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### 1. Human Testing

New Jersey Administrative Code (N.J.A.C.) Title 8 Chapter 57 mandates public health reporting of specified vector-borne diseases to prevent further disease spread. The table presented below is a summary of selected mosquito and tick-borne disease cases reported to NJDOH.

**Table 1.1 Human Cases <sup>1</sup>**

Mosquito-borne diseases			Tickborne Diseases		
	2018	2017		2018	2017
Chikungunya	16	12	Anaplasmosis	118	154
Dengue	20	25	Babesiosis	245	193
Eastern equine encephalitis	-	-	<i>Borrelia miyamotoi</i>	2	-
Jamestown Canyon	-	-	Ehrlichiosis	99	102
Malaria	93	125	Lyme disease	3789	5107
West Nile	61	8	Powassan	1	4
Zika	10	37	Spotted fever group rickettsioses	146	137

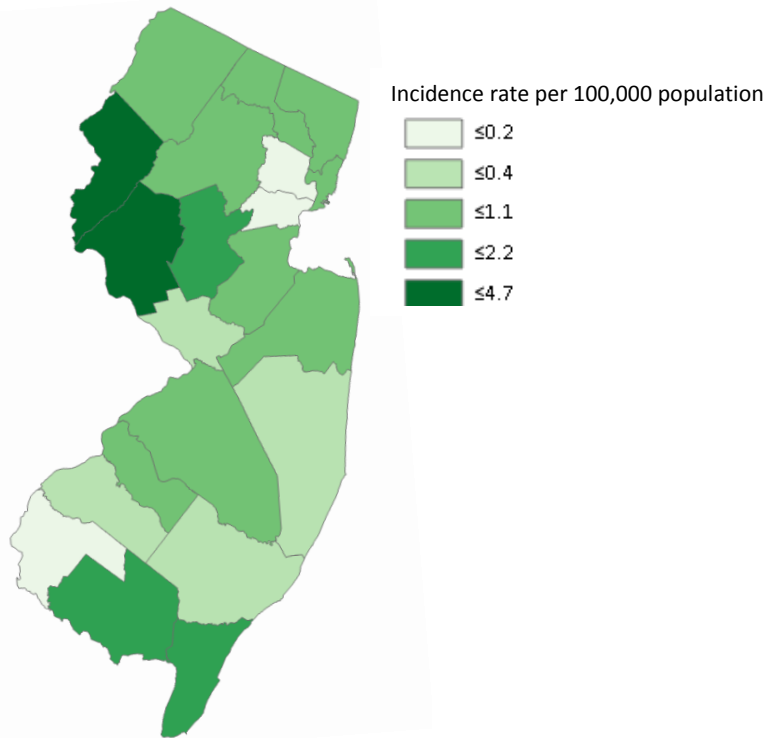
<sup>1</sup>Data for 2018 reflect confirmed and probable cases that have been approved by NJDOH as of March 19, 2019. This does not include cases under investigation. All 2018 numbers are preliminary and are subject to change.

### 2018 West Nile Virus Cases

- In 2018, a total of 61 West Nile virus (WNV) cases were identified from 20 NJ counties (Table 1.2). This is the highest number of cases ever reported in the state; in 2017, there was a total of 8 reported cases.
- There were 3 WNV fatalities reported from Bergen County, which was the County with the highest number of reported cases ( $n=10$ ). The incidence rate for WNV was highest in Warren and Hunterdon counties with over 3 cases per 100,000 population (Figure 1.1). There were no cases reported from Salem County.
- Of the 61 cases reported, 44 cases (72%) were classified as neuroinvasive disease meaning the patient presented with meningitis, encephalitis, acute flaccid paralysis, or other acute signs of central or peripheral neurologic dysfunction.
- 49 cases (80%) were hospitalized for an average of 12 days; with 19 of the 49 cases requiring additional medical care after hospitalization.
- Two cases were identified through routine blood screening (Hunterdon and Morris County).
- 4 asymptomatic presumptive viremic blood donor (PVD) reports were received from Bergen, Essex, Mercer and Middlesex County. These are not considered as cases but are reported to CDC as presumptive viremic blood donors (PVD).

- The median age of cases was 65 years (ranging from 14 to 95 years) and 66 percent were male.
- Dates of symptom onset of WNV cases ranged from July 23 to November 9 (Figure 1.2).
- 12 of the 58 cases had onset of symptoms in week 35 (August 28-September 1), which is also the week with the highest number of WNV positive mosquito pools (Figure2. 1).

