VECTOR SURVEILLANCE IN NEW JERSEY

EEE, WNV, SLE, LAC, DENV, CHIK and ZIKV

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CDC WEEK 26: 24 June to 30 June, 2018

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Culiseta melanura and Eastern Equine Encephalitis

SITE/Boxes	Inland or Coastal	Historic Population Mean	Current Weekly Mean	Total Tested* (Collected)	Total Pools Tested* (Submitted)	EEE Isolation Pools	MFIR
Bass River (Burlington Co.)/5	**Coastal**	0.03	0.00	0	0		
Green Bank (Burlington Co.)/25	**Coastal**	2.01	0.08	8 (10)	2 (3)		
Corbin City (Atlantic Co.)/25	**Coastal**	0.72	0.12	30 (33)	3 (4)		
Dennisville (Cape May Co.)/50	**Coastal**	3.04	0.06	237	7		
Winslow (Camden Co.)/50	**Inland**	1.29	1.64	753	17		
Centerton (Salem Co.)/50	**Inland**	1.64	0.52	128	5	1	7.812
Turkey Swamp (Monmouth Co.)/50	**Inland**	0.54	0.00	19 (27)	3 (4)		
Glassboro (Gloucester Co.)/50	**Inland**	0.34	0.32	65	4		

*Current week (in parentheses) results pending. ‡ corrected from previous week NC=no collection

Remarks: First positive EEE pool was detected in a pool of *Cs. melanura* collected on 26 June at the Centerton traditional resting box site. This is the earlier positive EEE pool collected in the past 20 years. See graph next page for potential implications. Last year, a total of 18 positive EEE pools, all in *Culiseta* melanura were detected, along with 6 positive horses and no human cases. Currently for the 2018 season, there is one detection of EEE among submitted mosquito pools.

Statewide, 2272 *Cs. melanura* from 118 pools have been tested, with one positive pool detected for an overall *Cs. melanura* MFIR of 0.440. 2240 specimens in 209 pools from 11 other species have also been tested, with no positives detected. Overall MFIR for all species statewide is 0.222.

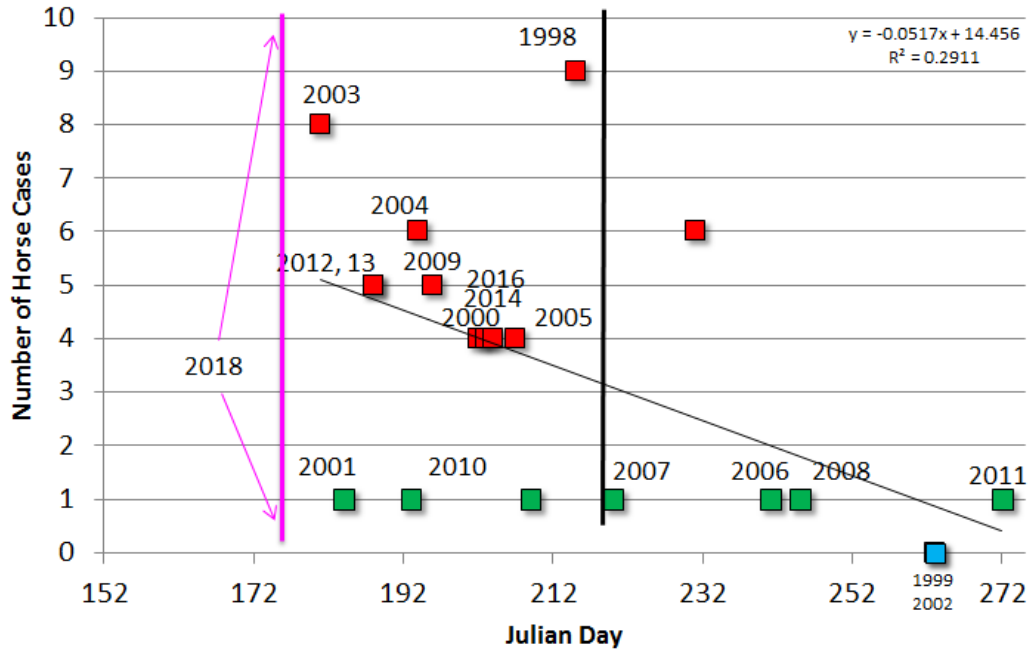
Traditional Resting Box Sites: 1240 *Cs. melanura* from 42 pools have been tested (plus three pools totaling 13 to be tested) in 2018 for EEE. One EEE positive pool have been detected from the Centerton site on the western side of the state.

