RUTGERS
New Jersey Agricultural Experiment Station

VECTOR SURVEILLANCE IN NEW JERSEY
EEE, WNV and SLE
CDC WEEK 29: July 19 to July 25, 2009

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Supported by funding from the NJ State Mosquito Control Commission.

Culiseta melanura and Eastern Equine Encephalitis

SITE	Inland / Coastal	Historic Mean	Current Weekly Mean	Total Tested to Date*	Total Pools Submitted	EEE Isolations	MFIR
Green Bank (Burlington County)	Coastal	2.80	1.32	146	22	0	0
Corbin City (Atlantic County)	Coastal	1.00	0.48	37	12	0	0
Dennisville (Cape May County)	Coastal	4.20	4.57	578	26	1	0
Waterford (Camden County)	Inland	0.40	0.14	21	6	0	0
Centerton (Salem County)	Inland	2.40	1.12	196	23	0	0
Turkey Swamp (Monmouth County)	Inland	1.50	1.48	113	67	0	0
Glassboro (Gloucester County)	Inland	0.10	1.30	255	22	0	0

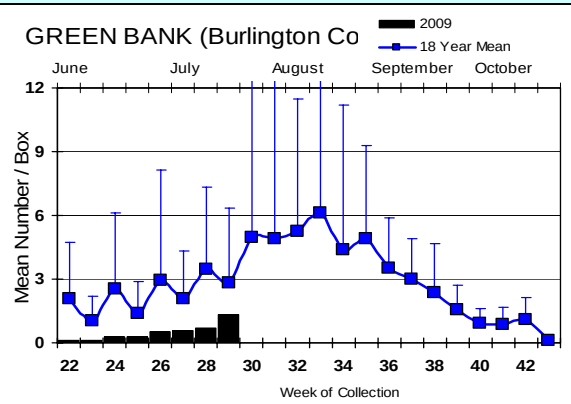
*Including trial run last week in May.

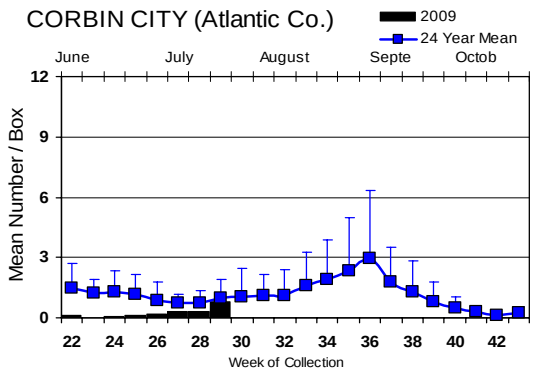
Remarks: A positive EEE pool of *Culiseta melanura* from the Dennisville resting box location was detected. This collection occurred on the 21st of July at a time when populations appear to be building.

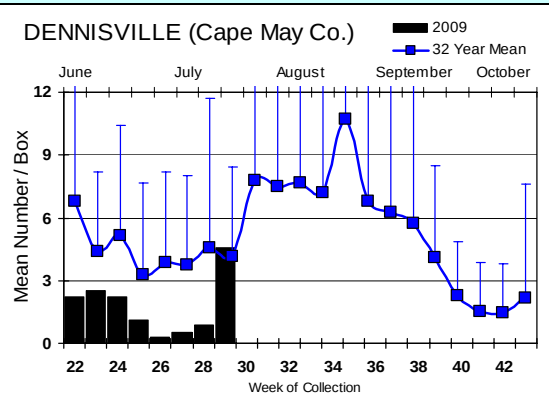
To date, 178 pools (note revision from previous week) from 1346 *Cs. melanura* mosquitoes have been sent for EEE testing from the seven resting box collections. Previously, Ocean County has submitted *Cs. melanura* samples collected from gravid and CO_2 traps while Gloucester County has sampled additional sites with resting boxes. Other species tested for EEE from resting boxes include: *Aedes atlanticus, Ae. japonicus, Ae. triseriatus, Ae. vexans, Anopheles barberi, An. crucians, An. punctipennis, An. quadrimaculatus, Culex erraticus, Cx. pipiens, Cx. restuans, Cx. salinarius,* Mixed *Culex* pools, and *Cx. territans.* Additional species from other trap types include: *Aedes abserratus, Ae. albopictus, Ae. canadensis, Ae. cantator, Ae. cinereus, Ae. japonicus, Ae. sollicitans, Ae. sticticus, Ae. taeniorhynchus, Ae. triseriatus, Ae. trivittatus, Ae. vexans, Anopheles bradleyi, Coquillettidia perturbans, Culiseta inornata and Psorophora ferox.* All 272 pools of 4219 non-*melanura* mosquitoes are reported negative for EEE virus.