**Figure 1.1 Incidence of West Nile Virus by County, 2018**

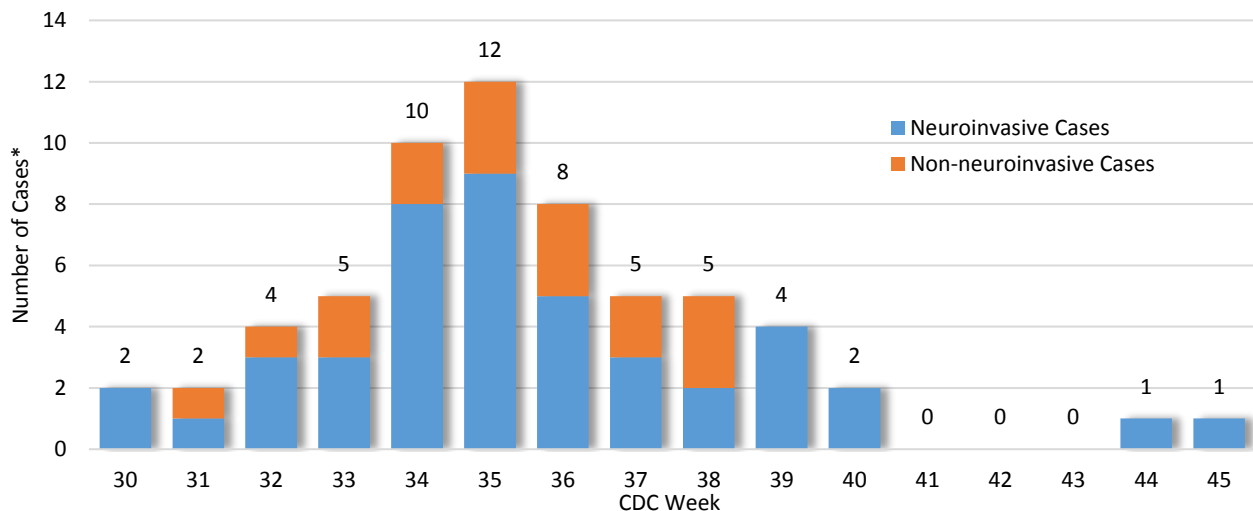


**Table. 1.2 West Nile Virus Cases**

County	No. of Cases	Incidence Rate per 100,000 <sup>1</sup>
Bergen	10	1.1
Middlesex	5	0.6
Warren	5	4.7
Hudson	4	0.6
Hunterdon	4	3.2
Monmouth	4	0.6
Morris	4	0.8
Somerset	4	1.2
Burlington	3	0.7
Camden	3	0.6
Passaic	3	0.6
Cape May	2	2.1
Cumberland	2	1.3
Ocean	2	0.3
Atlantic	1	0.4
Essex	1	0.1
Gloucester	1	0.3
Mercer	1	0.3
Sussex	1	0.7
Union	1	0.2
Salem	0	0.0
<b>Total</b>	<b>61</b>	<b>0.7</b>

<sup>1</sup> Number of cases/Total Population (2017)

**Figure 1.2 NJ West Nile Virus Cases, 2018, by Week of Illness Onset**



\* Represents confirmed and probable cases that have been approved by NJDOH.

## 2. Mosquito Testing

The New Jersey Department of Health Public Health and Environmental Laboratories (PHEL) and the Cape May County Department of Mosquito Control Bio-safety Level 3 Laboratory (CMBSL3) perform arboviral testing on mosquito pools collected by county mosquito control agencies throughout New Jersey.

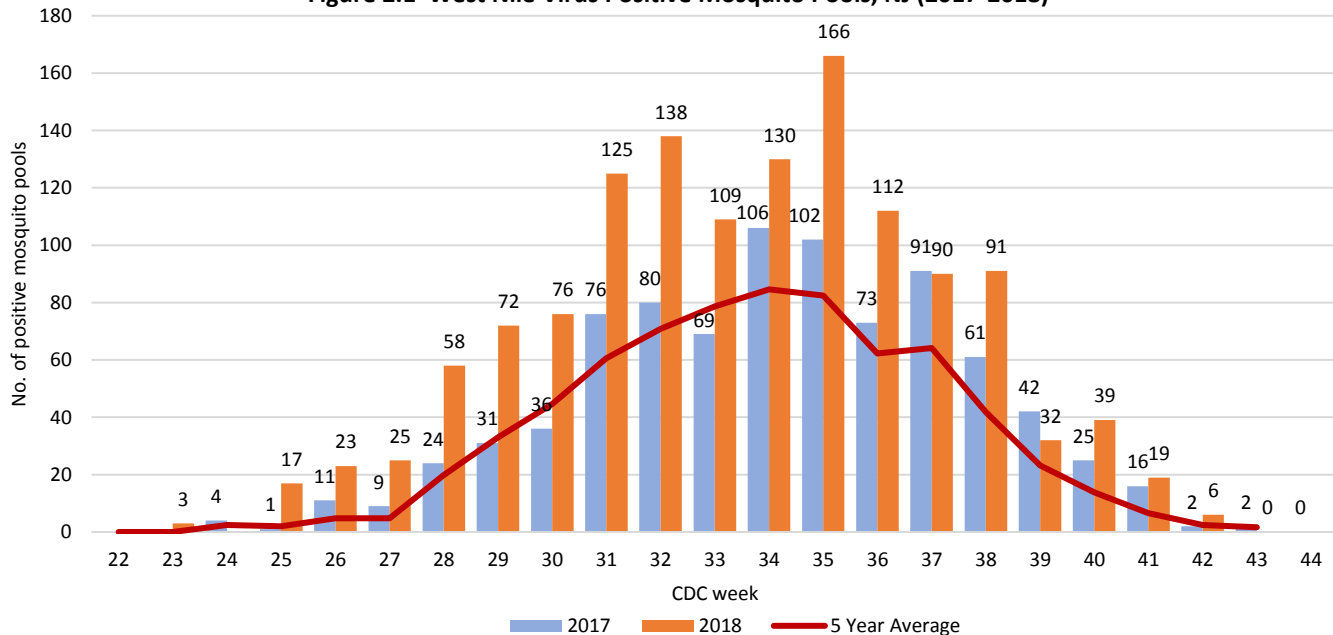
### West Nile virus (WNV)

- In 2018, a total of 11,114 pools (217,435 mosquitoes) were tested for WNV. 1,331 mosquito pools tested positive for WNV. This exceeds the total number of positive pools reported in 2017 ( $n=861$ ) and is the first time since 2012 that the number of positive pools reported in a season has exceeded 1000.
- Morris, Bergen, Hunterdon and Gloucester Counties reported the highest number of WNV positive pools in the State (Table 2.1).
- 90% ( $n=1,200$ ) of the positive pools were *Culex sp.* A total of 18 species tested positive for WNV in 2018 compared with 10 species in 2017.
- The number of WNV positive pools peaked in week 35 (figure 2.1) with 166 positive pools reported. This was the highest ratio (24%) of positive pools to total pools collected in a week during the season.
- The number of positive pools exceeded the 5-year average throughout the season.
- Overall, 17 counties reported increased WNV activity in 2018 compared with 2017.

Table 2.1 WNV Mosquito Pools, 2018

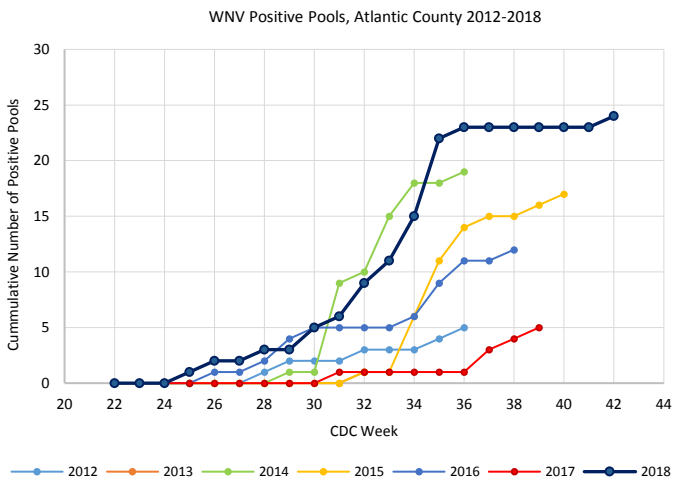
County	# Pools Tested	# Positive	% Positive
Morris	473	166	35.1%
Bergen	423	161	38.1%
Hunterdon	397	159	40.1%
Gloucester	615	121	19.7%
Somerset	289	84	29.1%
Warren	447	82	18.3%
Union	196	78	39.8%
Hudson	220	68	30.9%
Monmouth	585	63	10.8%
Middlesex	248	56	22.6%
Sussex	362	56	15.5%
Mercer	350	43	12.3%
Camden	211	40	19.0%
Burlington	347	35	10.1%
Ocean	382	26	6.8%
Atlantic	335	24	7.2%
Cape May	4038	20	0.5%
Passaic	260	16	6.2%
Essex	174	14	8.0%
Cumberland	344	10	2.9%
Salem	418	9	2.2%
<b>Total</b>	<b>11114</b>	<b>1331</b>	<b>12.0%</b>

