RUTGERS
New Jersey Agricultural Experiment Station

VECTOR SURVEILLANCE IN NEW JERSEY
EEE, WNV and SLE
CDC WEEK 33: August 16 to August 22, 2009

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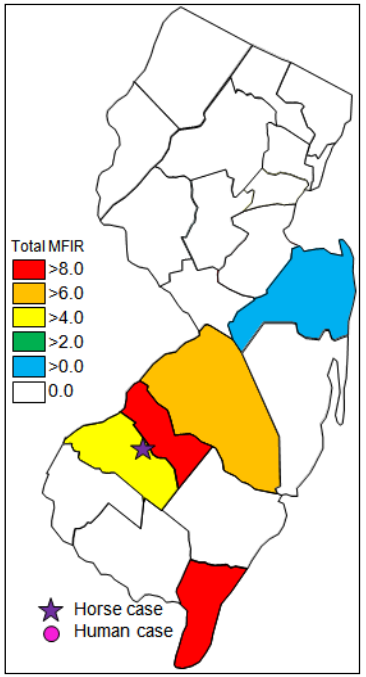
Supported by funding from the NJ State Mosquito Control Commission.

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	6.1	2.24	267	26	2	7.49
Corbin City (Atlantic County)	Coastal	1.6	0.48	70	14	0	0
Dennisville (Cape May County)	Coastal	7.2	2.86	1337	43	11	8.23
Winslow † (Camden County)	Inland	No history	4.22	484	11	5	10.33
Centerton (Salem County)	Inland	4.4	0.68	241	26	0	0
Turkey Swamp (Monmouth County)	Inland	1.6	5.30	550	84	1	1.82
Glassboro (Gloucester County)	Inland	No history	1.98	469	27	2	4.26

*Including trial run last week in May. † Date of site change-over occurred during Week 30.

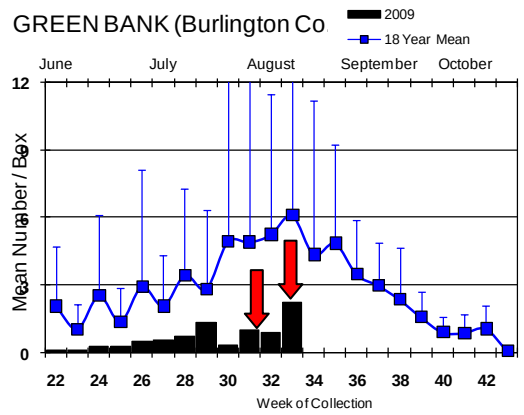
Remarks: The number of detected positive EEE pools of *Cs. melanura* from the traditional resting box sites has increased to 21. Seven additional positive EEE pools of mosquitoes including *Cs. melanura* have been detected in resting boxes and other traps maintained by county agencies in Atlantic, Burlington, Camden, Cape May, Gloucester and Monmouth counties. To date, 231 pools from 3418 *Cs. melanura* mosquitoes have been sent for EEE testing from the seven resting box collections (note adjustment from last week). A total of 28 positive pools from all species have been detected. See map at right for distribution of counties with positive EEE pools.