Culiseta melanura Population Graphs

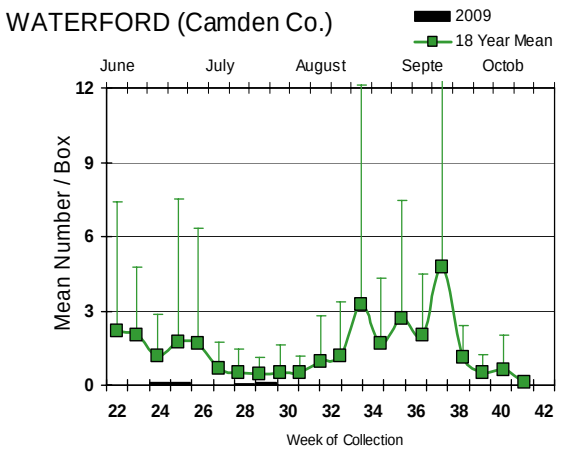
Coastal

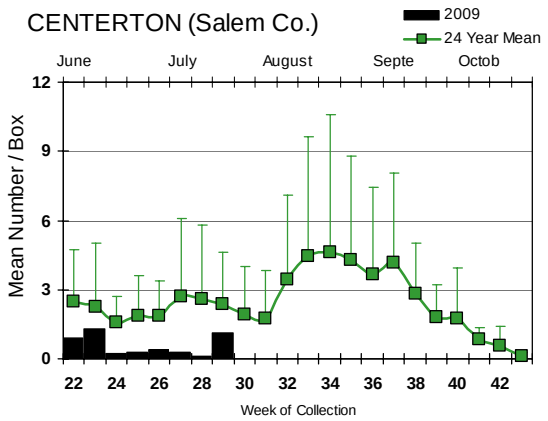


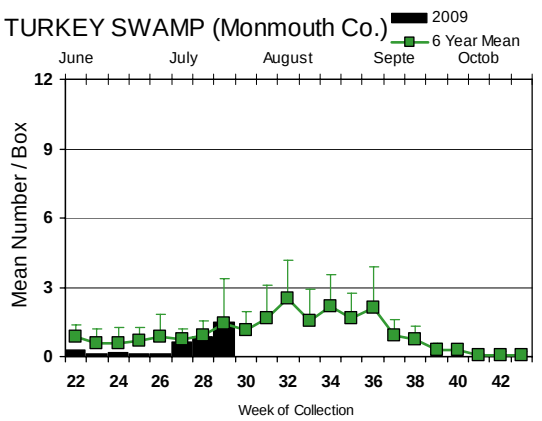




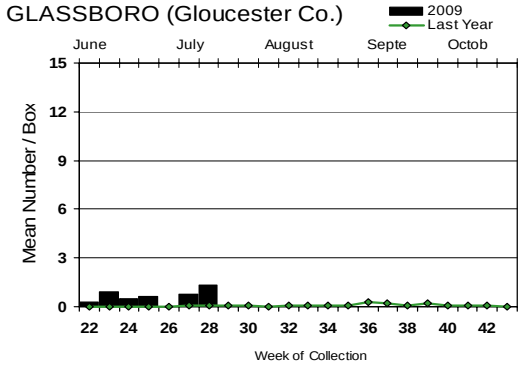
Inland







Culiseta melanura populations increased at all resting box locations from the previous week. At Dennisville and at Glassboro, population levels were higher than historical trends. Dennisville is a traditional enzootic foci and the site of the first positive EEE pool this year. Glassboro is a new site where collections began last year. Last year positive pools were detected at both sites (and eventually to almost all traditional sites by the end of the season).



EEE in US (2009 cumulative cases): (Red = new reported cases occurring)

- equine: 6(AL) 47(FL) 23(GA) 10(LA) 16(MS) 4(NC) 2(TX) 1(VA)
- mosquito: 1(FL) 1(LA) 1(MA) 1(NJ) 57(VA)
- sentinel: 2(AL) 104/49wild(FL) 31(VA)
- human:

West Nile Virus

West Nile in US (2009 cumulative cases): Single black values indicate no change from previous week. Black values / red values equals previous week/New totals.