Figure 2.1 West Nile Virus Positive Mosquito Pools, NJ (2017-2018)

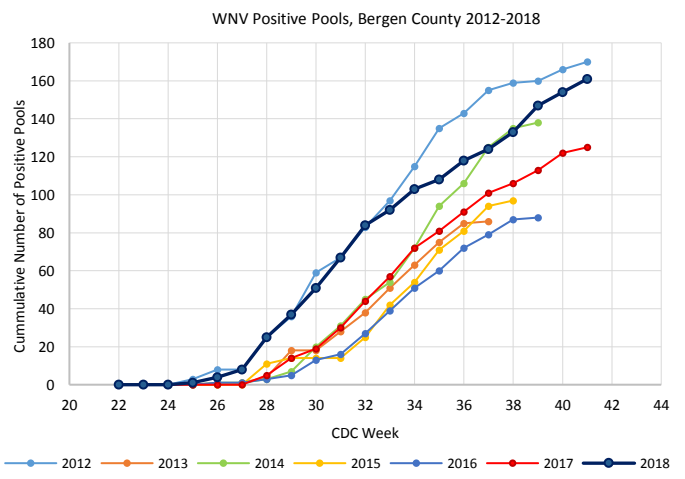


# WNV Positive Mosquito Pools by NJ County 2012-2018

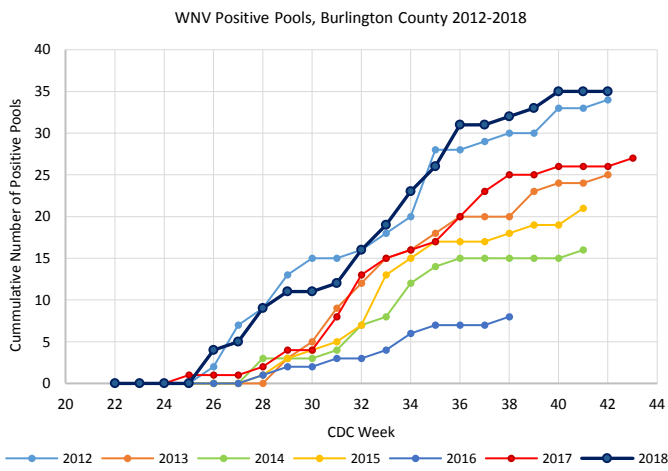
## Atlantic County



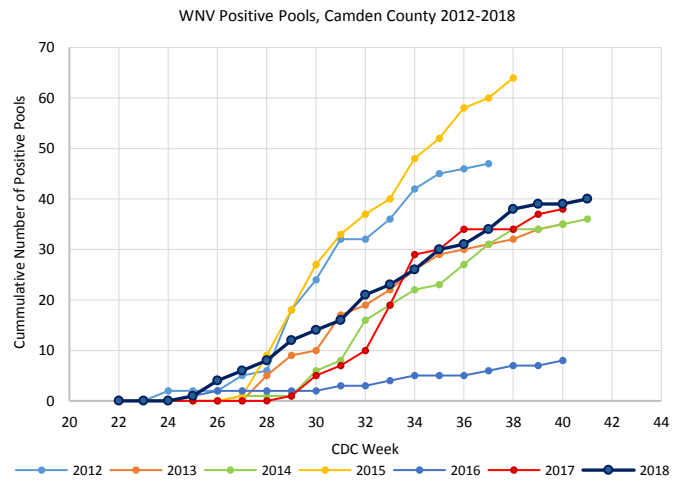
## Bergen County



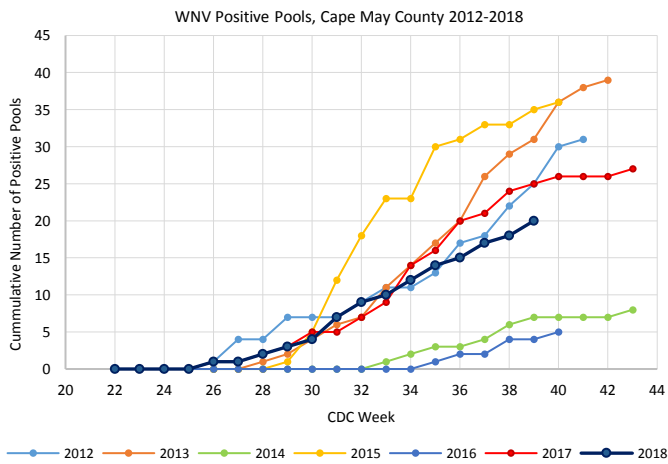
## Burlington County



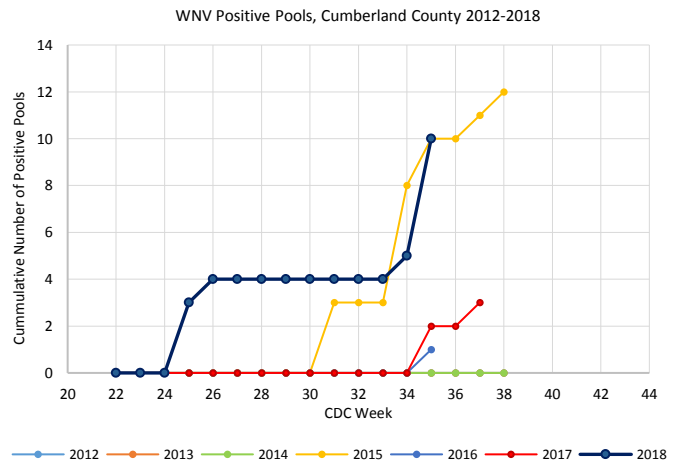
## Camden County



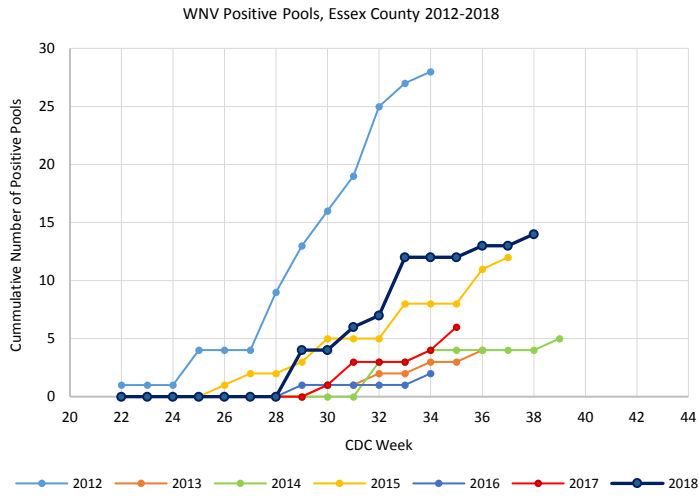
