RUTGERS
New Jersey Agricultural Experiment Station

VECTOR SURVEILLANCE IN NEW JERSEY

EEE, WNV, SLE and LAC

CDC WEEK 27: July 5 to July 11, 2009

Prepared by Lisa M. Reed, Scott Crans, Dina Fonseca and Randy Gaugler at the Center for Vector Biology, Rutgers University.
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	3.0	0.56	81	19	0	0
Corbin City (Atlantic County)	Coastal	0.8	0.28	18	9	0	0
Dennisville (Cape May County)	Coastal	3.9	0.53	428	24	0	0
Waterford (Camden County)	Inland	1.7	0	11	4	0	0
Centerton (Salem County)	Inland	2.7	0.28	166	21	0	0
Turkey Swamp (Monmouth County)	Inland	0.9	0.62	38	13	0	0
Glassboro (Gloucester County)	Inland	0	no collection	153	20	0	0

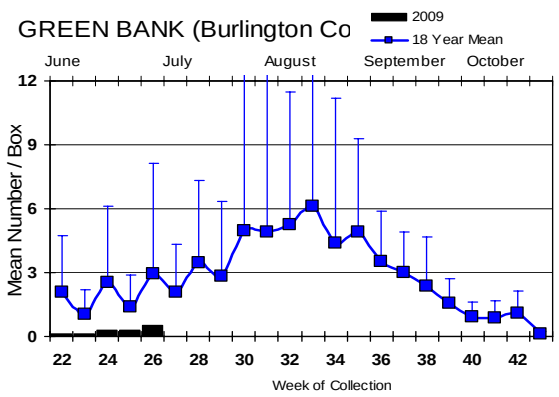
*Including trial run last week in May.

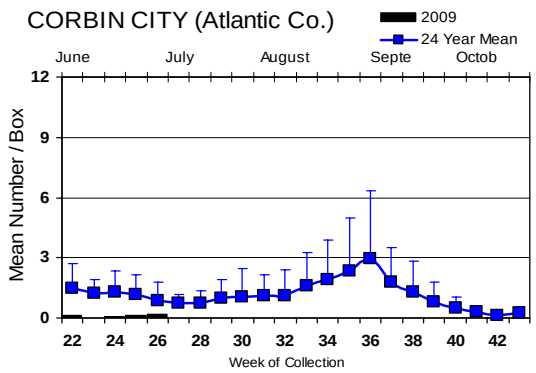
Remarks: *Culiseta melanura* populations continue to be lower than historical values. Normally, at this point in time, it would not be unusual to see small increases in the populations as the second generation for these southern New Jersey populations emerge. Cooler June temperatures may have an impact on the timing of emergence for this second (and amplifying) generation (Crans and Mahmood 1998 Does bi-voltinism in *Culiseta melanura* regulate the amplification of EEE? 86th Proceedings of the NJMCA 13-16). No eastern equine encephalitis virus has been detected at the six traditional resting box sites to this point in time. A collection was not made in Glassboro in anticipation of moving the site.

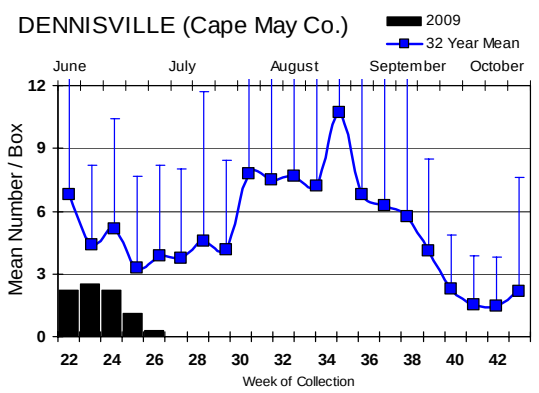
To date, 110 pools from 895 *Cs. melanura* mosquitoes have been sent for EEE testing from the seven resting box collections (NOTE: this value was re-adjusted from last week). Previously, Ocean County has submitted *Cs. melanura* samples collected from gravid and CO_2 traps while Gloucester County has sampled additional sites with resting boxes. Other species tested for EEE from resting boxes include: *Aedes atlanticus, Ae. japonicus, Ae. triseriatus, Anopheles punctipennis, An. quadrimaculatus, Culex erraticus, Cx. pipiens, Cx. restuans, Cx. salinarius,* Mixed *Culex* pools, and *Cx. territans.* Additional species from other trap types include: *Ae. abserratus, Ae. albopictus, Ae. canadensis, Ae. triseriatus, Ae. trivittatus, Ae. sollicitans, Ae. vexans, An. bradleyi, Coquillettidia perturbans* and *Culiseta inornata.* All 159 pools of 2019 mosquitoes are reported negative for EEE virus.