	Birds	Mosquito Pools	Sentinels	Horses	Humans
Alabama			1/2		
Alaska					
Arizona	0	50	3/5	0	4
Arkansas					1
California	218/240	168/233	10/13	0	1
Colorado		3			2
Connecticut	0	1	0	0	0
Delaware					
DC					
Florida	2 (flavi)	0	2	0	0
Georgia	0	0		2	0
Hawaii					
Idaho		7 counties			1
Illinois	3	39/45	0	0	0
Indiana		8			
Iowa		0	0	0	0
Kansas					
Kentucky					
Louisiana		13/37		1	1
Maine					
Maryland	0	0		0	0
Mass.		1		0	0
Michigan		0	0	0	0
Minnesota		3			1
Mississippi		2		2	4
Missouri		195		1	
Montana		+		1	
Nebraska	0	0		0	1

	Birds	Mosquito Pools	Sentinels	Horses	Humans
Nevada		4+			1/4
New Hampshire		0		0	0
New Jersey	0	3/10	0	0	0
New Mexico				0	0
New York	0	1	0	0	1
North Carolina					
North Dakota	0	0		0	0
Ohio	0	4/11		0	0
Oklahoma	0	0	0	0	0
Oregon	1	1	0	0	0
Pennsylvania	1/2	6/8	0	0	0
Rhode Island					
South Carolina	0	0			
South Dakota	0	2	0	0	2/3
Tennessee	0	23	0	0	1
Texas	1	79/88	0	1/2	2
Utah		60/78		1	0
Vermont	0	0	0	0	0
Virginia		1+	1	1	0
Washington	1	63	0	2	0
West Virginia	1	7/72	0	1	0
Wisconsin	0	0	0	0	0
Wyoming		9			

Note: Some data reported by states are provisional and are subject to change. Sources for this table can be found here.

Protocol: New Jersey Department of Health and Senior Services (NJDHSS Public Health and Environmental Laboratories, PHEL) and the Cape May County Division of Mosquito Control tests mosquito pools using RT-PCR Taqman techniques.

Mosquito Species Submitted for West Nile Virus Testing through 25 July 2009

Species	Pools	Mosquitoes	Positives	MFIR
Aedes abserratus	1	1		0
Aedes albopictus	141	813		0
Aedes atlanticus	5	8		0
Aedes canadensis canadensis	72	1947		0
Aedes cantator	37	307		0
Aedes cinereus	2	7		0
Aedes grossbecki	3	35		0
Aedes japonicus	322	2292		0
Aedes sollicitans	7	41		0
Aedes sticticus	11	114		0
Aedes taeniorhynchus	5	64		0
Aedes thibaulti	5	8		0
Aedes triseriatus	93	328		0
Aedes trivittatus	18	325		0
Aedes vexans	75	1165		0
Anopheles barberi	2	13		0
Anopheles bradleyi	13	106		0
Anopheles crucians	2	11		0
Anopheles punctipennis	61	175		0
Anopheles quadrimaculatus	57	1088		0
Coquillettidia perturbans	35	434		0
Culex erraticus	18	574		0
Culex pipiens	449	11018		0
Culex restuans	387	5173		0
Culex salinarius	36	450		0
Culex spp.	1534	67766	10	0.147567
Culex territans	23	58		0
Culiseta inornata	1	2		0
Culiseta melanura	259	2120		0
Culiseta morsitans	1	3		0
Psorophora columbiae	1	1		0
Psorophora ferox	8	40		0
State Total	**3684**	**96,487**	**10**	**0.104**

Remarks: The number of pools positive for West Nile virus rose to 10, with half of the positive pools coming from Camden County. Additional positive pools of mixed *Culex* from Bergen, Burlington, Mercer, Middlesex and Morris County. Last year, activity was considerably higher (105 pools detected in fewer total number of mosquitoes submitted). Despite high numbers of the enzootic vectors in areas traditional for WNV activity as well as the earlier beginning of the surveillance season this year, the number of positive pools are low. Cool weather may have mitigated WNV transmission cycle.