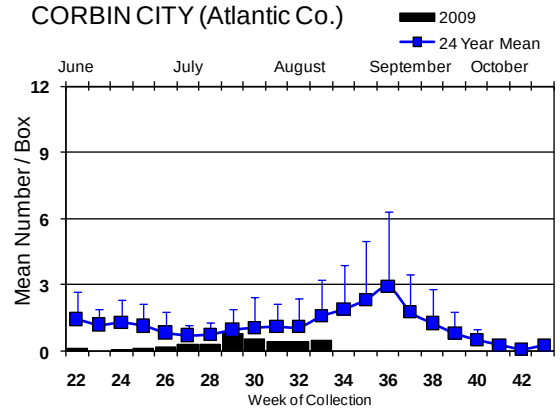


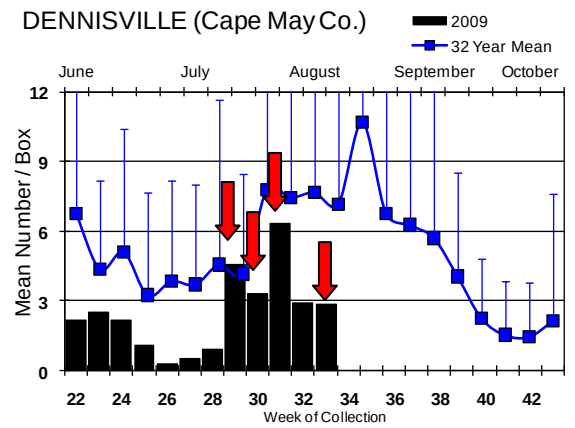
One horse was with no travel history was reported with both eastern equine encephalitis and West Nile virus infections. Symptoms appeared on 18 Aug and the horse was euthanized. The State Veterinarian noted the uncertain vaccination history of the horse. The fate of this horse reinforces the necessity 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
For more information on arboviral horse cases in New Jersey, see
http://www.state.nj.us/agriculture/news/press/2009/approved/press090824.html

Culiseta melanura Population Graphs

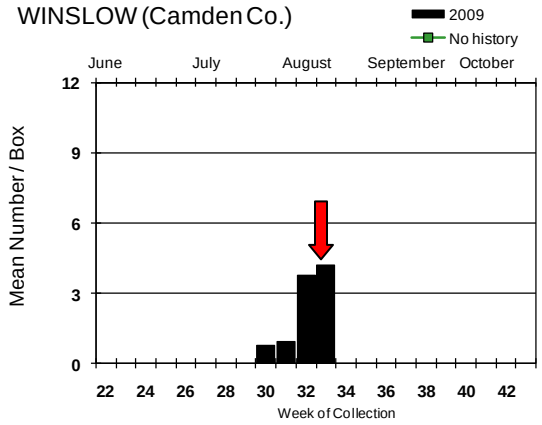
Coastal

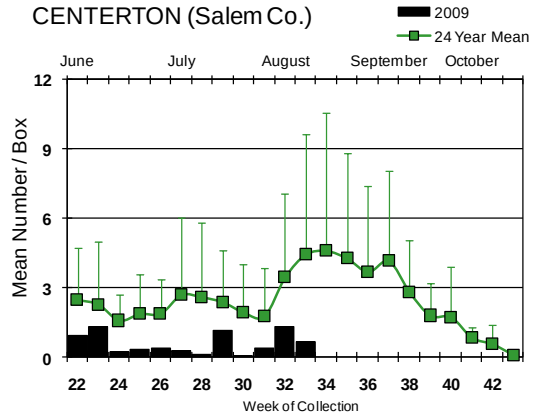


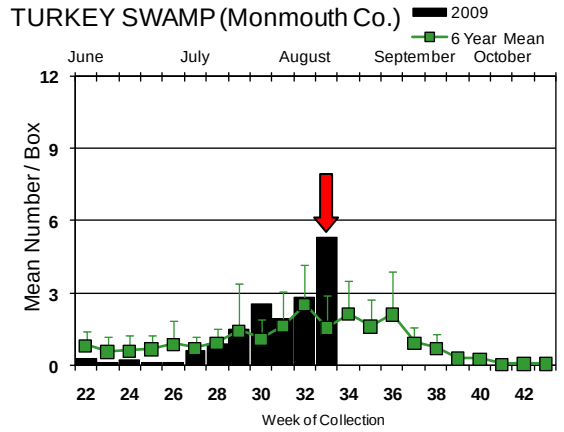




Inland

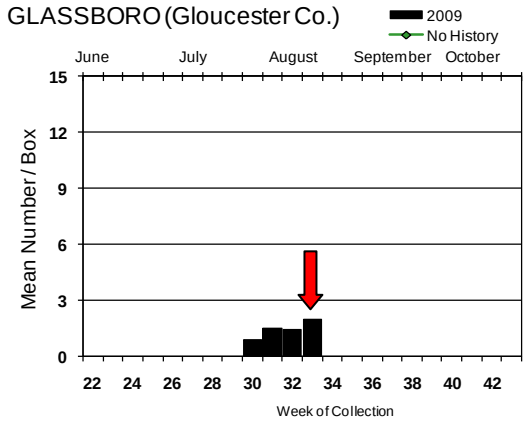






The Turkey Swamp population of *Culiseta melanura* soared to significantly higher numbers than historical data. At the same time, one positive EEE pool of *Cs. melanura* was detected. At the same time, positive pools of EEE in *Cs. melanura* were detected at numerous sites (both traditional resting box sites as well as traps set out by county agencies when the first positive pools were detected). This suggests that significant activity is occurring in the southern portions of New Jersey, with dissemination toward central New Jersey. This increase in activity appears concurrent with EEE activity elsewhere in the eastern half of the US.