Culiseta melanura Population Graphs

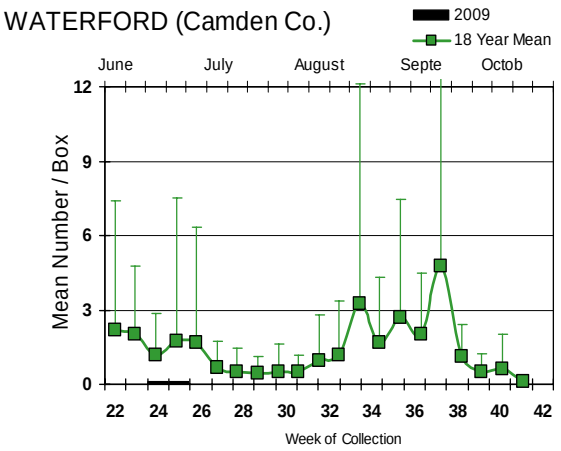
Coastal

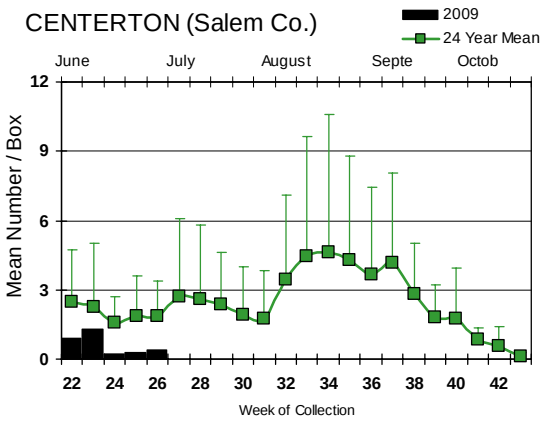


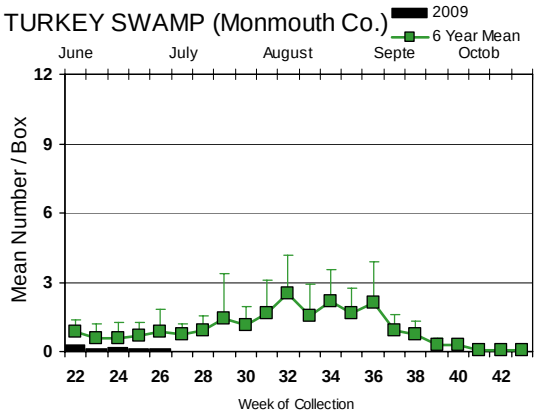




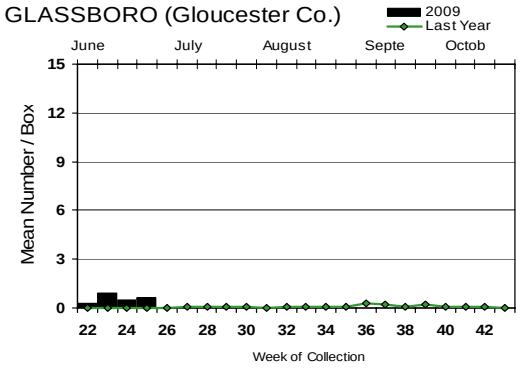
Inland







Resting box populations of *Culiseta melanura* continue to track lower than recent historical trends at all sites. Patterns for this species in the Statewide Adult Mosquito Surveillance program reflect similar patterns. No EEE activity was detected.