Humans, Horses and Wild Birds: No humans have been reported positive for WNV by PHEL. For more details plus information about WNV, see the PHEL's West Nile Virus Alert and FAQ Sheets:
http://www.state.nj.us/health/cd/westnile/enceph.htm

No confirmed horse cases have occurred. No positive birds have been detected as of this week.

2009 Positive Mosquito pools to date / Total Mosquito Pools Submitted	This time last year* * 2008 started later (at least one month) last year than in 2009
10 / 3169	105 / 2723
2009 Positive Birds to date / Total Birds Submitted	This time last year* * 2008 started later (at least one month) last year than in 2009
0 / 44	4 / 78

WNV Results by County through 25 July 2009

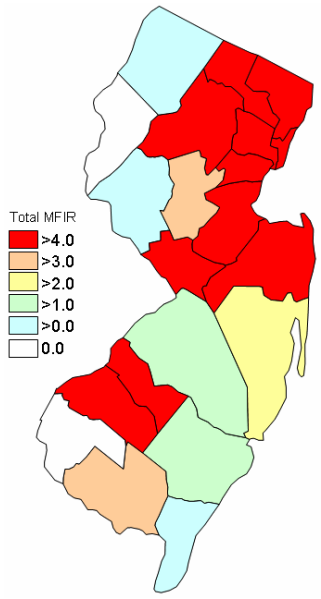
County	Species	Pools	Mosquitoes	Positives	MFIR
Atlantic		**104**	**2670**		
	Aedes albopictus	4	30		
	Aedes canadensis canadensis	4	38		
	Aedes cantator	5	138		
	Aedes grossbecki	1	8		
	Aedes japonicus	3	55		
	Aedes sollicitans	1	6		
	Aedes sticticus	2	18		
	Aedes taeniorhynchus	2	15		
	Aedes thibaulti	3	3		
	Aedes triseriatus	1	2		
	Aedes trivittatus	1	4		
	Aedes vexans	10	328		
	Anopheles bradleyi	1	9		
	Anopheles punctipennis	3	6		
	Anopheles quadrimaculatus	2	3		
	Culex erraticus	1	3		
	Culex restuans	2	5		
	Culex salinarius	2	37		
	Culex spp.	43	1920		
	Culex territans	1	1		
	Culiseta melanura	12	41		
Bergen		**66**	**4923**	**1**	**0.203**
	Aedes japonicus	1	3		
	Culex spp.	65	4920	1	0.203
Burlington		**226**	**5026**	**1**	**0.199**
	Aedes abserratus	1	1		
	Aedes albopictus	19	89		
	Aedes atlanticus	1	1		
	Aedes canadensis canadensis	19	883		
	Aedes cantator	5	42		
	Aedes cinereus	1	6		
	Aedes grossbecki	1	26		
	Aedes japonicus	19	96		
	Aedes sollicitans	2	22		
	Aedes sticticus	2	85		
	Aedes taeniorhynchus	2	48		
	Aedes triseriatus	9	39		
	Aedes trivittatus	2	9		
	Aedes vexans	15	451		
	Anopheles barberi	1	1		
	Anopheles bradleyi	2	18		
	Anopheles crucians	1	5		

	Anopheles punctipennis	6	22		
	Anopheles quadrimaculatus	1	6		
	Coquillettidia perturbans	13	224		
	Culex pipiens	1	75		
	Culex restuans	2	4		
	Culex salinarius	3	55		
	Culex spp.	56	2240	1	0.446
	Culex territans	2	10		
	Culiseta inornata	1	2		
	Culiseta melanura	37	562		
	Psorophora ferox	1	4		
Camden		**144**	**4408**	**5**	**1.134**
	Aedes albopictus	5	14		
	Aedes japonicus	19	43		
	Aedes thibaulti	1	1		
	Aedes triseriatus	1	1		
	Aedes trivittatus	2	2		
	Aedes vexans	1	1		
	Anopheles punctipennis	3	8		
	Anopheles quadrimaculatus	3	4		
	Culex pipiens	3	107		
	Culex restuans	2	2		
	Culex spp.	94	4213	5	1.187
	Culex territans	1	1		
	Culiseta melanura	4	11		
Cape May		**902**	**14810**		
	Aedes albopictus	13	28		
	Aedes canadensis canadensis	1	6		
	Aedes cantator	5	11		
	Aedes japonicus	93	343		
	Aedes triseriatus	31	102		
	Anopheles bradleyi	7	74		
	Anopheles punctipennis	5	19		
	Anopheles quadrimaculatus	25	907		
	Coquillettidia perturbans	1	19		
	Culex erraticus	12	523		
	Culex pipiens	172	2689		
	Culex restuans	247	3496		
	Culex salinarius	10	119		
	Culex spp.	205	5539		
	Culex territans	7	29		
	Culiseta melanura	68	906		
Cumberland		**34**	**625**		
	Aedes cantator	1	15		
	Aedes japonicus	4	12		
	Anopheles punctipennis	1	1		
	Culex pipiens	1	2		
	Culex restuans	2	6		
	Culex spp.	22	555		
	Culex territans	1	1		
	Culiseta melanura	2	33		

