



**Rhode Island Department of Health  
Center for Acute Infectious Disease Epidemiology  
Arbovirus Surveillance: Epidemiologic Report, 2017**

*Purpose: To monitor the epidemiology, incidence, and geographic distribution of West Nile Virus (WNV) and other arboviruses in Rhode Island for early detection and prevention of any human transmission.*

**Quick Facts:**

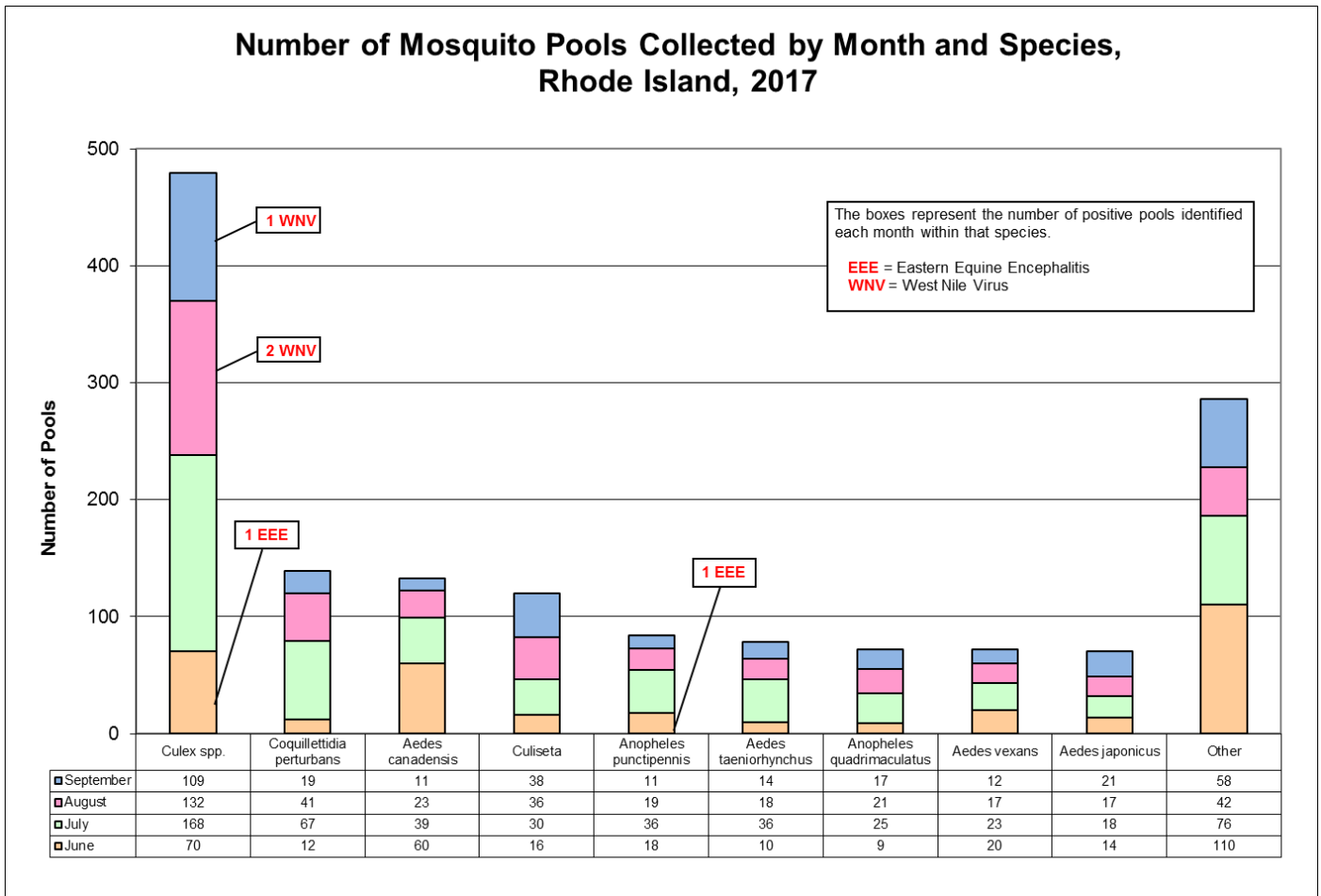
- The [Rhode Island Department of Environmental Management \(DEM\)](#) traps mosquitoes at various locations throughout Rhode Island. Mosquito traps are placed strategically throughout the state based on knowledge of environmental conditions conducive to West Nile Virus (WNV) and Eastern Equine Encephalitis (EEE) amplification in the mosquito population. Once the traps are collected, the mosquitoes collected in each trap are sorted by species into 'pools'. A pool can contain anywhere from 1 to 50 mosquitos. The [Rhode Island State Health Laboratory \(RISHL\)](#) tests each pool for the presence of virus through PCR testing.
- Mosquito traps were set weekly from June 5<sup>th</sup> through September 25<sup>th</sup>, 2017.
- In 2017, 1,533 mosquito pools (16,439 individual mosquitos) were tested for the presence of arboviruses, of which five tested positive (0.3%). Of the five positive pools, 3 tested positive for WNV and 2 tested positive for EEE. In 2016, there were four pools positive for arboviruses (EEE: 2, WNV: 1, JCV: 1).
- The first positive pools for the season (2 EEE) were collected on June 26, 2017 in Pawtucket (*Anopheles punctipennis*) and Tiverton (*Culex* spp.). The last positive pool of the season (WNV, *Culex* spp.) was collected on September 5, 2017 in Warren.
- The greatest number of mosquito pools were collected in Westerly (14.0% of total pools collected in 2017); whereas the highest arboviral positivity rate of pools was noted in Barrington (1.9% positivity).
- In 2017, there were no veterinary cases of arboviral disease.
- In 2017, 2 human cases of WNV and 2 human cases of Powassan virus were identified in Rhode Island residents. Powassan virus is an arbovirus transmitted by an infected tick. Rhode Island's first human Powassan virus case was identified in 2016.
- In 2017, 23 cases of Zika virus were identified (Disease, Non-congenital: 3, Infection, Non-congenital: 20). All cases were travel-acquired.