	Additional *Cs. melanura* trapped by counties *traps with positives indicated in **BOLD.**				
County	**Trap types***	**Pools**	**Mosquitoes**	**Positives**	**MFIR**
Atlantic	CO2, RB	8	306		
Bergen	RB	1	3		
Burlington	CDCL	8	417		
Cape May	GR, RB	37	118		
Cumberland	RB	2	15		
Monmouth	RB	1	8		
Ocean	CDCL, RB	11	102		
Passaic	RB	1	1		
Salem	CDCL	2	2		
Sussex	ABC	5	60		
TOTAL		**76**	**1032**		

Additional County-set *Cs. melanura*: Counties maintain trap sites for *Cs. melanura* in other areas, using a variety of traps. No positives have been collected at these sites.

Horses and Humans: Currently, there is no horse or human cases reported. Last year, there were 6 horses detected with EEE. EEE is nearly always fatal for those horses without a complete vaccination history. Horses in New Jersey that have gone down in the past with EEE have either an incomplete vaccination history or NO vaccination history. Note that Florida is experiencing early and continued EEE activity with horse and now 1 human case. ***Horse owners are urged to make sure their horses are up to date on their vaccinations. Horse cases are known to occur through October and sometimes into November (see link below).*** Other sensitive species are non-native birds, such as Ostriches/Emus and Gallinaceous birds such as pheasants of Eurasian origins.

Horses and Vaccinations: The fate of unvaccinated equids reinforces the necessity of maintaining a vaccination schedule for arboviruses. For vaccination schedules recommended by the American Association of Equine Practices, see: http://www.aaep.org/vaccination_guidelines.htm



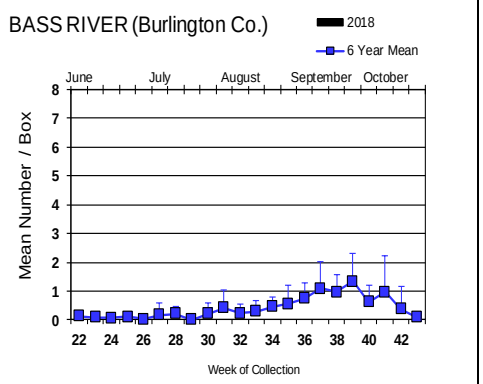
The graph to the right represents NJ EEE data with the first detection of the virus graphed as Julian date against the number of horse cases that occurred each year from 1998 to present. Around the beginning week of August, where the black line is drawn, we generally get one or no horse cases (exception was 2017, where a late detection was associated with 6 horse cases). This year, first detection occurred on 26 June – the PINK line. This line is the earliest for this graph, and may suggest that we may see multiple horse cases in NJ this year. Horse owners are urged to make sure their livestock/pets are up to date on vaccinations.

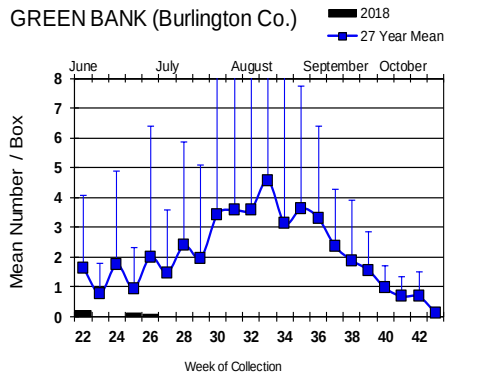
Additional Species: Eleven additional species were tested for EEE. No positives were detected.

