
	KFL	7	1.1	22	60.4	3.4	0	0	0	0.6	0	1	0.1	0	0	3.3	0	0.1	0.6
	OTT	29	5.3	19	27.7	1.9	0	0	0	0.2	0.3	8.1	1.3	0.2	0.1	0	0	0.4	0.4
	REN	5	3	14	51.8	4.8	0	0	0	0.4	0	0.2	0.8	0.6	0	0	0	0.2	0.8
North East	ALG	3	0	1.7	3.3	0	0	0	0	0	0	0	2.3	1	2	6.3	0	0.7	0.3
	NPS	7	0.4	20	104	0.7	0.1	0.3	0	0.1	0.4	0	1	0.7	1.9	0.9	0	3.1	0.9
	PQP	20	1.1	3.2	49.7	0.8	0	0.8	0	0	0	2.8	6	0.1	8.4	35	0	1.1	12
	SUD	21	0.2	2.1	15.9	0.1	0	0	0	0	0	0	0	1.2	1	0.6	0	1.8	1.4
	TSK	6	6.7	3	18.5	2	0	0.2	0	0	0	0.2	1.8	0.2	30	10	0	3.5	9
North West	NWR	5	0.2	8.6	60.2	0	0	0	0	0	0.4	0	0	0.4	0	1.2	0	0	0
	THB	12	0.3	7.3	17.3	0.3	0	0	0	0	0.2	0	0	0.1	0.2	15	0	1.3	0.6
South West	ELG	5	7.6	47	1	17	0	0	0.2	6.6	0.6	13	0	0	0	0.8	0	0	2.2
	HUR	10	1.4	27	0.6	0.9	0	0	0	0	0.3	24	0	0.8	0.2	6	0	0.6	1.5
	LAM	12	7.2	55	11	8.8	0	0	0	0.8	1.7	7.8	3.4	0	8.4	4.5	0.2	0	9.2
	MSL	23	4	28	9	3.9	0	0	0.1	0.9	2.1	35	1.8	0	6.5	12	0	0.6	2.2
	OXF	10	7.7	22	1.8	1.6	0	0	0	0.4	1.4	25	0.6	0.2	0.1	2.9	0	0.4	1.7
	PDH	8	4.8	7.3	0.6	0.1	0	0	0	0	0.4	17	0.3	0.1	1.3	0.1	0	0	0.9
	WEC	20	17	32	28.2	13	0	0	0.5	4.2	1	2.5	0.3	0.2	0.1	0.1	1.9	0.1	4.2

Background colour definitions:

value < 10
10 <= value < 30
30 <= value < 50
50 <= value

TABLE 5. AVERAGE NUMBER OF *CX. PIPIENS/RESTUANS* PER TRAP PER NIGHT BY WEEK AND BY HEALTH UNIT.

MOH Region	HU	CDC Week 22	23	24	25	26	27	28	29	30	Total Avg. for Weeks 22-30
Central East	DUR			2.1	7.2	14.9	10.1	10.9	19.8	7.5	**10.6**
	HKP		0.6	2	1.4	2.1	6.1	4.5	6	1.1	**2.9**
	PEE			6.9	6.7	8.6	14.6	12.4	10.9	18.5	**11.2**
	PTC			1.2	0.5	1.4	0.2	2.5	2.2	4.8	**1.8**
	SMD			0.5	0.4	4.6	0.2	0.4	2.1	1	**1**
	TOR	1	1.6	3.3	2.1	5.9	6.9	4.5	7.9	11.8	**5**
	YRK			4.7	0.6	2.7	2.8	3.3	2.4	3.1	**2.8**
Central West	BRN	0.6	2.5	2.1	2.3	7.9	1.5	4.2	7.5	10.8	**4.4**
	HAL					15.2	14.5	9	11.8	20.4	**14.2**
	HAM		5.5	2	2.3	8	7.5	5.5	6	17.2	**6.8**
	HDN			3.9		2.4		8.3		5.4	**5**
	NIA	1	2	3.1	6.1	8.9	4.4	7.1	9.2	7.7	**5.4**
	WAT			1.3	1.4	1	0.8	0.5	0.8	2.7	**1.2**
	WDG			0.3	0.7	0.4	2	4.1	11.4	0.8	**2.6**
Eastern	EOH			2.8	1.8	7.2	1.5	2.3	6.1	17.5	**5.5**
	HPE					4.1	1.7	3.5	7.4	11	**5.8**
	KFL		0	0.3	0.2	0.1	0	0.4	0.3	1.1	**0.3**
	LGL				0.4		0.1		0.5		**0.3**
	OTT			3.3	1.6	5.2	2.3	3.7	4.7	5.3	**3.7**
	REN				0	0	0	0	0.2	3	**0.5**
North East	ALG			0	0		0.8	1.5	1.5	0	**0.7**
	NPS	0	1	0.2	3.7			1.1	1.5	0.4	**1.2**
	PQP						0.5	2.3	1.9	1.1	**1.5**
	SUD			0.3	0.1	0	0.8	1.1	0.2	0.2	**0.4**
	TSK			0.5	0	0.7	0.5	3	3	6.7	**2**
North West	NWR						0.2	0.2	0.3	0.2	**0.2**
	THB					0.3	0	0	0.1	0.3	**0.2**
South West	CHK			4.5	1.4	4.7	4	5.8	6.5		**4.5**
	ELG				2		8.4	8.4	12	7.6	**7.7**
	HUR			2.3	0.2	0.3	0.8	0.7	2.4	1.4	**1.2**
	LAM						2.7	0.8	2.4	7.2	**3.3**
	MSL	1.7	2.3	2.6	8.9	4.8	9.4	2.5	6.9	4	**4.8**
	OXF		5	4.2	8.6		19.6	16.9	19.8	7.7	**11.7**
	PDH				17.3		12.6	0.6	4.8	4.8	**8**
	WEC			7.5	8.5	11.7	7	6.3	8.9	17	**9.5**

Background colour definitions:

value < 10
10 <= value < 30
30 <= value < 50
50 <= value

TABLE 6. COMPARISON OF NUMBER OF POSITIVE MOSQUITO POOLS AND POSITIVE VECTOR SPECIES IN WEEK 30 TO PREVIOUS YEARS IN WEEK 30.