**Figures and Tables**

**Figure 1 and Table 1: Mosquito Pools by Type of Mosquito and Month**

Between June 5<sup>th</sup>, 2017 and September 25<sup>th</sup>, 2017, The Rhode Island Department of Environmental Management submitted a total of 1,533 mosquito pools comprised of 16,439 individual mosquitoes to the Rhode Island State Health Laboratory where they were tested for WNV and EEE. The highest arboviral positivity was found in June (0.6%), followed by August (0.5%) and September (0.3%). There were no positive mosquito pools in July.

**Figure 1**



**Table 1: Mosquito Surveillance: Pools by Species, Rhode Island, 2017\***

Species	June	July	August	September	Total
<i>Aedes abserratus</i>	1				1
<i>Aedes albopictus</i>			4	5	9
<i>Aedes canadensis</i>	60	39	23	11	133
<i>Aedes cantador</i>	17	12	4	9	42
<i>Aedes cinereus</i>	1				1
<i>Aedes communis</i>		4			4
<i>Aedes dorsalis</i>	2				2
<i>Aedes excrucians</i>	10	3	1		14
<i>Aedes fitchii</i>	2				2
<i>Aedes hendersoni</i>	5				5
<i>Aedes intrudens</i>	9	2	3	3	17
<i>Aedes japonicus</i>	14	18	17	21	70
<i>Aedes provocans</i>	2				2
<i>Aedes sollicitans</i>	3	1			4
<i>Aedes stimulans</i>	5				5
<i>Aedes taeniorhynchus</i>	10	36	18	14	78
<i>Aedes triseriatus</i>	32	27	11	7	77
<i>Aedes trivittatus</i>	12	8	6	1	27
<i>Aedes vexans</i>	20	23	17	12	72
<i>Amopheles barberi</i>	1	1			2
<i>Anopheles crucians</i>	1	6	5	12	24
<i>Anopheles punctipennis</i>	18 1 EEE (+)	36	19	11	84 (1.2% Positivity)
<i>Anopheles quadrimaculatus</i>	9	25	21	17	72
<i>Anopheles walkeri</i>	5	12	4	12	33
<i>Coquilletidia perturbans</i>	12	67	41	19	139
<i>Culex</i> spp.	70 1 EEE (+)	168	132 2 WNV (+)	109 1 WNV (+)	479 (0.8% Positivity)
<i>Culiseta</i> spp.	16	30	36	38	120
<i>Ochlerotatus canadensis</i>	1				1
<i>Uranotaenia sapphirina</i>	1	0	4	9	14
<b>Total</b>	<b>339</b>	<b>518</b>	<b>366</b>	<b>310</b>	<b>1,533</b>

\* All pools tested negative, unless otherwise specified.