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

- equine: 6(AL) 34(FL) 15(GA) 3(LA) 1(MO) 6(MS) 1(VA)
- mosquito: 1(LA)
- sentinel: 2(AL) 69/39wild(FL)
- 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					
Alaska					
Arizona	0	26/39	3	0	1
Arkansas					1
California	139	97/120	5	0	0
Colorado		1			2
Connecticut	0	0	0	0	0
Delaware					
DC					
Florida	2	0	1	0	0
Georgia				2	
Hawaii					
Idaho		2 counties			1
Illinois	2	12/21	0	0	0
Indiana					
Iowa	0	0	0	0	0
Kansas					
Kentucky					
Louisiana					
Maine					
Maryland	0	0		0	0
Mass.		0		0	0
Michigan		0	0	0	0
Minnesota					
Mississippi		1		0	2
Missouri		+?			
Montana					
Nebraska	0	0		0	0

	Birds	Mosquito Pools	Sentinels	Horses	Humans
Nevada		4+			1
New Hampshire					
New Jersey	0	2	0	0	0
New Mexico				0	0
New York	0	1	0	0	0
North Carolina					
North Dakota	0	0		0	0
Ohio	0	3		0	0
Oklahoma	0	0	0	0	0
Oregon	0	1	0	0	0
Pennsylvania	1	5	0	0	0
Rhode Island					
South Carolina					
South Dakota	0	0	0	0	1/2
Tennessee	0	0	0	0	1
Texas	1	8	0	1	1
Utah		16/31		0	0
Vermont	0				
Virginia	0	1+	0	0	0
Washington	0	15/63	0	0	0
West Virginia	0	7	0	0	0
Wisconsin	0	0	0	0	0
Wyoming		3			

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 11 July 2009

Species	Pools	Mosquitoes	Positives	MFIR
Aedes abserratus	1	1		0
Aedes albopictus	85	571		0
Aedes atlanticus	2	2		0
Aedes canadensis canadensis	62	1831		0
Aedes cantator	25	162		0
Aedes cinereus	2	7		0
Aedes grossbecki	3	35		0
Aedes japonicus	192	1200		0
Aedes sollicitans	5	34		0
Aedes sticticus	6	68		0
Aedes taeniorhynchus	3	58		0
Aedes thibaulti	5	8		0
Aedes triseriatus	50	169		0
Aedes trivittatus	13	312		0
Aedes vexans	53	978		0
Anopheles bradleyi	11	96		0
Anopheles punctipennis	40	109		0
Anopheles quadrimaculatus	39	742		0
Coquillettidia perturbans	27	357		0
Culex erraticus	7	92		0
Culex pipiens	307	7374		0
Culex restuans	308	4274		0
Culex salinarius	19	166		0
Culex spp.	920	40129	2	0.050
Culex territans	19	51		0
Culiseta inornata	1	2		0
Culiseta melanura	164	1623		0
Culiseta morsitans	1	3		0
Psorophora columbiae	1	1		0
Psorophora ferox	4	26		0
State Total	**2373**	**60,481**	**2**	**0.033**

Remarks: The number of pools positive for West Nile virus remains at two, one each from Mercer and Bergen counties. These two counties include highly urban/suburbanized areas typical of WNV activity in New Jersey. Activity last year at this time was much higher: there were 35 positive pools from 10 counties.