↓ = positive pool detected.



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

- equine: 14(AL) 63(FL) 34(GA) 1(KY) 15(LA) 1(ME) 1(MO) 30(MS) 12(NC) 1alpaca(NH) 2(SC) 3(TX) 5(VA)
- mosquito: 1(FL) 1(LA) 7(MA) 28(NJ) 5(NY) 116(VA)
- sentinel: 2(AL) 143/72wild(FL) 24(NC) 30(VA)
- human: 1(LA)

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

	Birds	Mosquito Pools	Sentinels	Horses	Humans
Alabama			1/2		
Alaska					
Arizona	1	64/68	4	0	12
Arkansas					1
California	329	504/649	56/98	3/4	10
Colorado		38/51			9/14
Connecticut	0	7	0	0	0
Delaware					
DC					
Florida	2 (flavi)	0	3/4	0	0
Georgia	0	4		2	0
Hawaii					
Idaho		7 co.		4	3/8
Illinois	8	107	0	0	0
Indiana	0	29/36		0	1
Iowa		3/5	1/3	1	1
Kansas					
Kentucky				2	
Louisiana		13/37		1/2	1/8
Maine					
Maryland	0	5		0	0
Mass.		5		0	0
Michigan		0	0	0	0
Minnesota		3			1
Mississippi		6		3	19/21
Missouri		195/238		1	1
Montana		4		1/6	3
Nebraska	2	15		2	8

	Birds	Mosquito Pools	Sentinels	Horses	Humans
Nevada		4+			5
New Hampshire		0		0	0
New Jersey	1/3	63/84	0	0	0
New Mexico		+		0	1/2
New York	7	18/34	0	0	1
North Carolina					
North Dakota	0	0		0	0
Ohio	0	44		0	0
Oklahoma	0	0	0	0	0
Oregon	6	154	0	2	0
Pennsylvania	2	40/57	0	0	1
Rhode Island					
South Carolina	2	0			
South Dakota	0	2/17	0	1	3/9
Tennessee	0	151/207	0	0	1
Texas	1/6	150/187	0	1/2	11/12
Utah		183		1	0
Vermont	0	0	0	0	0
Virginia		0	1		0
Washington	7/8	214	0	20	0
West Virginia	1	7/72	0	1	0
Wisconsin	2	0	0	0	0
Wyoming		17			2

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 20 August 2009

Species	Pools	Mosquitoes	Positives	MFIR
Aedes abserratus	1	1		
Aedes albopictus	292	1918		
Aedes atlanticus	5	8		
Aedes atropalpus	1	15		
Aedes canadensis canadensis	88	2168		
Aedes cantator	49	447		
Aedes cinereus	2	7		
Aedes grossbecki	3	35		
Aedes japonicus	502	3660		
Aedes sollicitans	24	185		
Aedes sticticus	12	115		
Aedes taeniorhynchus	12	121		
Aedes thibaulti	6	9		
Aedes triseriatus	152	527		
Aedes trivittatus	27	415		
Aedes vexans	109	1631		
Anopheles barberi	4	15		
Anopheles bradleyi	28	530	1	1.887
Anopheles crucians	3	26		
Anopheles punctipennis	99	340		
Anopheles quadrimaculatus	85	1335		
Anopheles walkeri	1	19		
Coquillettidia perturbans	47	534		
Culex erraticus	36	1554		
Culex pipiens	670	16052	3	0.187
Culex restuans	482	5927	1	0.169
Culex salinarius	101	2961		
Culex spp.	2484	106383	80	0.752
Culex territans	28	80		
Culiseta inornata	1	2		
Culiseta melanura	344	3628	1	0.276
Culiseta morsitans	1	3		
Orthopodomyia signifera	1	1		
Psorophora ciliata	2	4		
Psorophora columbiae	3	7		
Psorophora ferox	19	205		
Uranotaenia sapphirina	1	14		
State Total	**5725**	**150,882**	**86**	**0.570**