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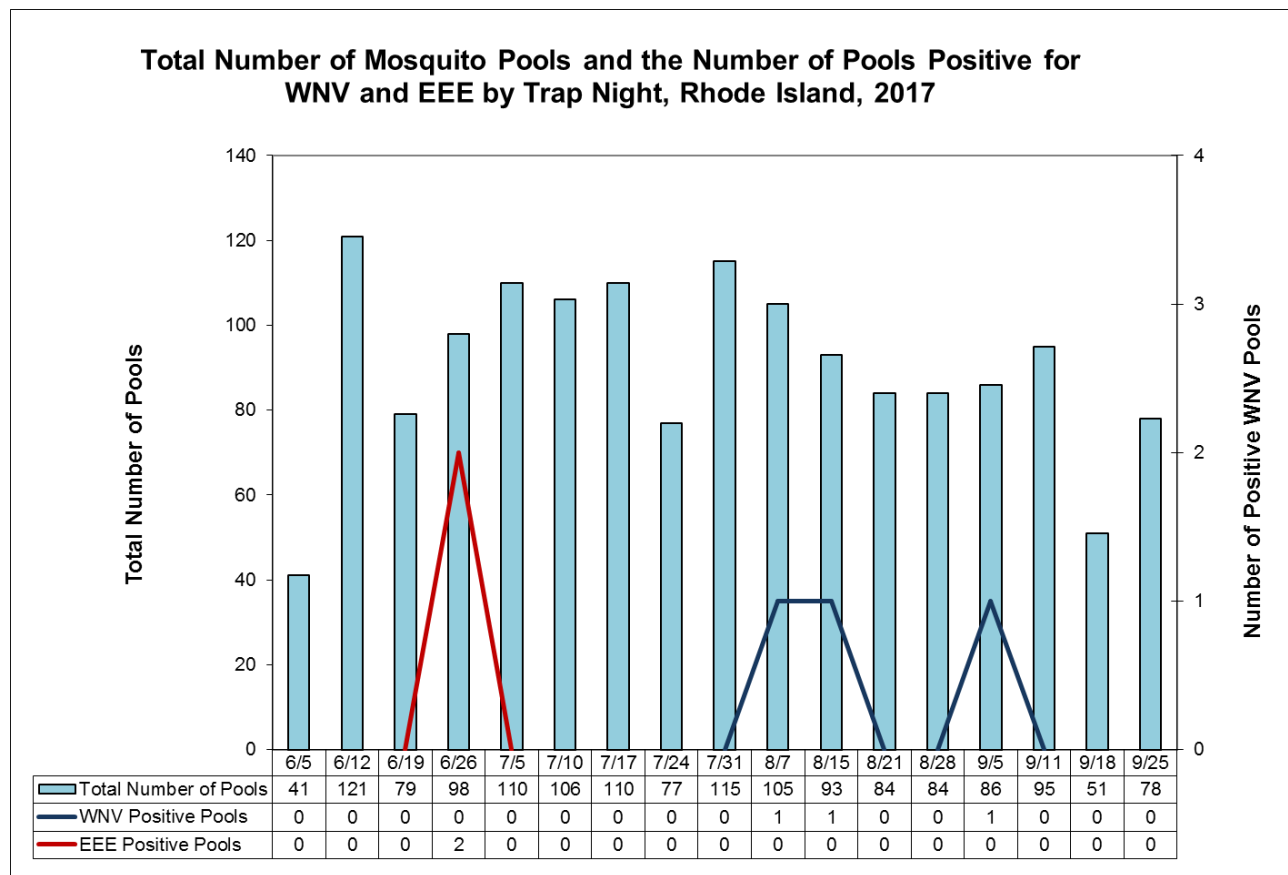
July 3, 2018

Over the past two years, Rhode Island has increased its surveillance for *Aedes albopictus*. During the summer of 2016, 28 individual *A. albopictus* mosquitoes were trapped in Barrington. From August 7, 2017 through September 25, 2017, 4 individual (3 pools) *A. albopictus* mosquitoes were trapped in Barrington and 12 (6 pools) were trapped in Providence. It is unclear whether these populations are established in either location. Annual trapping and monitoring will continue.