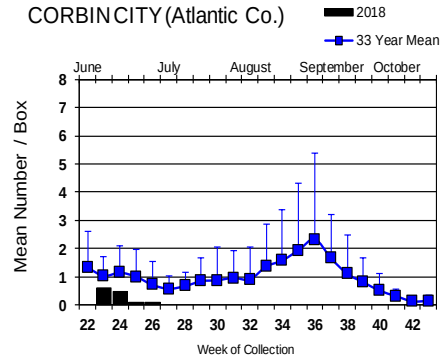
Species other than *Cs. melanura*	Pools	Mosquitoes	Positives	MFIR
Aedes cantator	2	2		
Aedes sollicitans	1	1		
Anopheles bradleyi	1	6		
Anopheles punctipennis	2	7		
Anopheles quadrimaculatus	1	1		
Coquillettidia perturbans	15	205		
Culex erraticus	4	21		
Culex pipiens	141	1785		
Culex salinarius	23	151		
Culex spp.	18	51		
Culiseta inornata	1	10		
State Total	**209**	**2240**		

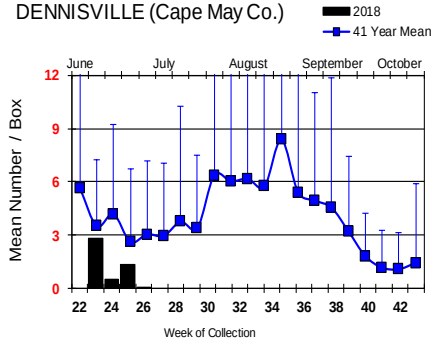
Culiseta melanura Populations

Coastal

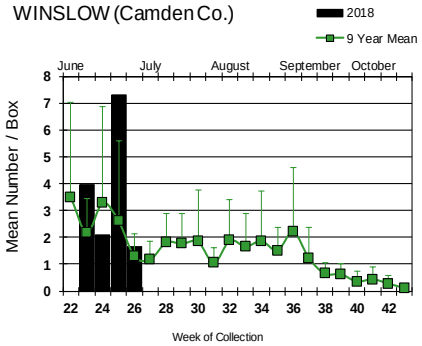


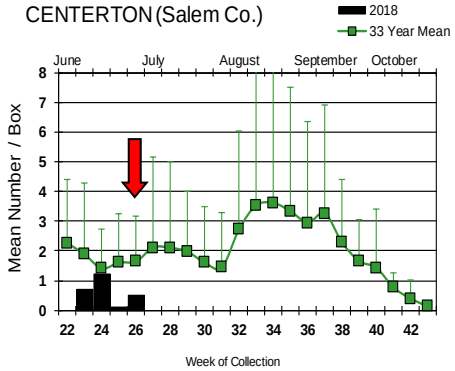


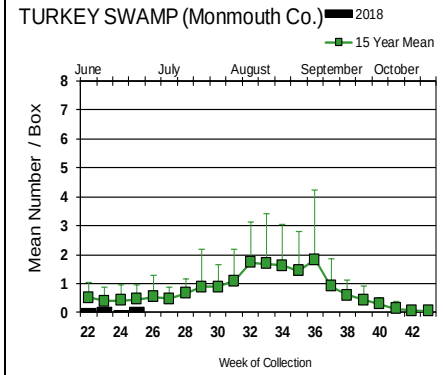


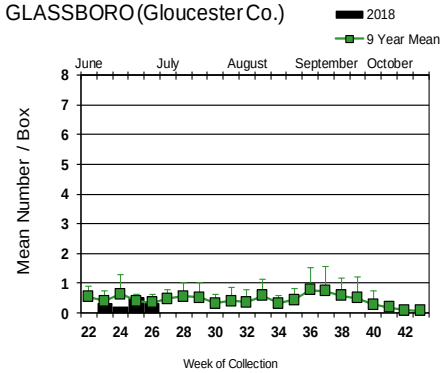


Inland









The first positive *Culiseta melanura* pool was collected rom the traditional resting box site at Centerton, representing the earliest collection dates from the past twenty year. Populations at the resting boxes have been decrasing after an early season population boom. But past experience at these sites show that despite low population numbers, EEE activity can be detected, similar to yellow fever detection.