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
2 / 2394	35 / 1963

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 / 31	0 / 62

WNV Results by County through 11 July 2009

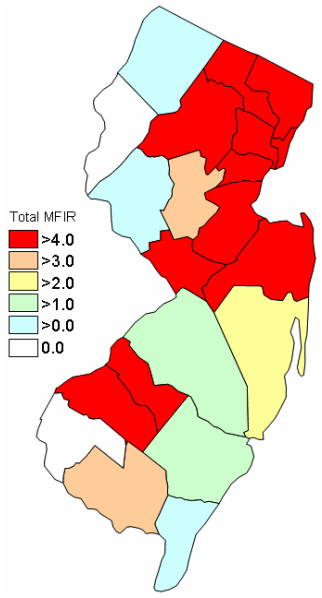
County	Species	Pools	Mosquitoes	Positives	MFIR
Atlantic		**73**	**1745**		
	Aedes albopictus	2	17		
	Aedes canadensis canadensis	3	34		
	Aedes cantator	3	70		
	Aedes grossbecki	1	8		
	Aedes japonicus	1	2		
	Aedes sticticus	2	18		
	Aedes taeniorhynchus	1	10		
	Aedes thibaulti	3	3		
	Aedes triseriatus	1	2		
	Aedes vexans	7	254		
	Anopheles bradleyi	1	9		
	Anopheles punctipennis	3	6		
	Anopheles quadrimaculatus	2	3		
	Culex restuans	2	5		
	Culex salinarius	1	1		
	Culex spp.	29	1280		
	Culex territans	1	1		
	Culiseta melanura	10	22		
Bergen		**38**	**2778**	**1**	**0.36**
	Aedes japonicus	1	3		
	Culex spp.	37	2775	**1**	**0.36**
Burlington		**161**	**3242**		
	Aedes abserratus	1	1		
	Aedes albopictus	14	70		
	Aedes canadensis canadensis	16	793		
	Aedes cantator	3	21		
	Aedes cinereus	1	6		
	Aedes grossbecki	1	26		
	Aedes japonicus	14	44		
	Aedes sollicitans	2	22		
	Aedes sticticus	1	44		
	Aedes taeniorhynchus	1	47		
	Aedes triseriatus	7	29		
	Aedes trivittatus	1	6		
	Aedes vexans	12	383		
	Anopheles bradleyi	2	18		
	Anopheles punctipennis	4	10		
	Coquillettidia perturbans	9	155		
	Culex pipiens	1	75		
	Culex restuans	1	3		
	Culex salinarius	2	24		
	Culex spp.	36	1045		
	Culex territans	1	6		
	Culiseta inornata	1	2		
	Culiseta melanura	30	412		

Camden		**101**	**3035**		
	Aedes albopictus	2	8		
	Aedes japonicus	13	30		
	Aedes thibaulti	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.	66	2860		
	Culex territans	1	1		
	Culiseta melanura	4	11		
Cape May		**567**	**8615**		
	Aedes albopictus	1	2		
	Aedes canadensis canadensis	1	6		
	Aedes cantator	1	1		
	Aedes japonicus	7	17		
	Anopheles bradleyi	6	67		
	Anopheles punctipennis	4	16		
	Anopheles quadrimaculatus	14	691		
	Culex pipiens	11	73		
	Culex restuans	29	230		
	Culex salinarius	4	16		
	Culex spp.	1	4		
	Culex territans	7	29		
	Culiseta melanura	24	428		
Cumberland		**19**	**254**		
	Aedes japonicus	1	2		
	Anopheles punctipennis	1	1		
	Culex pipiens	1	2		
	Culex restuans	2	6		
	Culex spp.	12	234		
	Culex territans	1	1		
	Culiseta melanura	1	8		
Essex		**44**	**758**		
	Aedes albopictus	2	3		
	Aedes japonicus	7	13		
	Aedes triseriatus	3	6		
	Aedes vexans	4	15		
	Culex spp.	27	719		
	Psorophora ferox	1	2		
Gloucester		**268**	**6565**		
	Aedes albopictus	15	266		
	Aedes atlanticus	1	1		
	Aedes canadensis canadensis	2	2		
	Aedes japonicus	27	228		
	Aedes thibaulti	1	4		