## Cape May County



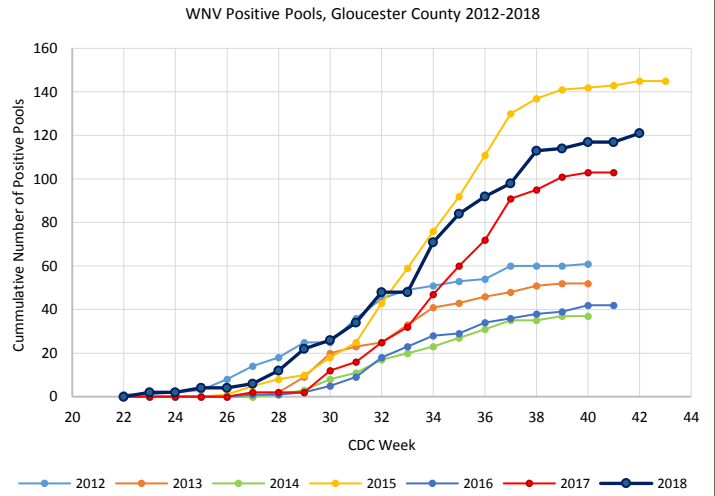
## Cumberland County



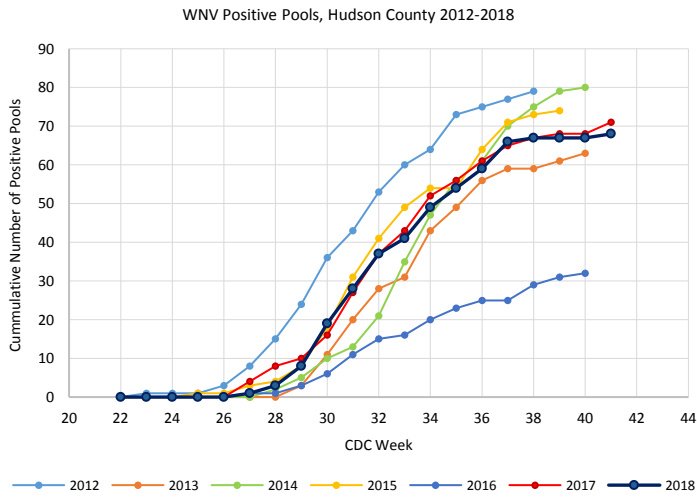
### Essex County



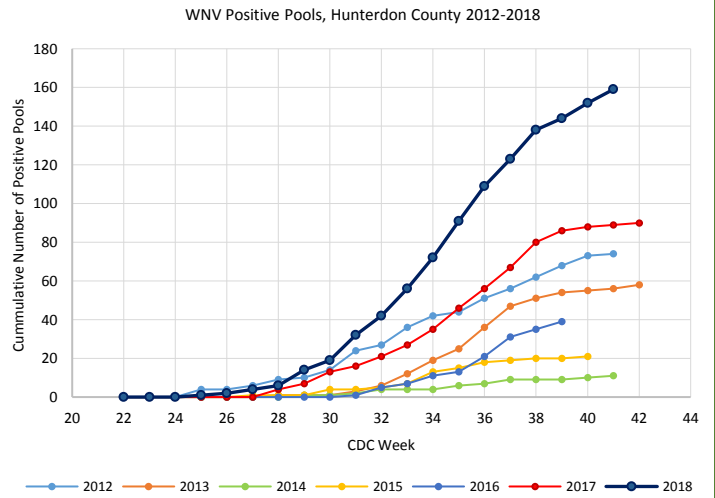
### Gloucester County



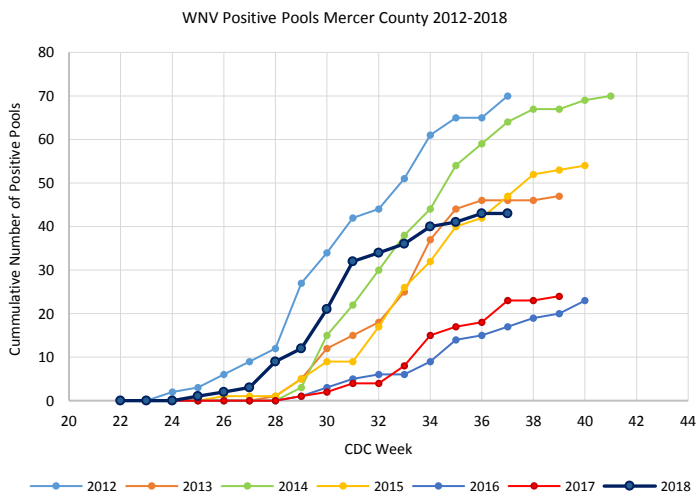
### Hudson County



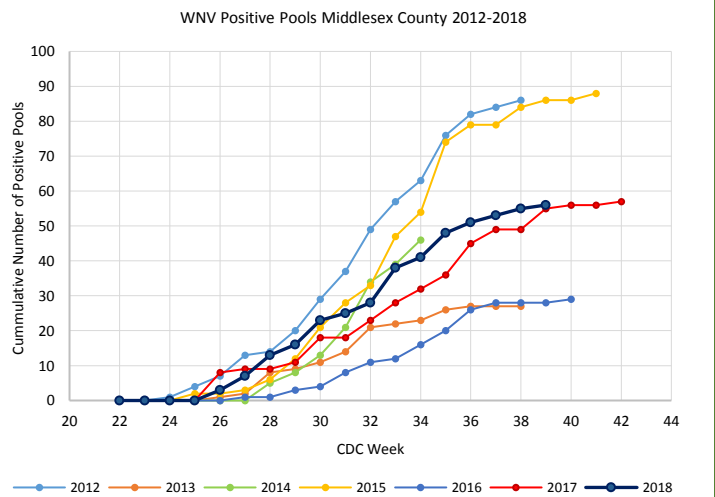
### Hunterdon County



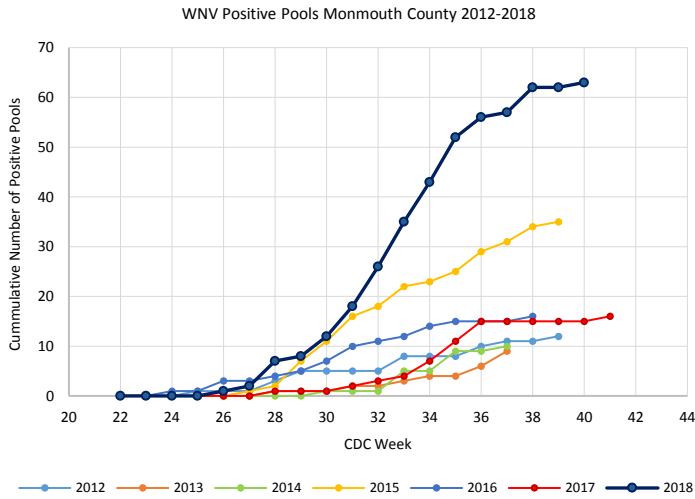