= Positive pool(s) detected (red = melanura, purple = other species).

EEE in US (2018 cumulative cases): (Black or Red = previous + new reported cases occurring)

- equine: FL(29/1 mule)
- mosquito pools: FL(2) NJ(1) RI(3)
- sentinel: FL(71/6 owl emus)
- human: FL(1)

West Nile Virus Positive Organisms in US, 2018

West Nile in US (2017 cumulative cases): Single black values I ndicate no change from previous week. Black values / red values equals previous week/New totals.
Note: Data reported by all states should be considered provisional and subject to change. Sources for this table can be found here.

	Birds	Mosquito Pools	Sentinels	Horses	Humans
Alabama					0
Alaska					
Arizona	0	7	0	0	1
Arkansas		0			0
California	21/34	10/31	0	0	4/9
Colorado		0			0
Connecticut		1			0
Delaware					
DC					
Florida			27/28	0	0
Georgia		1			
Hawaii					
Idaho	0	1/2		0	0
Illinois		36/63		0	1
Indiana	0	2		0	0
Iowa					
Kansas		0		0	0
Kentucky				0	0
Louisiana	0	0		0	0
Maine		0			0
Maryland	0	0		0	0
Mass.		2		0	0
Michigan	2	1/6		0	0
Minnesota					
Mississippi					
Missouri		0		0	0

	Birds	Mosquito Pools	Sentinels	Horses	Humans
Montana				0	0
Nebraska		0		0	0
Nevada					
New Hampshire					
New Jersey		1/7		0	0
New Mexico					0
New York					
North Carolina					
North Dakota	2	1		0	1/2
Ohio		10/26		0	0
Oklahoma					
Oregon	0	1	0	0	0
Pennsylvania	0	16/55		0	0
Rhode Island					
South Carolina					
South Dakota		1			1
Tennessee					
Texas		27/58			
Utah					
Vermont		0		0	0
Virginia					
Washington	0	1/3		0	0
West Virginia					
Wisconsin	2/3	1/3		0	0
Wyoming					

* Can include other species (e.g., dogs, cows) reported positive.

Protocol: New Jersey Department of Health (NJDH Public Health Environmental and Agricultural Laboratories, PHEAL) and the Cape May County Department of Mosquito Control tests mosquito pools using RT-PCR Taqman techniques.