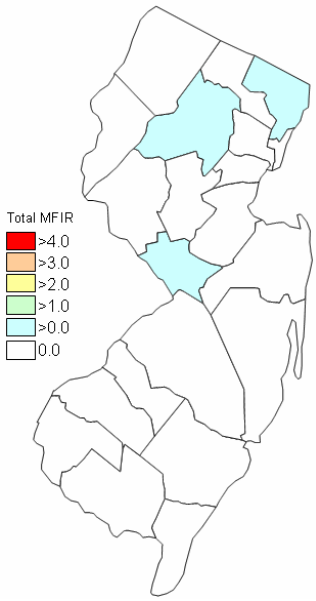
Essex		**94**	**1695**		
	Aedes albopictus	4	6		
	Aedes japonicus	11	37		
	Aedes sticticus	1	1		
	Aedes triseriatus	7	12		
	Aedes vexans	9	25		
	Anopheles punctipennis	1	1		
	Culex spp.	60	1611		
	Psorophora ferox	1	2		
Gloucester		**348**	**8889**		
	Aedes albopictus	18	302		
	Aedes atlanticus	1	1		
	Aedes canadensis canadensis	2	2		
	Aedes japonicus	36	340		
	Aedes thibaulti	1	4		
	Aedes triseriatus	1	1		
	Aedes trivittatus	1	75		
	Aedes vexans	6	57		
	Anopheles barberi	1	12		
	Anopheles crucians	1	6		
	Anopheles punctipennis	12	57		
	Anopheles quadrimaculatus	16	45		
	Coquillettidia perturbans	2	2		
	Culex pipiens	195	7699		
	Culex restuans	14	47		
	Culex salinarius	1	1		
	Culex territans	4	9		
	Culiseta melanura	36	229		
Hudson		**94**	**4635**		
	Culex spp.	94	4635		
Hunterdon		**102**	**5041**		
	Aedes albopictus	1	45		
	Culex spp.	101	4996		
Mercer		**270**	**5513**	**1**	**0.181**
	Aedes albopictus	23	63		
	Aedes japonicus	27	71		
	Aedes triseriatus	3	3		
	Culex erraticus	1	1		
	Culex pipiens	60	421		
	Culex restuans	85	1308		
	Culex salinarius	3	3		
	Culex spp.	68	3643	1	0.274
Middlesex		**194**	**10829**	**1**	**0.92**
	Aedes albopictus	2	15		
	Aedes japonicus	13	207		
	Culex spp.	179	10607	1	0.94
Monmouth		**271**	**2009**		
	Aedes albopictus	17	91		

	Aedes canadensis canadensis	16	149		
	Aedes cantator	9	39		
	Aedes japonicus	15	72		
	Aedes triseriatus	9	57		
	Aedes trivittatus	5	5		
	Aedes vexans	7	52		
	Anopheles punctipennis	10	12		
	Anopheles quadrimaculatus	1	1		
	Coquillettidia perturbans	4	12		
	Culex erraticus	1	2		
	Culex pipiens	12	13		
	Culex restuans	20	33		
	Culex spp.	72	1352		
	Culex territans	5	5		
	Culiseta melanura	67	113		
	Psorophora ferox	1	1		
Morris		**72**	**3186**	**1**	**0.314**
	Aedes japonicus	10	181		
	Culex spp.	62	3005	1	0.333
Ocean		**261**	**5125**		
	Aedes albopictus	23	131		
	Aedes atlanticus	3	6		
	Aedes canadensis canadensis	28	842		
	Aedes cantator	12	62		
	Aedes cinereus	1	1		
	Aedes grossbecki	1	1		
	Aedes japonicus	27	172		
	Aedes sollicitans	3	12		
	Aedes sticticus	6	10		
	Aedes taeniorhynchus	1	1		
	Aedes triseriatus	15	50		
	Aedes trivittatus	2	5		
	Aedes vexans	23	90		
	Anopheles bradleyi	3	5		
	Anopheles punctipennis	8	10		
	Anopheles quadrimaculatus	1	1		
	Coquillettidia perturbans	6	14		
	Culex restuans	3	3		
	Culex salinarius	9	56		
	Culex spp.	73	3603		
	Culiseta melanura	8	19		
	Psorophora columbiae	1	1		
	Psorophora ferox	4	30		
Passaic		**56**	**1197**		
	Aedes albopictus	1	7		
	Aedes canadensis canadensis	1	20		
	Aedes japonicus	14	229		
	Aedes triseriatus	3	14		
	Anopheles punctipennis	1	2		
	Culex spp.	36	925		
Salem		**86**	**1962**		