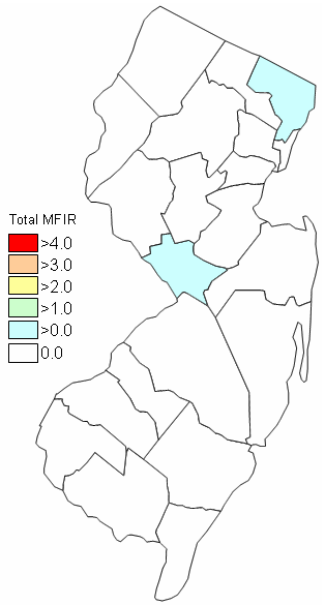
	Aedes triseriatus	1	1		
	Aedes trivittatus	1	75		
	Aedes vexans	6	57		
	Anopheles punctipennis	8	34		
	Anopheles quadrimaculatus	12	22		
	Coquillettidia perturbans	2	2		
	Culex pipiens	144	5607		
	Culex restuans	12	41		
	Culex territans	4	9		
	Culiseta melanura	32	216		
Hudson		**64**	**2891**		
	Culex spp.	64	2891		
Hunterdon		**61**	**2991**		
	Aedes albopictus	1	45		
	Culex spp.	60	2946		
Mercer		**174**	**3005**	**1**	**0.333**
	Aedes albopictus	9	25		
	Aedes japonicus	8	13		
	Aedes triseriatus	2	2		
	Culex erraticus	1	1		
	Culex pipiens	50	342		
	Culex restuans	67	1082		
	Culex salinarius	2	2		
	Culex spp.	35	1538	1	0.650
Middlesex		**153**	**8516**		
	Aedes japonicus	9	156		
	Culex spp.	144	8360		
Monmouth		**128**	**709**		
	Aedes albopictus	10	77		
	Aedes canadensis canadensis	14	143		
	Aedes cantator	7	33		
	Aedes japonicus	10	30		
	Aedes triseriatus	6	39		
	Aedes trivittatus	3	3		
	Aedes vexans	5	49		
	Anopheles punctipennis	3	3		
	Anopheles quadrimaculatus	1	1		
	Coquillettidia perturbans	3	11		
	Culex erraticus	1	2		
	Culex pipiens	1	1		
	Culex restuans	9	22		
	Culex spp.	40	255		
	Culex territans	2	2		
	Culiseta melanura	13	38		
Morris		**33**	**1356**		
	Aedes japonicus	5	39		
	Culex spp.	28	1317		
Ocean		**181**	**3846**		

	Aedes albopictus	14	49		
	Aedes atlanticus	1	1		
	Aedes canadensis canadensis	24	826		
	Aedes cantator	7	27		
	Aedes cinereus	1	1		
	Aedes grossbecki	1	1		
	Aedes japonicus	18	120		
	Aedes sollicitans	3	12		
	Aedes sticticus	3	6		
	Aedes taeniorhynchus	1	1		
	Aedes triseriatus	9	16		
	Aedes trivittatus	1	1		
	Aedes vexans	15	64		
	Anopheles bradleyi	2	2		
	Anopheles punctipennis	7	9		
	Coquillettidia perturbans	5	9		
	Culex restuans	2	2		
	Culex salinarius	5	42		
	Culex spp.	54	2625		
	Culiseta melanura	5	10		
	Psorophora columbiae	1	1		
	Psorophora ferox	2	21		
Passaic		**37**	**896**		
	Aedes albopictus	1	7		
	Aedes canadensis canadensis	1	20		
	Aedes japonicus	7	77		
	Aedes triseriatus	2	3		
	Culex spp.	26	789		
Salem		**50**	**676**		
	Aedes albopictus	4	24		
	Aedes japonicus	2	6		
	Aedes triseriatus	1	1		
	Aedes vexans	2	150		
	Anopheles punctipennis	5	17		
	Anopheles quadrimaculatus	3	6		
	Coquillettidia perturbans	2	64		
	Culex restuans	2	2		
	Culex spp.	6	238		
	Culex territans	2	2		
	Culiseta melanura	21	166		
Somerset		**70**	**2199**		
	Aedes albopictus	1	2		
	Aedes canadensis canadensis	1	7		
	Aedes japonicus	11	193		
	Aedes triseriatus	6	19		
	Aedes trivittatus	5	225		
	Aedes vexans	1	5		
	Anopheles punctipennis	1	2		
	Coquillettidia perturbans	2	3		
	Culex spp.	41	1740		
	Psorophora ferox	1	3		