Year	# of Positive Pools	# of HUs	Positive Vector Species
2002	52	13	*Ae. vexans vexans, An. punctipennis, Anopheles species, Cq. perturbans, Culex species, Cx. pipiens/restuans, Cx. salinarius*
2003	2	2	*Cx. pipiens/restuans, Oc. stimulans*
2004	0	0	N/A
2005	20	4	*Cx. pipiens/restuans*
2006	9	6	*Cq. perturbans, Cx. pipiens/restuans*
2007	0	0	N/A
2008	0	0	N/A
2009	0	0	N/A
2010	3	2	*Cx. pipiens/restuans*
2011	6	3	*Cx. pipiens/restuans*
2012	49	19	*Ae. vexans vexans, Cx. pipiens/restuans*
2013	10	6	*Ae. vexans vexans, Cx. pipiens/restuans*
2014	2	2	*Cx. pipiens/restuans*
2015	6	4	*Ae. vexans vexans, Cx. pipiens/restuans*

FIGURE 2. LOCATION OF POSITIVE MOSQUITO POOLS UP TO WEEK 30, 2015.

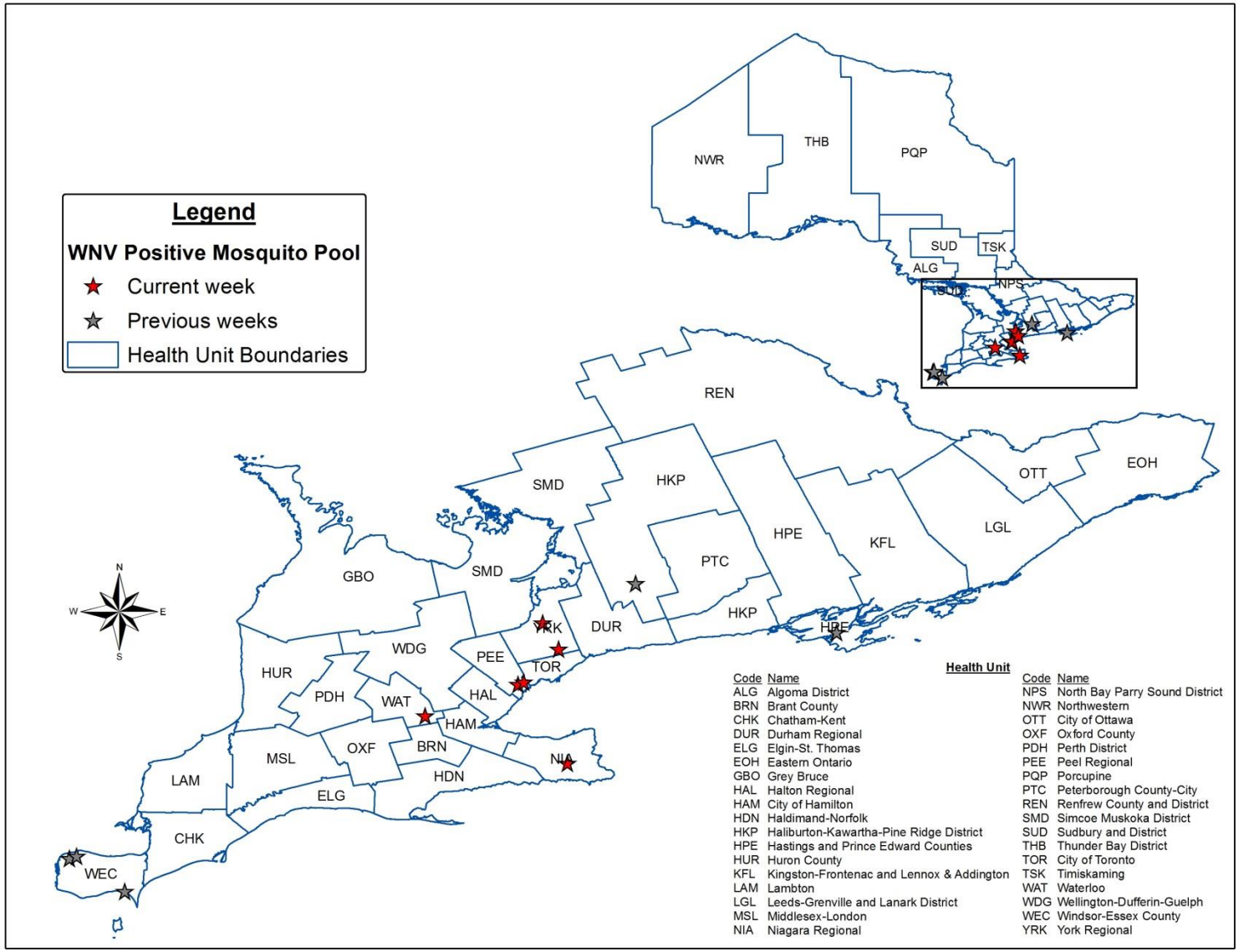

FIGURE 3. ACCUMULATED DEGREE DAY MAP FOR ONTARIO UP TO WEEK 30, 2015.