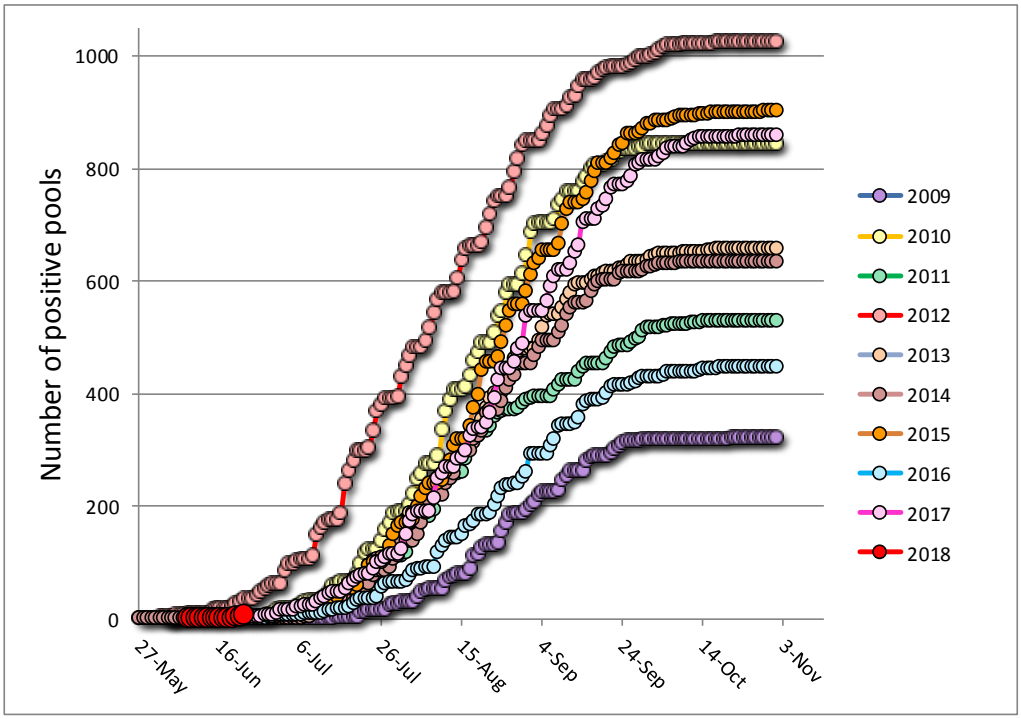
Mosquito Species Submitted and Tested for West Nile Virus through 29 June 2018

Species	Pools	Mosquitoes	Positives	MFIR
Aedes albopictus	90	355		
Aedes atropalpus	9	33		
Aedes canadensis canadensis	13	72		
Aedes cantator	5	50		
Aedes grossbecki	2	10		
Aedes japonicus	110	660		
Aedes sollicitans	4	9		
Aedes sticticus	1	1		
Aedes triseriatus	29	57		
Aedes trivittatus	2	49		
Aedes vexans	7	157		
Anopheles bradleyi	2	7		
Anopheles punctipennis	11	40		
Anopheles quadrimaculatus	27	691		
Coquillettidia perturbans	14	198		
Culex erraticus	3	12		
Culex pipiens	156	2126		
Culex restuans	213	2060		
Culex salinarius	27	267		
Culex spp.	498	19830	7	0.353
Culex territans	1	1		
Culiseta melanura	101	1769		
Psorophora columbiae	1	2		
Psorophora ferox	12	149		
Grand Total	**1338**	**28605**	**7**	**0.245**

Remarks: To date, 1338 pools of 28,605 mosquitoes from 23 species have been tested. A total of seven positive WNV pools have been detected, all in *Culex* spp and found in Hunterdon, Somerset, and Warren. First positive WNV pool was detected in *Culex* spp. on 7 June 2018 in Warren County and continuing the trend of first detection in the northern part of the state. Last year, the first positive *Culex* Mix pool was detected in Sussex County on 12 June.

Humans, Horses and Wild Birds: Currently, no horse or human cases of WNV have been detected. In 2017, eight human cases of WNV were detected and two horse cases were detected. For further information, see http://www.nj.gov/health/cd/statistics/arboviral-stats/ .

Birds are no longer routinely tested in New Jersey.



Above is a graph showing cumulative number of positive pools for the previous 9 years, inclusive of the most active (2012) and least active (2009) years. The red series near the bottom of the graph represents this year.

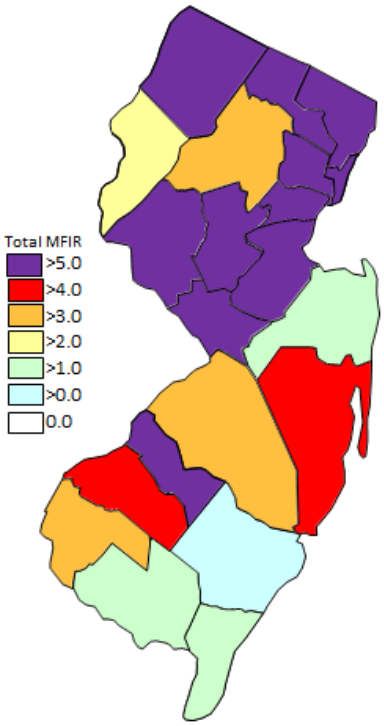
WNV Results by County through 29 June 2018.