Remarks: The number of pools positive for West Nile virus has increased from 63 to 84. Infected pools continue to be primarily from ornithophilic species: *Culex and Culiseta*. However, two horse cases have occurred (see below). Molaei and Andreadis (2006 Identification of avian- and mammalian-derived bloodmeals in *Aedes vexans* and *Culiseta melanura* (Diptera: Culicidae) and its implication for West Nile virus transmission in Connecticut, U.S.A. J. Med Ent: 43(5):1088-1093) found that while *Cs. melanura* was primarily ornithophilic, some bloodmeals were derived from mammals, usually deer and may potentially act as a bridge vector.

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

Two confirmed horse cases for WNV infection have occurred (one in Gloucester and one in Salem counties). The Gloucester horse was also positive for EEE. Both horses appear to have had an uncertain vaccination history. See first page with links regarding the horse cases and vaccination schedules. Two positive Blue Jays (*Cyanocitta cristata*) in Ocean County and one American Crow (*Corvus brachyrhynchos*) in Monmouth County have been detected with WNV infection to date.

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
84 / 4967 (1.7%)	388 / 4951 (7.8%)
2009 Positive Birds to date / Total Birds Submitted	This time last year* * 2008 started later (at least one month) last year than in 2009
3 / 63 (4.7%)	21 / 120 (17.5%)

WNV Results by County through 25 August 2009

County	Species	Pools	Mosquitoes	Positives	MFIR
Atlantic		**148**	**3609**	**1**	**0.277**
	Aedes albopictus	9	115		
	Aedes canadensis canadensis	4	38		
	Aedes cantator	6	140		
	Aedes grossbecki	1	8		
	Aedes japonicus	5	63		
	Aedes sollicitans	3	9		
	Aedes sticticus	2	18		
	Aedes taeniorhynchus	4	27		
	Aedes thibaulti	3	3		
	Aedes triseriatus	2	3		
	Aedes trivittatus	1	4		
	Aedes vexans	13	349		
	Anopheles bradleyi	4	34	1	29.412
	Anopheles punctipennis	4	7		
	Anopheles quadrimaculatus	3	5		
	Culex erraticus	1	3		
	Culex restuans	2	5		
	Culex salinarius	2	37		
	Culex spp.	61	2652		
	Culex territans	1	1		
	Culiseta melanura	16	86		
	Psorophora columbiae	1	2		
Bergen		**128**	**9137**	**22**	**2.408**
	Aedes albopictus	1	6		
	Aedes japonicus	4	16		
	Culex spp.	123	9115	22	2.414
Burlington		**325**	**8492**	**10**	**1.178**
	Aedes abserratus	1	1		
	Aedes albopictus	27	154		
	Aedes atlanticus	1	1		
	Aedes atropalpus	1	15		
	Aedes canadensis canadensis	20	958		
	Aedes cantator	6	67		