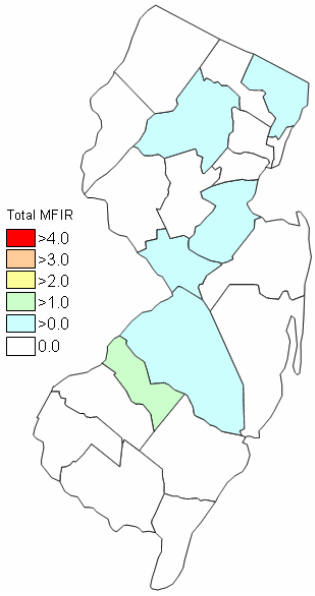
	Aedes albopictus	6	26		
	Aedes japonicus	5	26		
	Aedes triseriatus	1	1		
	Aedes vexans	2	150		
	Anopheles punctipennis	7	24		
	Anopheles quadrimaculatus	6	115		
	Coquillettidia perturbans	2	64		
	Culex erraticus	3	45		
	Culex restuans	4	79		
	Culex salinarius	2	150		
	Culex spp.	23	1084		
	Culex territans	2	2		
	Culiseta melanura	23	196		
Somerset		**110**	**3155**		
	Aedes albopictus	5	8		
	Aedes canadensis canadensis	1	7		
	Aedes japonicus	15	290		
	Aedes triseriatus	12	46		
	Aedes trivittatus	5	225		
	Aedes vexans	1	5		
	Anopheles punctipennis	4	13		
	Anopheles quadrimaculatus	2	6		
	Coquillettidia perturbans	3	4		
	Culex spp.	61	2548		
	Psorophora ferox	1	3		
Sussex		**75**	**1486**		
	Aedes japonicus	3	3		
	Coquillettidia perturbans	3	94		
	Culex pipiens	5	12		
	Culex restuans	6	190		
	Culex salinarius	6	29		
	Culex spp.	49	1145		
	Culiseta melanura	2	10		
	Culiseta morsitans	1	3		
Union		**66**	**2538**		
	Aedes albopictus	1	3		
	Aedes japonicus	6	67		
	Aedes sollicitans	1	1		
	Aedes vexans	1	6		
	Coquillettidia perturbans	1	1		
	Culex spp.	56	2460		
Warren		**108**	**6765**		
	Culex spp.	108	6765		
Grand Total		**3684**	**96,487**	**10**	**0.104**



Cumulative activity in 2008



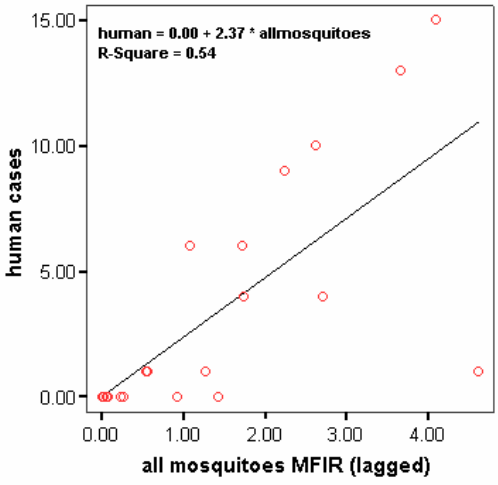
Activity last week.