County	Species	Pools	Mosquitoes	Positives	MFIR
Atlantic		**24**	**739**		
	Aedes canadensis canadensis	2	36		
	Aedes japonicus	1	5		
	Aedes vexans	1	20		
	Coquillettidia perturbans	2	29		
	Culex erraticus	1	9		
	Culex pipiens	2	135		
	Culex salinarius	1	24		
	Culex spp.	1	36		
	Culiseta melanura	11	336		
	Psorophora ferox	2	109		
Bergen		**20**	**1500**		
	Culex spp.	20	1500		
Burlington		**1**	**5**		
	Culiseta melanura	1	5		
Camden		**38**	**1803**		
	Aedes albopictus	2	3		
	Aedes japonicus	1	9		
	Culex spp.	17	1036		
	Culiseta melanura	17	753		
	Psorophora ferox	1	2		
Cape May		**598**	**4662**		

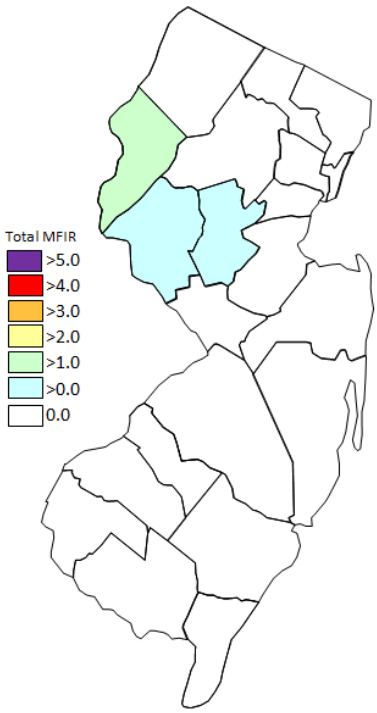
	Aedes albopictus	57	110		
	Aedes atropalpus	9	33		
	Aedes canadensis canadensis	6	10		
	Aedes cantator	2	2		
	Aedes japonicus	60	204		
	Aedes sollicitans	1	1		
	Aedes sticticus	1	1		
	Aedes triseriatus	20	39		
	Aedes vexans	1	1		
	Anopheles bradleyi	1	6		
	Anopheles punctipennis	3	5		
	Anopheles quadrimaculatus	25	650		
	Coquillettidia perturbans	2	2		
	Culex erraticus	2	3		
	Culex pipiens	141	1785		
	Culex restuans	183	1292		
	Culex salinarius	21	115		
	Culex spp.	16	43		
	Culex territans	1	1		
	Culiseta melanura	44	355		
	Psorophora ferox	2	4		
Cumberland		**6**	**132**		
	Aedes albopictus	1	10		
	Aedes vexans	1	65		
	Anopheles punctipennis	2	8		
	Anopheles quadrimaculatus	1	40		
	Psorophora	1	9		
Gloucester		**4**	**65**		
	Culiseta melanura	4	65		
Hudson		**27**	**1563**		
	Culex spp.	27	1563		
Hunterdon		**64**	**3183**	**1**	**0.314**
	Culex spp.	64	3183	1	0.314
Mercer		**44**	**1206**		
	Aedes albopictus	3	56		
	Aedes canadensis canadensis	1	6		
	Aedes japonicus	9	49		
	Aedes vexans	3	69		
	Culex pipiens	3	44		
	Culex restuans	6	252		
	Culex spp.	19	730		
Middlesex		**40**	**1463**		
	Culex spp.	40	1463		
Monmouth		**99**	**1492**		
	Aedes albopictus	21	168		
	Aedes canadensis canadensis	2	7		
	Aedes cantator	3	48		
	Aedes grossbecki	2	10		