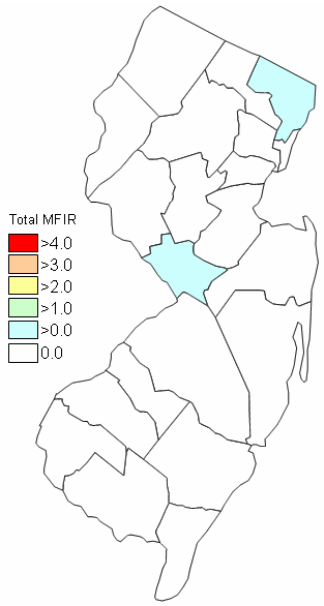
Sussex		**45**	**871**		
	Aedes japonicus	3	3		
	Coquillettidia perturbans	3	94		
	Culex pipiens	3	7		
	Culex restuans	6	190		
	Culex salinarius	3	3		
	Culex spp.	25	562		
	Culiseta melanura	1	9		
	Culiseta morsitans	1	3		
Union		**40**	**1687**		
	Aedes japonicus	4	30		
	Culex spp.	36	1657		
Warren		**68**	**3846**		
	Culex spp.	68	3846		
Grand Total		**2375**	**60,481**	**2**	**0.033**



Cumulative activity in 2008



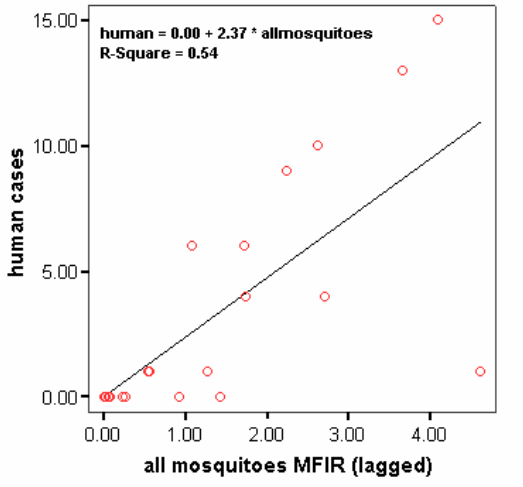
Activity last week



Recent Activity to 11July 2009

WNV Risk of Exposure Model

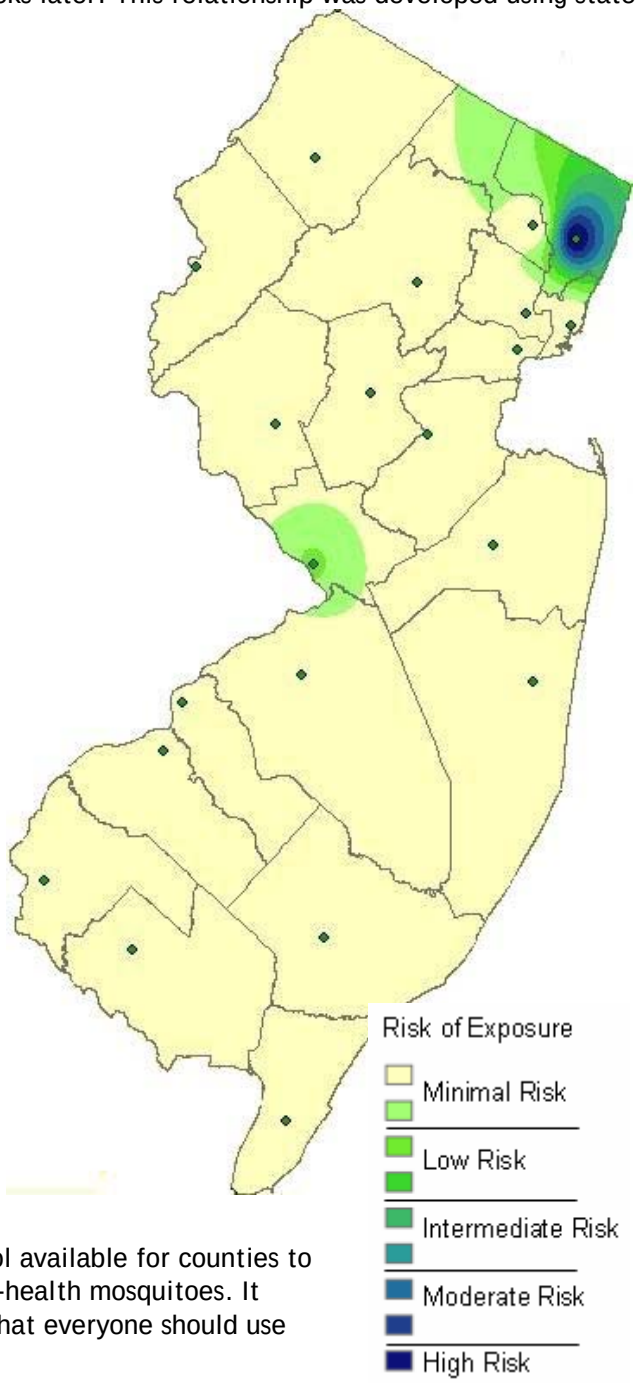
This is Phase 1 of our WNV Risk Exposure model presentation. Our WNV risk model begins with a simple linear relationship we have found between overall mosquito MFIR values and the number of human cases that appeared two weeks later. This relationship was developed using statewide values from 2002 to 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." Since this calculation was for the county as a whole, each county point was fixed within the county using the county seat (green diamond symbols). The values used in the linear regression were reported during Week 25 (the two week lag) of the Vector Surveillance Program from the WNV Results By County table.