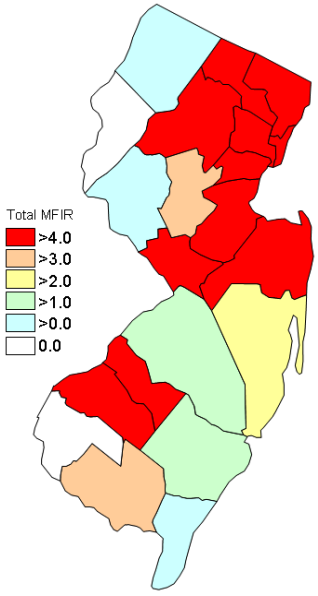
	Aedes cinereus	1	6		
	Aedes grossbecki	1	26		
	Aedes japonicus	25	131		
	Aedes sollicitans	3	38		
	Aedes sticticus	2	85		
	Aedes taeniorhynchus	3	54		
	Aedes triseriatus	11	52		
	Aedes trivittatus	2	9		
	Aedes vexans	22	734		
	Anopheles barberi	1	1		
	Anopheles bradleyi	6	282		
	Anopheles crucians	1	5		
	Anopheles punctipennis	9	29		
	Anopheles quadrimaculatus	3	11		
	Coquillettidia perturbans	16	244		
	Culex erraticus	1	4		
	Culex pipiens	1	75		
	Culex restuans	2	4		
	Culex salinarius	6	168		
	Culex spp.	92	4126	10	2.424
	Culex territans	3	13		
	Culiseta inornata	1	2		
	Culiseta melanura	53	1174		
	Psorophora ciliate	1	1		
	Psorophora columbiae	1	4		
	Psorophora ferox	1	4		
	Uranotaenia sapphirina	1	14		
Camden		**200**	**6003**	**12**	**1.999**
	Aedes albopictus	14	44		
	Aedes japonicus	24	59		
	Aedes thibaulti	1	1		
	Aedes triseriatus	4	4		
	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.	137	5758	12	2.084
	Culex territans	1	1		
	Culiseta melanura	4	11		
	Orthopodomyia signifera	1	1		
Cape May		**1435**	**24997**	**4**	**0.160**
	Aedes albopictus	52	178		
	Aedes canadensis canadensis	4	37		
	Aedes cantator	6	20		
	Aedes japonicus	147	595		
	Aedes sollicitans	9	109		
	Aedes taeniorhynchus	3	20		
	Aedes triseriatus	42	141		
	Aedes vexans	1	1		

	Anopheles bradleyi	9	120		
	Anopheles punctipennis	5	19		
	Anopheles quadrimaculatus	30	1059		
	Coquillettidia perturbans	2	27		
	Culex erraticus	24	1252		
	Culex pipiens	313	5873	2	0.341
	Culex restuans	300	3912	1	0.256
	Culex salinarius	59	2489		
	Culex spp.	329	7992		
	Culex territans	7	29		
	Culiseta melanura	93	1124	1	0.890
Cumberland		**64**	**1538**		
	Aedes albopictus	3	16		
	Aedes cantator	1	15		
	Aedes japonicas	8	56		
	Anopheles punctipennis	1	1		
	Anopheles quadrimaculatus	1	3		
	Culex erraticus	1	9		
	Culex pipiens	6	150		
	Culex restuans	2	6		
	Culex spp.	36	1227		
	Culex territans	1	1		
	Culiseta melanura	4	54		
Essex		**198**	**3363**	**1**	**0.297**
	Aedes albopictus	12	41		
	Aedes japonicus	18	110		
	Aedes sticticus	1	1		
	Aedes triseriatus	12	23		
	Aedes trivittatus	3	26		
	Aedes vexans	11	31		
	Anopheles punctipennis	5	10		
	Anopheles quadrimaculatus	4	11		
	Coquillettidia perturbans	3	5		
	Culex spp.	124	3063	1	0.326
	Psorophora ciliata	1	3		
	Psorophora ferox	4	39		
Gloucester		**445**	**10853**	**1**	**0.092**
	Aedes albopictus	30	405		
	Aedes atlanticus	1	1		
	Aedes canadensis canadensis	2	2		
	Aedes japonicus	44	433		
	Aedes thibaulti	1	4		
	Aedes triseriatus	2	2		
	Aedes trivittatus	1	75		
	Aedes vexans	8	60		
	Anopheles barberi	2	13		
	Anopheles crucians	2	21		
	Anopheles punctipennis	18	116		
	Anopheles quadrimaculatus	22	75		
	Anopheles walkeri	1	19		