### Mercer County



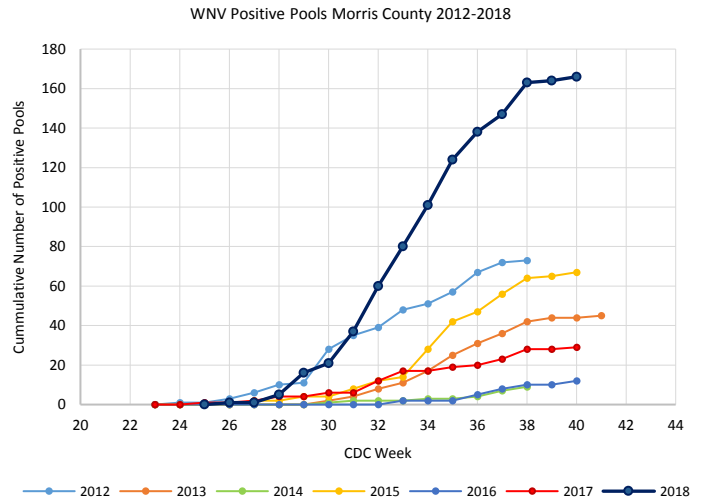
### Middlesex County



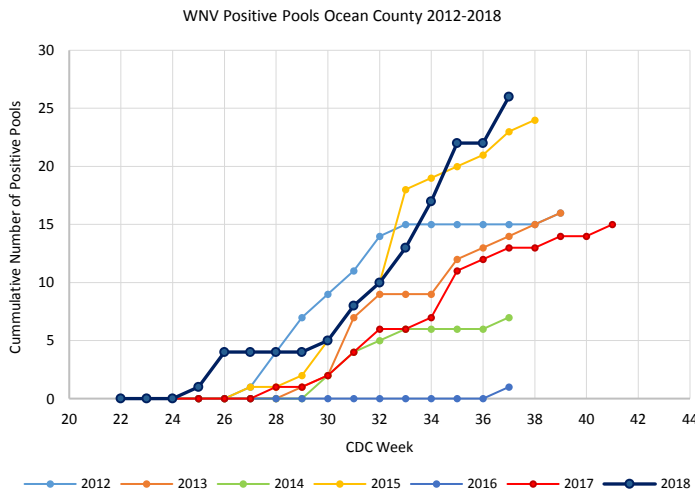
### Monmouth County



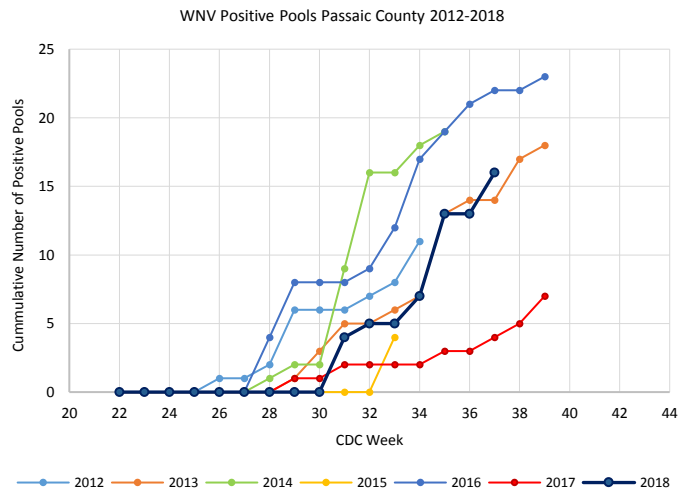
### Morris County



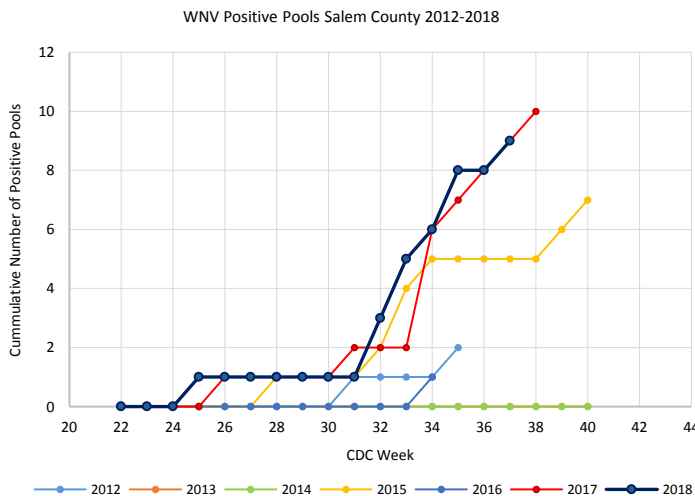
### Ocean County



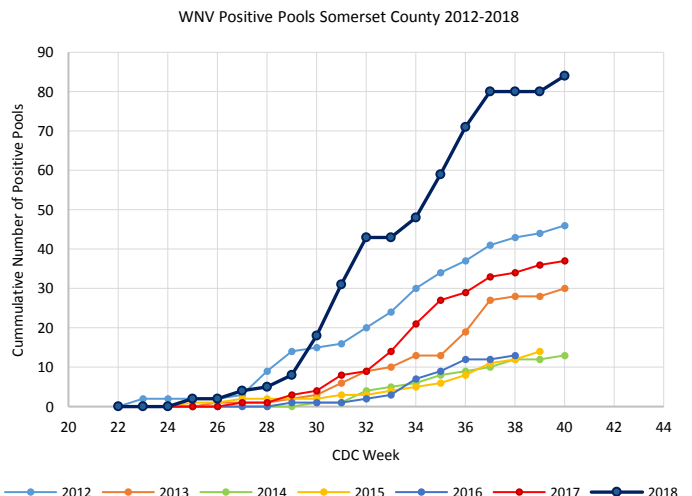
### Passaic County



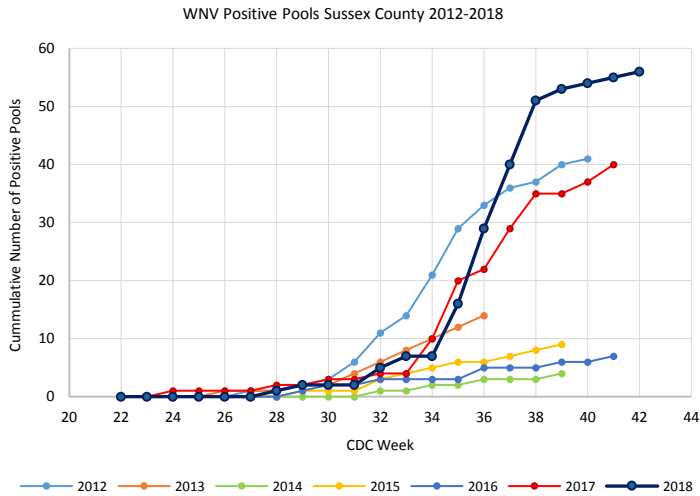
### Salem County



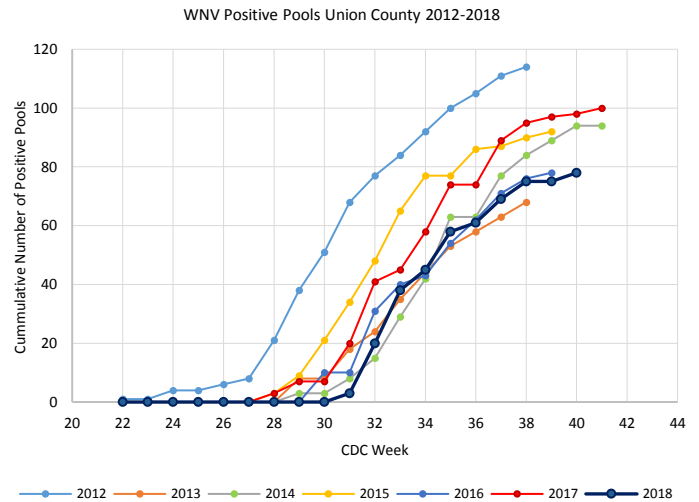