### Figure 2 and Figure 3: Mosquito Pools Identified by Trap Night

Although not as dramatic as seen in past years, the number of mosquito pools identified on a weekly basis in 2017 peaked in mid-summer and for the most part, declined gradually for the remainder of the season (Figure 2). To further illustrate this point, an average of 103 mosquito pools were identified per week from July 5<sup>th</sup> to August 7<sup>th</sup>, but after August 7<sup>th</sup>, the total number of mosquito pools identified each week declined to an average of 81 pools per week. This gradual decline is normal.

Figure 2



During the latter part of summer, mosquito populations decrease, but older mosquitos are more likely to carry arboviruses, thus increasing the risk of human infection. This is illustrated in Figure 3 below. This figure describes the biweekly frequency of WNV and EEE positive mosquito pools for 2001 – 2017. As can be seen from the figure, the frequency of positive pools increased through the mid-summer months until it peaks in early September. Interestingly, from mid-September until first frost, the frequency of EEE positive pools is greater than WNV positive pools.

**Figure 3**

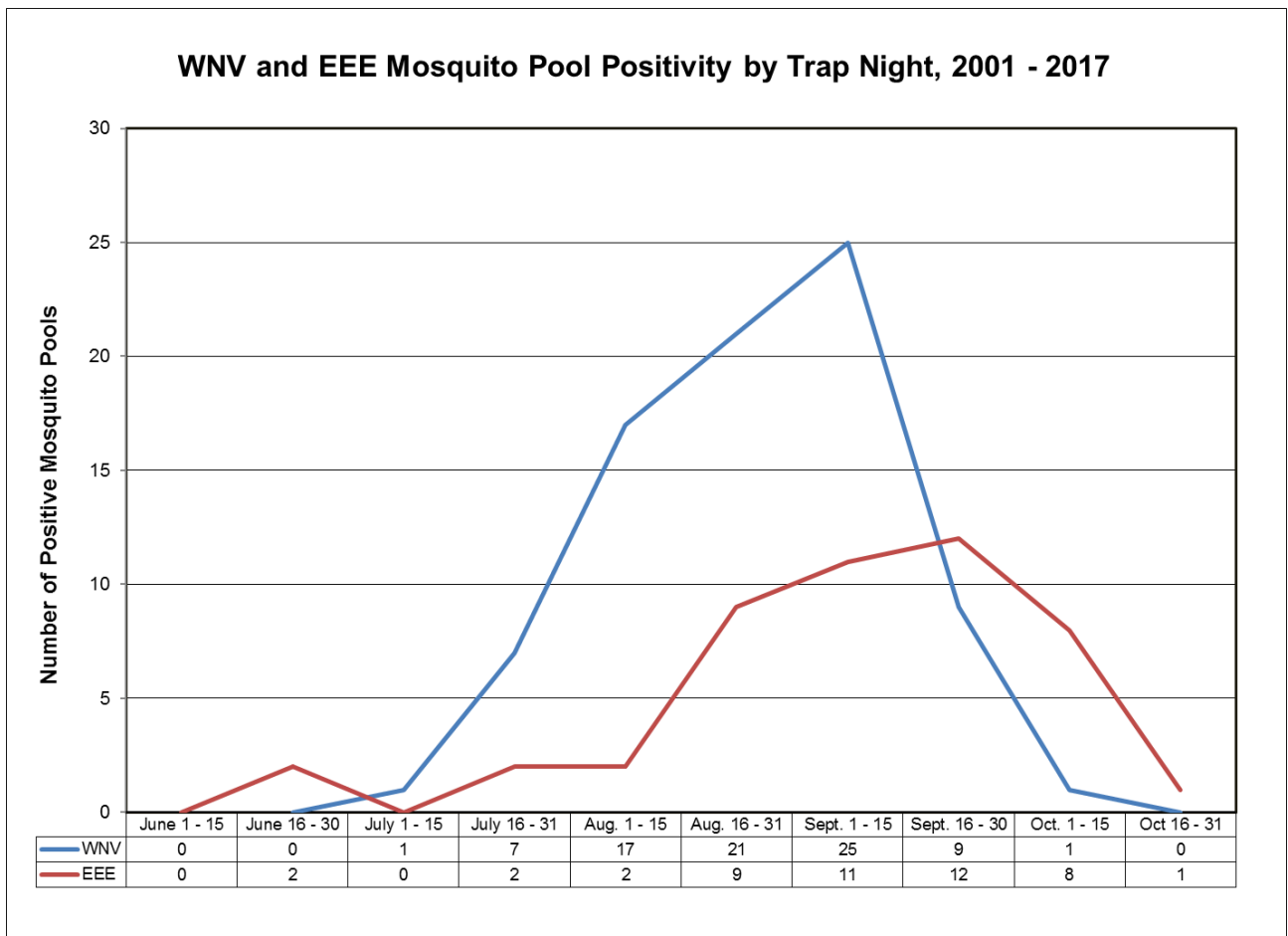


Figure 4

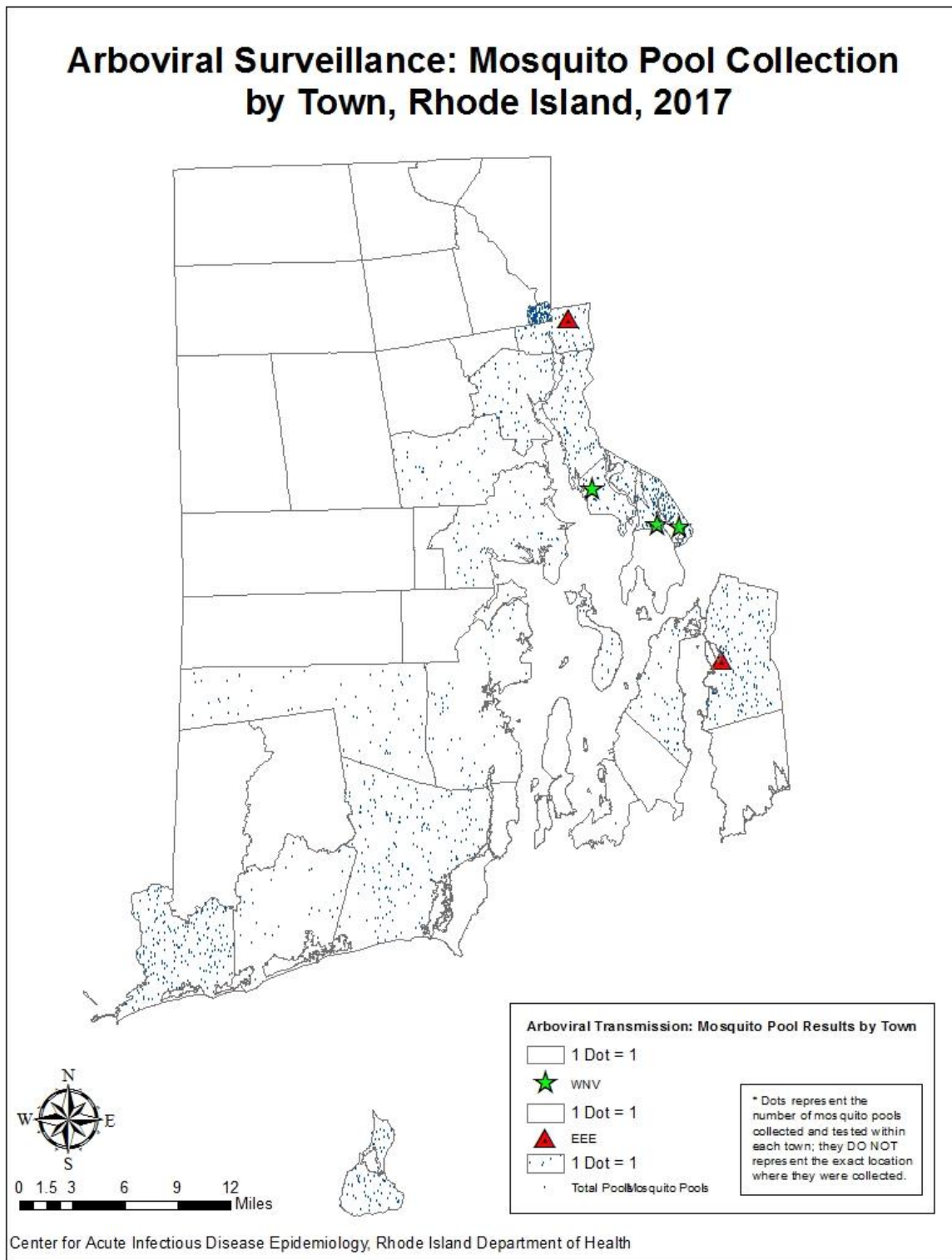
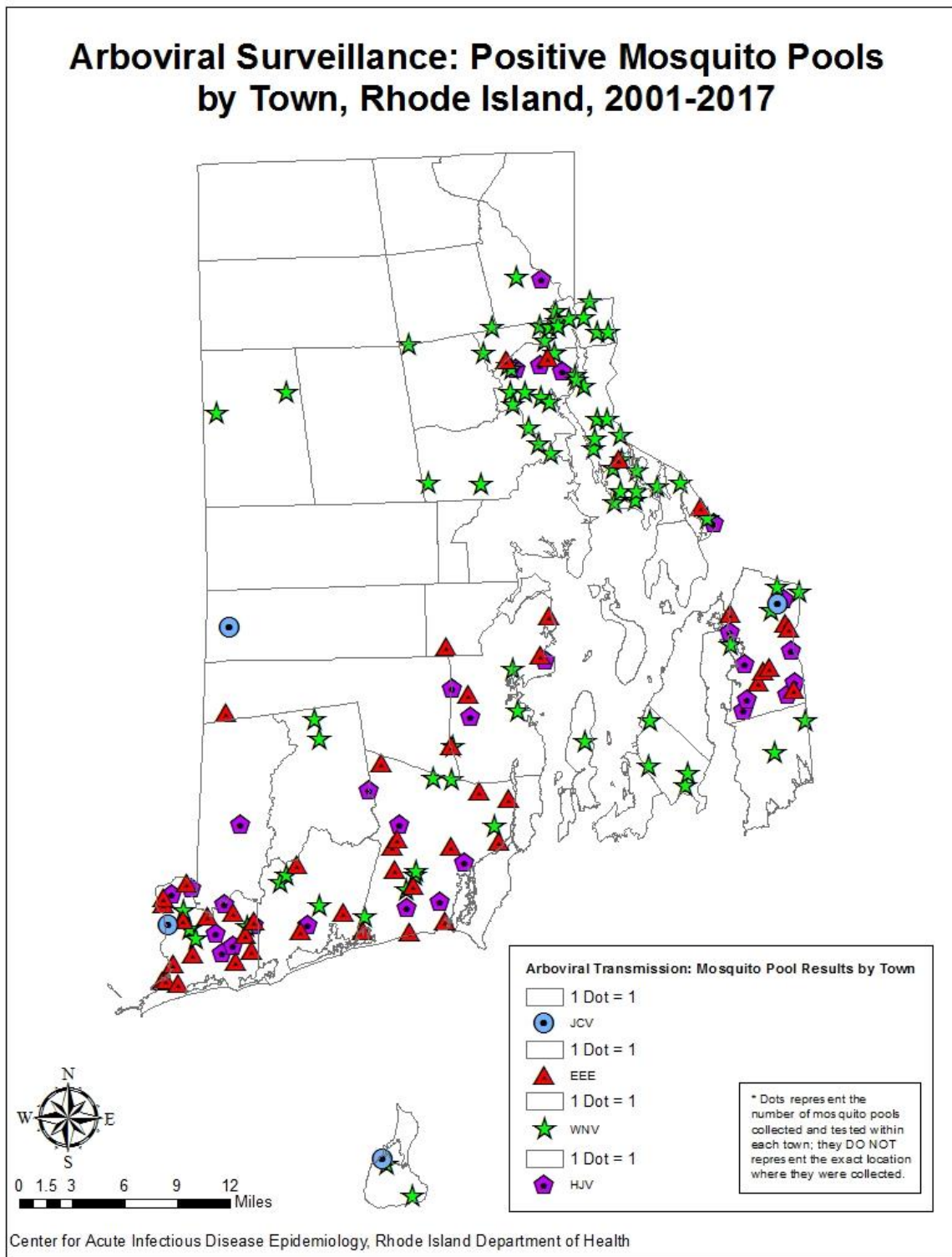