	Aedes japonicus	7	27		
	Aedes sollicitans	3	8		
	Aedes trivittatus	2	49		
	Aedes vexans	1	2		
	Anopheles punctipennis	5	26		
	Culex salinarius	4	108		
	Culex spp.	38	994		
	Culiseta melanura	5	20		
	Psorophora ferox	6	25		
Morris		**74**	**2448**		
	Culex spp	74	2448		
Ocean		**43**	**453**		
	Aedes japonicus	7	19		
	Aedes triseriatus	2	4		
	Coquillettidia perturbans	5	84		
	Culex spp.	17	241		
	Culiseta melanura	12	105		
Passaic		**39**	**404**		
	Aedes albopictus	2	3		
	Aedes japonicus	9	56		
	Aedes triseriatus	1	4		
	Culex pipiens	7	158		
	Culex restuans	7	83		
	Culex spp.	12	99		
	Culiseta melanura	1	1		
Salem		**64**	**887**		
	Aedes albopictus	4	5		
	Aedes canadensis canadensis	1	1		
	Aedes japonicus	10	96		
	Aedes triseriatus	6	10		
	Anopheles bradleyi	1	1		
	Anopheles punctipennis	1	1		
	Anopheles quadrimaculatus	1	1		
	Coquillettidia perturbans	5	83		
	Culex pipiens	3	4		
	Culex restuans	2	13		
	Culex spp.	23	541		
	Culiseta melanura	6	129		
	Psorophora columbiae	1	2		
Somerset		**50**	**2072**	**2**	**0.965**
	Aedes canadensis canadensis	1	12		
	Aedes japonicus	2	34		
	Culex spp.	47	2026	2	0.987
Sussex		**40**	**1332**		
	Culex restuans	15	420		
	Culex salinarius	1	20		
	Culex spp.	24	892		
Warren		**63**	**3196**	**4**	**1.252**

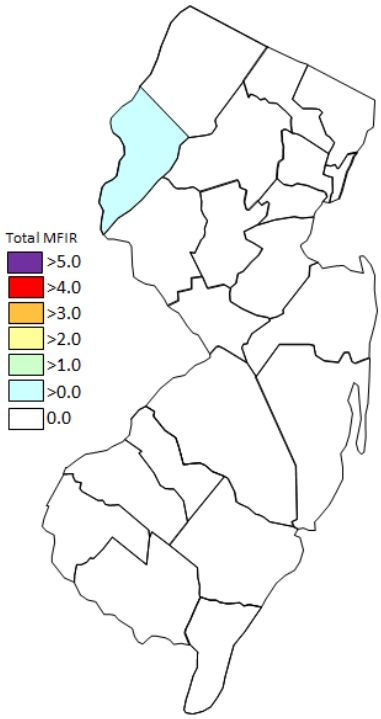
	Aedes japonicus *Culex* spp.	4 59	161 3035	4	1.318
Grand Total		**1338**	**28605**	**7**	**0.245**



Cumulative WNV activity in 2017.



WNV activity to 29 June 2018.



WNV activity last week, 2018

Saint Louis Encephalitis (SLE) to 29 June 2018.

New Jersey will be primarily testing for SLE this year only when adjacent states show human activity (Cape May tests mosquitoes in the Cape May lab independently). SLE has had previous activity in New Jersey, most notably in 1964 and 1975 (CDC's SLE website), the latter prompting the surveillance reporting by Rutgers. SLE is a flavivirus and has a similar transmission pattern to West Nile, with *Culex* species as the predominant vectors.

No pools of SLE have tested positive for 2018. No human cases have been reported.

County	Species	Pools	Mosquitoes	Positives	MFIR
Burlington		**14**	**664**		
	Culex spp	14	664		
Cape May		**156**	**1826**		
	Culex pipiens	141	1785		
	Culex spp.	15	41		
Grand Total		**170**	**2490**		

La Crosse Encephalitis (LAC) to 29 June 2018.