### Somerset County



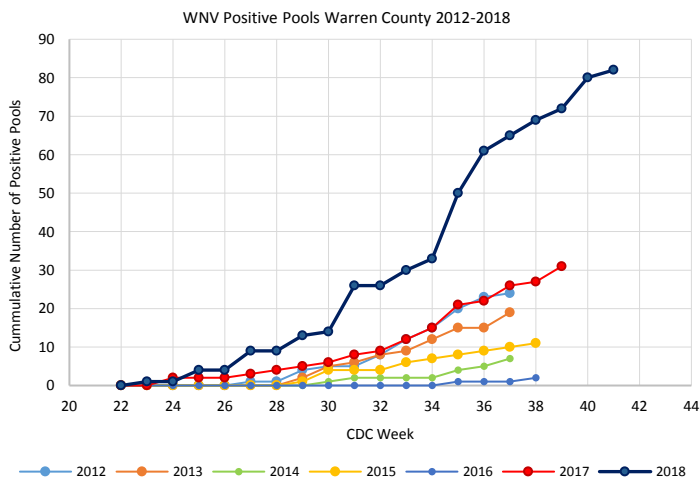
### Sussex County



### Union County



### Warren County



- Although the state had its most active season since 2012, WNV activity in some counties (Camden, Hudson, Mercer and Middlesex) was comparable to previous seasons.
- Compared with the previous 6 years, 2018 was the most active season for Hunterdon, Monmouth, Morris, Somerset, Sussex and Warren Counties.