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.

Areas of higher risk are noted in Bergen and Mercer counties. These are both counties that reported a single positive *Culex* pool during the past few weeks. Because Bergen County had fewer overall mosquitoes submitted, their risk value for the same number of positive mosquito pools (i.e., 1) is higher than for Mercer County.



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 11 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		**116**	**2083**		
	Aedes abserratus	1	1		
	Aedes albopictus	14	70		
	Aedes canadensis canadensis	4	52		
	Aedes cinereus	2	20		
	Aedes cantator	1	6		
	Aedes japonicus	13	43		
	Aedes sollicitans	2	22		
	Aedes taeniorhynchus	1	47		
	Aedes triseriatus	6	28		
	Aedes trivittatus	1	6		
	Aedes vexans	8	140		
	Anopheles bradleyi	2	18		
	Anopheles punctipennis	2	4		
	Coquillettidia perturbans	9	155		
	Culex pipiens	1	75		
	Culex restuans	1	3		
	Culex salinarius	2	24		
	Culex spp.	34	1036		
	Culiseta inornata	1	2		
	Culiseta melanura	11	331		
Camden		**20**	**848**		
	Aedes japonicus	1	7		
	Aedes vexans	1	1		
	Culex pipiens	2	95		
	Culex spp.	16	745		
Cape May		**152**	**3639**		
	Aedes cantator	1	2		
	Aedes triseriatus	2	11		
	Anopheles quadrimaculatus	1	1		
	Coquillettidia perturbans	1	19		
	Culex pipiens	36	630		
	Culex restuans	54	706		
	Culex spp.	57	2270		
Essex		**44**	**758**		
	Aedes albopictus	2	3		
	Aedes japonicus	7	13		
	Aedes triseriatus	3	6		
	Aedes vexans	4	15		
	Culex spp.	27	719		
	Psorophora ferox	1	2		

Mercer	**156**	**2903**		
Aedes albopictus	9	25		
Aedes japonicus	4	9		
Aedes triseriatus	2	2		
Culex pipiens	47	331		
Culex restuans	63	1039		
Culex spp.	31	1497		

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

La Crosse Encephalitis (LAC) through 11 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 also infect *Aedes albopictus* and transovarial transmission was 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		**45**	**160**		
	Aedes albopictus	10	21		
	Aedes japonicus	25	98		
	Aedes triseriatus	10	41		