New Jersey will be primarily testing for LAC this year only when adjacent states show human activity (Cape May tests mosquitoes in the Cape May lab independently). New Jersey has had 3 cases of this encephalitic

disease since 1964 (see CDC's LAC website). The mortality is low but like other encephalitides, LAC can have both personal (lasting neurological sequelae) and economic impacts. LAC is a bunyavirus with a transmission cycle involving mosquitoes such as *Aedes triseriatus* and small mammals such as squirrels and chipmunks. LAC can not only infect *Aedes albopictus* but transovarial transmission was also demonstrated.
(Tesh and Gubler 1975 Laboratory studies of transovarial transmission of La Crosse and other arboviruses by *Aedes albopictus* and *Culex fatigans.* American Journal of Tropical Medicine and Hygiene 24(5):876-880).

No pools of LAC have been tested yet for 2018. No human cases have been reported.

County	Species			Positives	MFIR
Burlington		**1**	**27**		
	Aedes japonicus	1	27		
Grand Total		**1**	**27**		

Dengue (DENV) to 29 June 2018.

New Jersey will be selectively testing for DENV (including serotypes) this year. Dengue has not had a history of local transmission here in New Jersey, but each year, travelers can bring virus back from areas in the world with virus activity. This is significant as humans are NOT dead-end hosts and thus there is the potential for local transmission (i.e., New Jersey mosquitoes biting a sick person and then biting and transmitting the disease to someone else) to be established. DENV is a flavivirus but unlike WNV, *Aedes* mosquitoes are predominant vectors. In New Jersey, *Aedes albopictus* is a candidate for local transmission. There are 4 serotypes tested for Dengue.

Note Same pools of *Ae. albopictus* are tested for the four serotypes of Dengue as well as Chikungunya.

No pools of Dengue have been tested yet in 2018. There are currently 3 travel-related human cases in NJ.

County	Species	DENV1		DENV2		DENV3		DENV4		Pos.	MFIR
		Pool	Mos.	Pool	Mos.	Pool	Mos.	Pool	Mos.		
Middlesex		**2**	**12**	**2**	**12**	**2**	**12**	**2**	**12**		
	Aedes albopictus	2	12	2	12	2	12	2	12		
Grand Total		**2**	**12**	**2**	**12**	**2**	**12**	**2**	**12**		

Chikungunya (CHIK) to 29 June 2018.

New Jersey will be selectively testing for CHIK this year. Chikungunya is similar in symptoms to Dengue, a "breakbone" fever and has a low mortality rate. But this virus has had recent worldwide activity, and in the past year has come to the Western Hemisphere. As with Dengue, transmission can occur when a mosquito bites an infected human, then bites an uninfected human who subsequently becomes ill. CHIK is an alphavirus with *Aedes* mosquitoes as potential vectors. In New Jersey, *Aedes albopictus* is the mosquito of interest.

No pools of CHIK have been tested yet in 2018. There are currently 2 travel-related human cases in NJ.

County	Species	Pools	Mosquitoes	Positives	MFIR
Middlesex		**2**	**12**		
	Aedes albopictus	2	12		

Grand Total		**2**	**12**		

Zika (ZIKV) to 29 June 2018.

New Jersey will be selectively testing for ZIKV this year. Zika is an emerging arboviral threat with significant health consequences for fetuses and recent activity in the Western Hemisphere. Humans are potential hosts that can transmit through sexual activity. ZIKV is a flavivirus with *Aedes* mosquitoes as potential vectors. In New Jersey, *Aedes albopictus* is the mosquito of interest.

No pools have tested positive in 2018. There are currently 4 travel-related human cases in NJ.

County	Species	Pools	Mosquitoes	Positives	MFIR
Cape May		**54**	**107**		
	Aedes albopictus	54	107		
Middlesex		**2**	**12**		
	Aedes albopictus	2	12		
Grand Total		**56**	**119**		