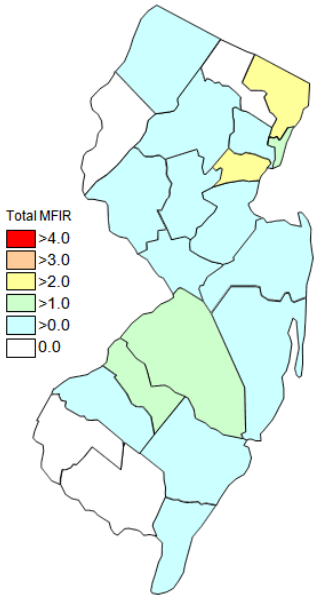
	Coquillettidia perturbans	2	2		
	Culex pipiens	242	9185	1	0.109
	Culex restuans	18	106		
	Culex salinarius	1	1		
	Culex territans	4	9		
	Culiseta melanura	44	324		
Hudson		**148**	**8031**	**12**	**1.494**
	Culex spp.	148	8031	12	1.494
Hunterdon		**182**	**9026**	**2**	**0.222**
	Aedes albopictus	1	45		
	Culex spp.	181	8981	2	0.223
Mercer		**361**	**6105**	**1**	**0.164**
	Aedes albopictus	29	73		
	Aedes japonicus	47	109		
	Aedes triseriatus	7	9		
	Culex erraticus	1	1		
	Culex pipiens	83	596		
	Culex restuans	117	1576		
	Culex salinarius	5	5		
	Culex spp.	72	3736	1	0.268
Middlesex		**261**	**12645**	**6**	**0.474**
	Aedes albopictus	7	45		
	Aedes japonicus	21	314		
	Aedes triseriatus	1	6		
	Culex spp.	232	12280	6	0.489
Monmouth		**421**	**4127**	**1**	**0.242**
	Aedes albopictus	34	183		
	Aedes canadensis canadensis	19	168		
	Aedes cantator	11	52		
	Aedes japonicus	28	209		
	Aedes sollicitans	2	3		
	Aedes thibaulti	1	1		
	Aedes triseriatus	18	75		
	Aedes trivittatus	6	6		
	Aedes vexans	13	74		
	Anopheles barberi	1	1		
	Anopheles punctipennis	18	54		
	Anopheles quadrimaculatus	6	13		
	Coquillettidia perturbans	5	13		
	Culex erraticus	2	15		
	Culex pipiens	14	21		
	Culex restuans	24	42		
	Culex spp.	123	2604	1	0.384
	Culex territans	9	24		
	Culiseta melanura	84	550		
	Psorophora ferox	3	19		
Morris		**134**	**5718**	**2**	**0.350**

	Aedes japonicus	19	334		
	Aedes triseriatus	3	26		
	Culex spp.	112	5358	2	0.373
Ocean		**420**	**8671**	**1**	**0.115**
	Aedes albopictus	47	536		
	Aedes atlanticus	3	6		
	Aedes canadensis canadensis	36	937		
	Aedes cantator	19	153		
	Aedes cinereus	1	1		
	Aedes grossbecki	1	1		
	Aedes japonicus	46	322		
	Aedes sollicitans	6	25		
	Aedes sticticus	6	10		
	Aedes taeniorhynchus	2	20		
	Aedes triseriatus	25	88		
	Aedes trivittatus	5	15		
	Aedes vexans	32	178		
	Anopheles bradleyi	9	94		
	Anopheles punctipennis	14	18		
	Anopheles quadrimaculatus	1	1		
	Coquillettidia perturbans	8	16		
	Culex restuans	5	5		
	Culex salinarius	14	67		
	Culex spp.	117	6063	1	0.165
	Culiseta melanura	15	48		
	Psorophora columbiae	1	1		
	Psorophora ferox	7	66		
Passaic		**77**	**1628**		
	Aedes albopictus	4	34		
	Aedes canadensis canadensis	1	20		
	Aedes japonicus	16	271		
	Aedes triseriatus	4	20		
	Anopheles punctipennis	1	2		
	Culex spp.	51	1281		
Salem		**110**	**2777**		
	Aedes albopictus	6	26		
	Aedes japonicus	5	26		
	Aedes triseriatus	1	1		
	Aedes vexans	2	150		
	Anopheles punctipennis	10	47		
	Anopheles quadrimaculatus	9	146		
	Coquillettidia perturbans	4	128		
	Culex erraticus	6	270		
	Culex restuans	4	79		
	Culex salinarius	2	150		
	Culex spp.	30	1505		
	Culex territans	2	2		
	Culiseta melanura	29	247		
Somerset		**190**	**4704**	**1**	**0.213**