Recent Activity to 25 July 2009

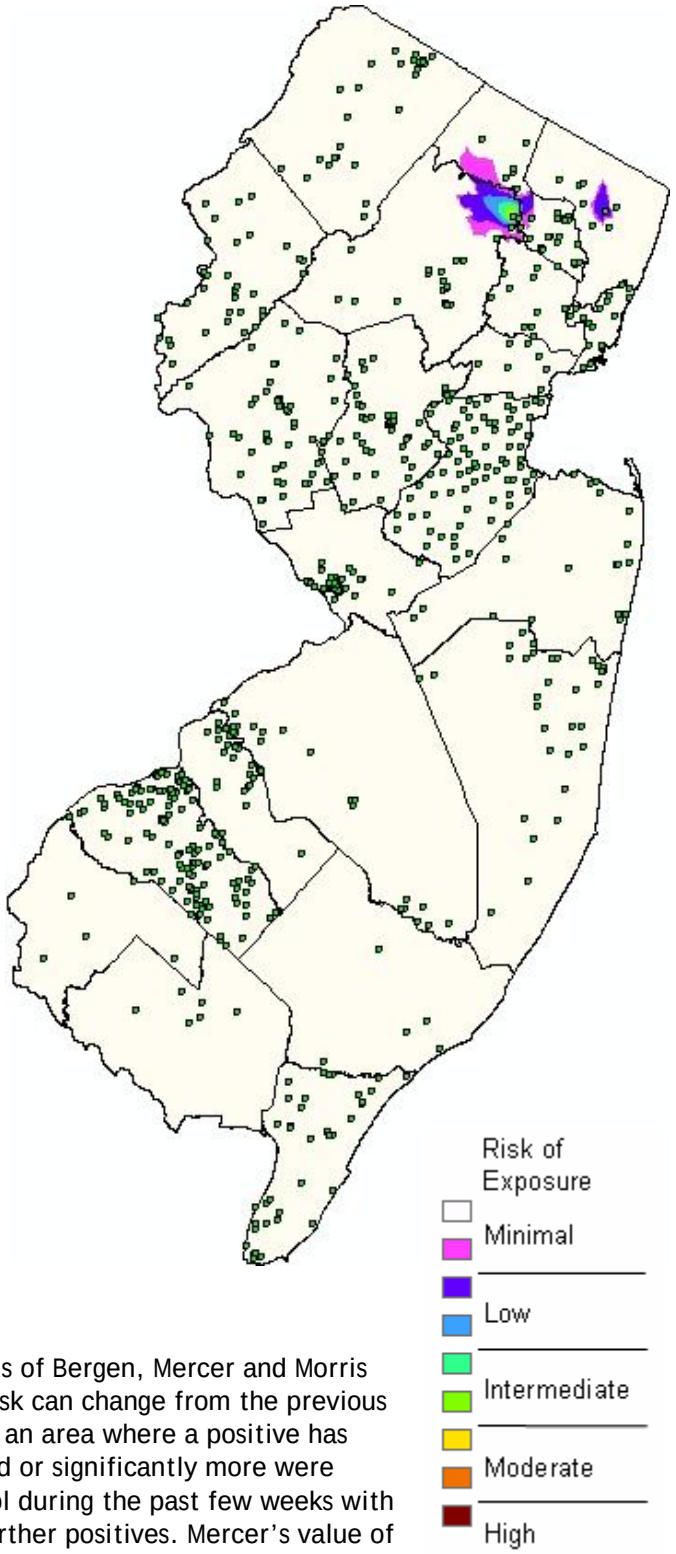
WNV Risk of Exposure Model

Risk Development: This is the second week of Phase 1 of our WNV Risk Exposure model presentation. Our WNV risk model begins with a simple linear relationship we have found between overall mosquito MFIR values and the number of human cases that appeared two weeks later. This relationship was developed using statewide values from 2002 to 2006. The regression model, graphed to the left, explains over 50% of the variation observed. We've continued to explore the variables that contribute to WNV cases, and will present more precise models on this page in the future.



Using ArcMap 9.2, we applied this linear relationship of overall mosquito MFIR values at the county level to calculate a "risk of exposure." Last risk map used county seats to map risk. This week, pool locations (green diamond symbols) were used. The values used in the linear regression were calculated from Week 27 (the two week lag) data values taken from the PHEL West Nile Virus database. These values were slightly smaller than the tabular values of the Week 27 report due to more samples being reported.