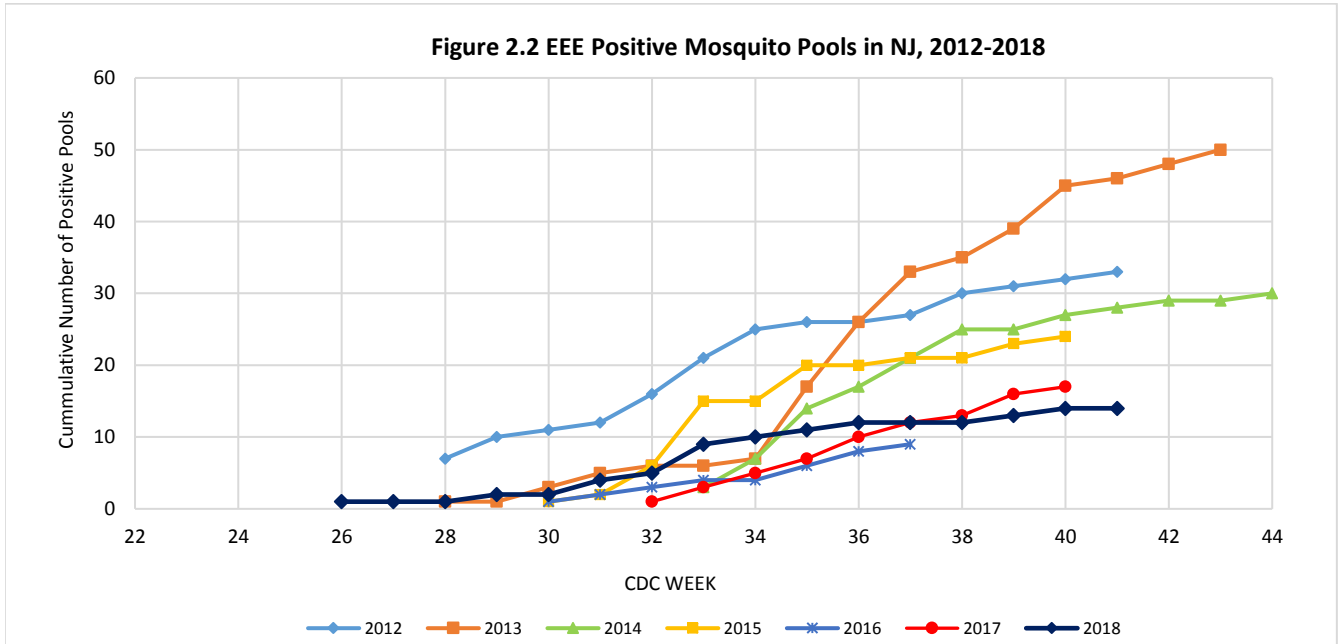
### Eastern equine encephalitis virus (EEE)

- In 2018, 2,603 mosquito pools (29,860 mosquitoes) from 16 counties (Atlantic, Bergen Burlington, Camden, Cape May, Cumberland, Gloucester, Hunterdon, Middlesex, Monmouth, Morris, Ocean, Passaic, Salem, Sussex, and Warren) were tested for EEE.
- 14 mosquito pools in 6 counties (Atlantic, Burlington, Camden, Cumberland, Monmouth and Salem) tested positive for EEE in 2017 (Table 2.2). This is lower than the 18 positive pools reported in 2017 and the 5-year average ( $n= 30$ ).
- The first EEE positive pool was reported in week 26 and is the earliest EEE positive pool identified in the state in the past 7 years (Figure2.2).
- 71% of the pools ( $n= 1,858$ ) tested for EEE were collected in Cape May County.
- All EEE positive pools were *Culiseta melanura* species.

**Table 2.2 EEE Positive Mosquito Pools**

County	Cumulative Total	
	2018	2017
Burlington	5	3
Camden	4	1
Salem	2	5
Atlantic	1	3
Cumberland	1	1
Monmouth	1	1
Cape May		3
Gloucester		1
<b>Total</b>	<b>14</b>	<b>18</b>

**Figure 2.2 EEE Positive Mosquito Pools in NJ, 2012-2018**



**Other viruses:**

Mosquito pools from 11 counties (Atlantic, Bergen, Burlington, Cape May, Gloucester, Middlesex, Monmouth, Ocean, Salem, Somerset and Sussex) were tested for other arboviruses. No positive mosquito pools were identified.

**Cumulative 2018 Mosquito Pool Testing (Other Viruses<sup>1</sup>)**

County	SLE		LAC		CHIKV		DENV		ZIKV	
	Pools	Positives	Pools	Positives	Pools	Positives	Pools	Positives	Pools	Positives
Atlantic					55	-	55	-	55	-
Bergen					1	-	1	-	1	-
Burlington	36	-	16	-						
Cape May	987	-							665	-
Gloucester					7	-	7	-	7	-
Middlesex					2	-	2	-	2	-
Monmouth					2	-	2	-	2	-
Ocean			4	-	67	-	67	-	67	-
Salem			3	-						
Somerset					1	-			1	-
Sussex			3	-	3	-	3	-	3	-
<b>Total</b>	<b>1023</b>	<b>-</b>	<b>26</b>	<b>-</b>	<b>138</b>	<b>-</b>	<b>138</b>	<b>-</b>	<b>803</b>	<b>-</b>

<sup>1</sup> St. Louis encephalitis virus (SLE), La Crosse encephalitis virus (LAC), Chikungunya virus (CHIKV), Dengue virus (DENV), Zika Virus (ZIKV)

Numbers in white columns represent number of pools tested to date in 2018

Numbers in green shaded columns represent positive pools in 2018

**3. Equine Testing**

Equine testing for West Nile Virus (WNV) and Eastern equine encephalitis virus (EEE) is conducted at the New Jersey Department of Agriculture's Animal Health and Diagnostic Laboratory.

In 2018, there were 5 equine cases of EEE and one equine WNV case reported in New Jersey. There were 6 equine cases of EEE reported in 2017. Since 2013, there has been an average of 4 EEE cases and 1 WNV case per year in New Jersey, most cases occurring in southern counties.



- 2018 EEE cases:
  - Monmouth County: 5-year-old mare. Onset Aug 17<sup>th</sup>.
  - Camden County: 12-year-old gelding. Onset Aug 26<sup>th</sup>.
  - Ocean County: 2 geldings (7-year-old and one of unknown age). Onset Sep 3<sup>rd</sup> and 4<sup>th</sup>.
  - Gloucester County: 12-year-old gelding. Onset Sep 12<sup>th</sup>.

All horses with EEE were euthanized.

- The equine case of WNV was reported in a 10-year-old mare from Burlington County in week 36 (onset Sep 4<sup>th</sup>). The mare recovered from illness.

#### 4. Avian /Other Animal Testing

Routine avian testing was discontinued in 2016 but is available upon request at the New Jersey Department of Health Public Health and Environmental Laboratories (PHEL). In 2018, WNV was detected in 13 dead bird carcasses from 7 counties submitted to NJDEP/NJDA for testing. The species of birds tested were the American crow, Broad-winged hawk, Cooper’s Hawk, Fish crow and Red-tailed Hawk.