Figure 5



**Table 2: Mosquito Surveillance: Pools by Towns, Rhode Island, 2017\***

Town	Total Pools	Percentage of all Pools Collected	Positive Pools	Percent Positivity by Town
Westerly	215	14.0	0	0
South Kingstown	194	12.7	0	0
Tiverton	176	11.5	1 (EEE)	0.6
Warren	141	9.2	2 (2 WNV)	1.4
Central Falls	126	8.2	0	0
East Providence	81	5.3	0	0
New Shoreham	74	4.8	0	0
Warwick	73	4.8	0	0
Portsmouth	72	4.7	0	0
Exeter	65	4.2	0	0
Providence	62	4.0	0	0
Pawtucket	59	3.9	1 (EEE)	1.7
Barrington	54	3.5	1 (WNV)	1.9
North Kingstown	53	3.5	0	0
Cranston	45	2.9	0	0
Charlestown	40	2.6	0	0
Newport	3	0.2	0	0
<b>Total</b>	<b>1533</b>	<b>100</b>	<b>5</b>	<b>0.3</b>

\* Towns without any mosquito pools collected have been excluded from the table.

**Table 3: Mosquito Surveillance: Summary Data, Rhode Island, 2001-2017**

Year	Number of pools tested	Number of positive counties	Total number of positive pools	Number of WNV positive pools	Earliest positive trap date for WNV	Number of EEE positive pools	Earliest positive trap date for EEE
2001	1856	3	14	14	7/16/2001	0	NA
2002	1417	2	4	4	8/28/2002	0	NA
2003	2383	4	27	7	8/21/2003	17	9/10/2003
2004	3062	2	7	0	NA	7	7/19/2004
2005	1466	2	2	1	9/19/2005	0	NA
2006	1382	4	19	10	8/8/2006	3	9/17/2006
2007	1048	2	5	5	8/20/2007	0	NA
2008	1207	2	10	10	8/26/2009	0	NA
2009	1138	2	14	3	9/8/2009	3	8/24/2009
2010	1621	3	9	2	8/30/2010	2	8/23/2010
2011	1690	3	3	2	8/22/2011	0	NA
2012	2234	4	16	5	7/9/2012	6	8/6/2012
2013	2311	4	17	8	7/29/2013	4	8/26/2013
2014	1727	2	4	2	8/04/2014	0	NA
2015	2117	3	5	4	8/12/2015	0	NA
2016	1969	3	4	1	7/25/2016	2	8/1/2016
2017	1533	3	5	3	8/7/2017	2	6/26/2017

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**Table 4: Human Arboviral Cases, Rhode Island, 2013-2017**

In 2017, there were 2 human cases of WNV identified in Rhode Island residents. Both cases became ill in September with the first case initially becoming ill on September 9, 2017. One of the two cases had no history of recent travel outside Rhode Island prior to illness onset. In addition, in 2017 two cases of Powassan virus were identified in Rhode Island residents. These individuals initially became ill in May and October 2017 and had no history of recent travel outside Rhode Island prior to illness onset.

There were also 24 cases of other arboviral diseases reported to the Rhode Island Department of Health in 2017. All cases of Zika and dengue virus were acquired outside of the United States in countries where these diseases are endemic.

Cases are classified using current CSTE case definitions and can be locate at <https://www.cdc.gov/nndss/conditions/notifiable/2017/infectious-diseases/>.

Year	2013	2014	2015	2016	2017	5-Year Total
Eastern Equine Encephalitis	0	0	0	0	0	0
Jamestown Canyon Virus (Neuroinvasive)	1	0	0	0	0	1
Powassan Virus (Neuroinvasive)	0	0	0	1	2	3
West Nile Virus	1	0	0	2	2	5
Neuroinvasive	1	0	0	2	1	-
Non-neuroinvasive	0	0	0	0	1	-
<b>Travel Associated Arboviral Cases</b>						
Chikungunya	0	54	5	3	0	62
Dengue	9	5	3	5	1	23
Zika Virus	0	0	0	75	23	98
Zika Virus Disease, Non-congenital	0	0	0	56	3	-
Zika Virus Infection, Non-congenital	0	0	0	18	20	-
Zika Virus Infection, Congenital	0	0	0	1	0	-

*For questions/comments on data/methods, please contact Michael Gosciminski at 401-222-6056.  
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