Risk is rated from minimal exposure (no positive pools found) through to high risk (positive mosquitoes found) with several risk levels in between. Risk is interpolated from each of the 21 county points in equal gradients. It should be noted that minimal risk does not mean no risk and that high risk cannot be mediated by mosquito bite avoidance behavior.



Summary: Areas of higher than minimal risk are seen for portions of Bergen, Mercer and Morris counties based on the positive pools detected two weeks ago. Risk can change from the previous map due to 1) continued overall county sampling, 2) sampling in an area where a positive has been detected and 3) either no new positive pools were detected or significantly more were detected. All three counties reported a single positive *Culex* pool during the past few weeks with continued sampling and (apart from Morris's positive pool) no further positives. Mercer's value of risk is located within Trenton but is contained by several samples that were not positive. This effectively reduced the distance that most of the interpolation surrounding the positive point. Note: many of the points represent more than one pool as samples may be taken from one location over time.

NOTE: These maps are presented as an additional early warning tool available for counties to use as part of their decision-making processes for controlling public-health mosquitoes. It should be understood that *minimal risk does not mean no risk* and that everyone should use personal protection to avoid mosquito bites.

Saint Louis Encephalitis (SLE) through 25 July 2009.

New Jersey will be selectively testing for SLE this year. 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.

County	Species	Pools	Mosquitoes	Positives	MFIR
Burlington		**161**	**3383**		
	Aedes abserratus	1	1		
	Aedes albopictus	19	89		
	Aedes atlanticus	1	1		
	Aedes canadensis canadensis	7	142		
	Aedes cantator	4	41		
	Aedes cinereus	1	6		
	Aedes japonicus	18	95		
	Aedes sollicitans	2	22		
	Aedes sticticus	1	41		
	Aedes taeniorhynchus	2	48		
	Aedes triseriatus	8	38		
	Aedes trivittatus	2	9		
	Aedes vexans	10	207		
	Anopheles barberi	1	1		
	Anopheles bradleyi	2	18		
	Anopheles crucians	1	5		
	Anopheles punctipennis	4	16		
	Anopheles quadrimaculatus	1	6		
	Coquillettidia perturbans	13	224		
	Culex pipiens	1	75		
	Culex restuans	1	3		
	Culex salinarius	3	55		
	Culex spp.	55	2231		
	Culex territans	1	4		
	Culiseta inornata	1	2		
	Psorophora ferox	1	4		
Camden		**65**	**2321**		
	Aedes albopictus	3	6		
	Aedes japonicus	7	20		
	Aedes triseriatus	1	1		
	Aedes vexans	1	1		
	Culex pipiens	2	95		
	Culex spp.	51	2198		
Cape May		**264**	**6306**		
	Aedes cantator	1	2		
	Aedes japonicus	1	12		
	Aedes triseriatus	2	11		
	Anopheles quadrimaculatus	1	1		
	Coquillettidia perturbans	1	19		
	Culex erraticus	1	3		
	Culex pipiens	94	1801		
	Culex restuans	92	1220		
	Culex salinarius	4	25		

	Culex spp.	175	5354		
Essex		**94**	**1695**		
	Aedes albopictus	4	6		
	Aedes japonicus	11	37		
	Aedes sticticus	1	1		
	Aedes triseriatus	7	12		
	Aedes vexans	9	25		
	Anopheles punctipennis	1	1		
	Culex spp.	60	1611		
	Psorophora ferox	1	2		
Hunterdon		**10**	**500**		
	Culex spp.	10	500		
Mercer		**252**	**5411**		
	Aedes albopictus	23	63		
	Aedes japonicus	23	67		
	Aedes triseriatus	3	3		
	Culex pipiens	57	410		
	Culex restuans	81	1265		
	Culex salinarius	1	1		
	Culex spp.	64	3602		
Grand Total		**954**	**21759**		

Specimens submitted by the counties continue to be negative for SLE.

La Crosse Encephalitis (LAC) through 25 July 2009.

New Jersey will be selectively testing for La Crosse (LAC) virus this year. 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 Hygeine 24(5):876-880).

County	Species	Pools	Mosquitoes	Positives	MFIR
Cape May		**103**	**378**		
	Aedes albopictus	12	26		
	Aedes japonicus	63	262		
	Aedes triseriatus	28	90		
Essex		**1**	**11**		
	Aedes triseriatus	1	11		