#### 5. Surveillance Maps

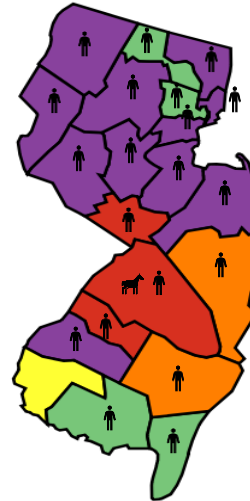
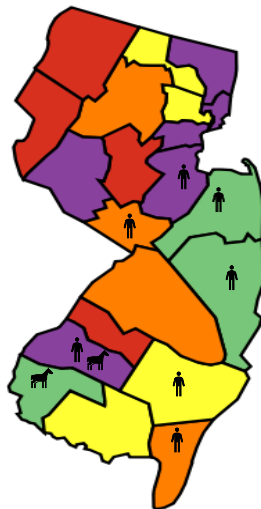
2017 WNV Activity

2018 WNV Activity

**WNV Positive Pools**

- > 50
- 31 - 50
- 21 - 30
- 10 - 20
- < 10

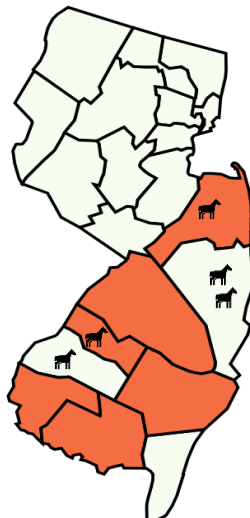
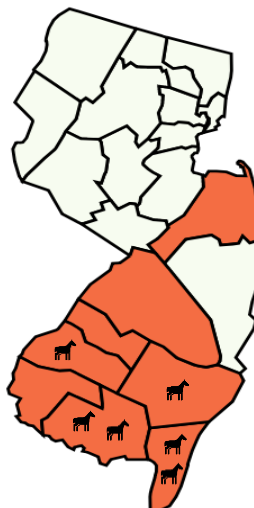
- 👤 ≥ 1 WNV human case
- 🐎 WNV equine case



2017 EEE Activity

2018 EEE Activity

- Positive mosquito pool
- 🐎 Equine case
- 👤 Human case

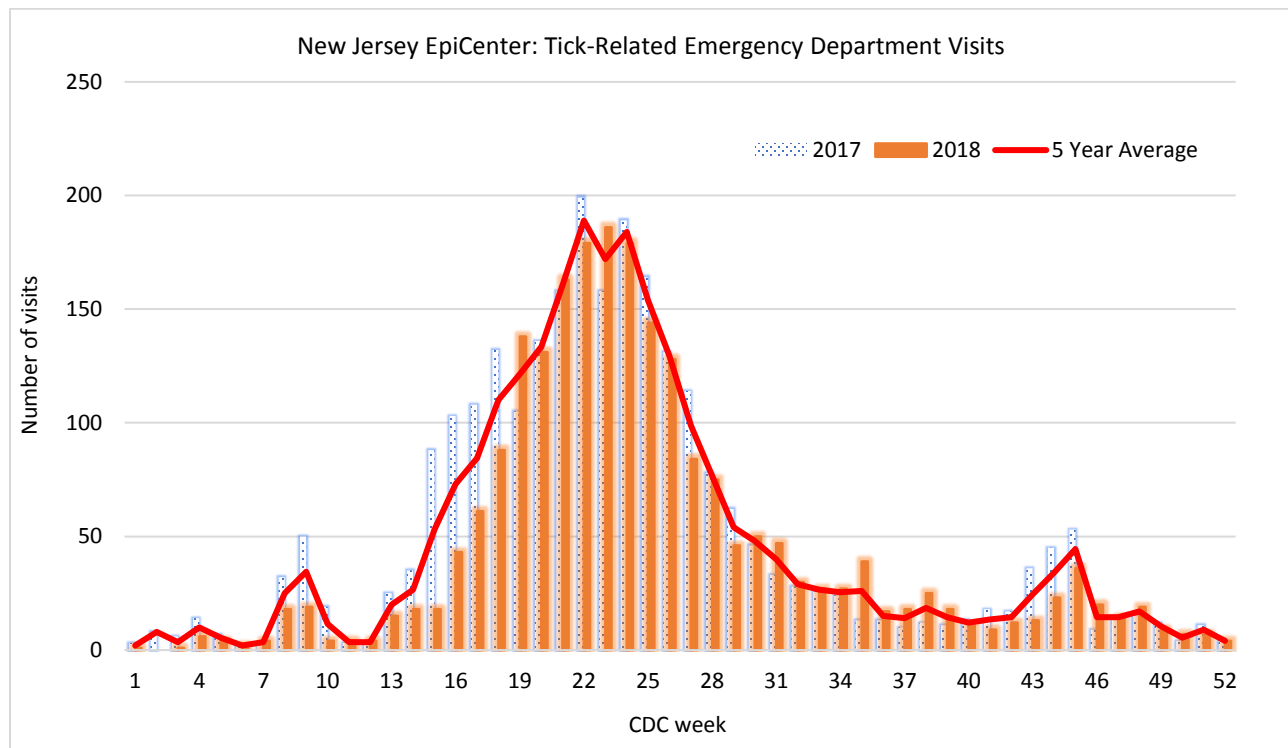


## 6. Syndromic Surveillance for Tick-related Emergency Department Visits

EpiCenter is a syndromic surveillance system developed and maintained by Health Monitoring Systems, Inc, for monitoring by health departments in the United States.

New Jersey's EpiCenter receives real time Emergency Department (ED) data from 78 acute care and satellite health (99 percent reporting) facilities statewide. The system collects "chief complaint" information and limited patient registration data from existing ED computer systems. EpiCenter monitors the health of the community for both culture-proven cases of disease as well as for abnormal incidences of select infectious disease syndromes by examining these data

The chart below represents NJ residents seen at emergency departments state wide with a tick-bite complaint or signs/symptoms associated with a reported tick-bite. ED visits occurred throughout the year in 2018. The highest number of visits in 2018 occurred between May and June (weeks 19-26) and the lowest number of visits was in January. Overall the total number of visits was lower compared with 2017 but followed seasonal trends observed in the past 5 years.



Data reflects ED visits downloaded from EpiCenter as of January 8, 2019

### For More Information

- NJDOH Communicable Disease Service: <http://nj.gov/health/cd/topics/vectorborne.shtml>
- NJDEP Office of Mosquito Control Coordination: <http://www.nj.gov/dep/mosquito/>
- NJDA Division of Animal Health: <http://www.nj.gov/agriculture/divisions/ah/>
- Rutgers Center for Vector Biology: <http://vectorbio.rutgers.edu/>