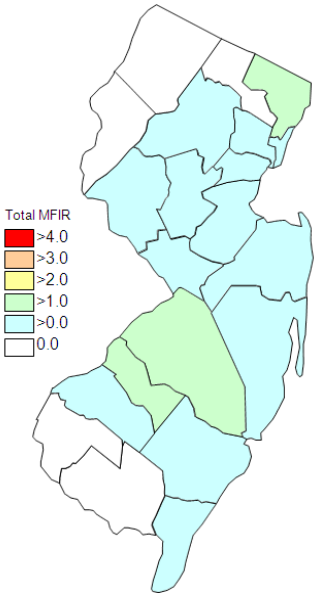
	Aedes albopictus	8	25		
	Aedes canadensis canadensis	2	8		
	Aedes japonicus	27	446		
	Aedes sticticus	1	1		
	Aedes triseriatus	20	77		
	Aedes trivittatus	7	278		
	Aedes vexans	1	5		
	Anopheles punctipennis	9	23		
	Anopheles quadrimaculatus	3	7		
	Coquillettidia perturbans	3	4		
	Culex spp.	108	3827	1	0.261
	Psorophora ferox	1	3		
Sussex		**176**	**4529**	**1**	**0.221**
	Aedes japonicus	3	3		
	Coquillettidia perturbans	3	94		
	Culex pipiens	8	45		
	Culex restuans	6	190		
	Culex salinarius	12	44		
	Culex spp.	141	4140	1	0.242
	Culiseta melanura	2	10		
	Culiseta morsitans	1	3		
Union		**119**	**3930**	**8**	**2.036**
	Aedes albopictus	9	37		
	Aedes japonicus	14	118		
	Aedes sollicitans	1	1		
	Aedes vexans	5	48		
	Anopheles punctipennis	2	6		
	Coquillettidia perturbans	1	1		
	Culex spp.	84	3645	8	2.195
	Psorophora ferox	3	74		
Warren		**183**	**10999**		
	Culex spp.	183	10999		
Grand Total		**5725**	**150,882**	**86**	**0.570**



Cumulative activity in 2008



Activity this year to 25 August 2009



Activity last week, 2009.

Saint Louis Encephalitis (SLE) through 25 August 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		**270**	**7144**		
	Aedes abserratus	1	1		
	Aedes albopictus	27	154		
	Aedes atlanticus	1	1		
	Aedes atropalpus	1	15		
	Aedes canadensis canadensis	8	217		
	Aedes cantator	5	66		
	Aedes cinereus	1	6		
	Aedes japonicus	24	130		
	Aedes sollicitans	3	38		
	Aedes sticticus	1	41		
	Aedes taeniorhynchus	3	54		
	Aedes triseriatus	10	51		
	Aedes trivittatus	2	9		
	Aedes vexans	17	490		
	Anopheles barberi	1	1		
	Anopheles bradleyi	6	282		
	Anopheles crucians	1	5		
	Anopheles punctipennis	7	23		
	Anopheles quadrimaculatus	2	10		
	Coquillettidia perturbans	16	244		
	Culex erraticus	1	4		
	Culex pipiens	1	75		
	Culex restuans	1	3		
	Culex salinarius	6	168		
	Culex spp.	90	4117		
	Culex territans	2	7		
	Culiseta inornata	1	2		
	Culiseta melanura	27	907		
	Psorophora ciliate	1	1		
	Psorophora columbiae	1	4		
	Psorophora ferox	1	4		
	Uranotaenia sapphirina	1	14		
Camden		**119**	**3816**		
	Aedes albopictus	12	36		
	Aedes japonicus	12	36		
	Aedes triseriatus	4	4		
	Aedes vexans	1	1		
	Culex pipiens	2	95		
	Culex spp.	87	3643		
	Orthopodomyia signifera	1	1		
Cape May		**668**	**13935**		
	Aedes cantator	1	2		

	Aedes japonicus	2	22		
	Aedes triseriatus	2	11		
	Anopheles quadrimaculatus	1	1		
	Coquillettidia perturbans	1	19		
	Culex erraticus	2	78		
	Culex pipiens	221	4548		
	Culex restuans	138	1594		
	Culex salinarius	4	25		
	Culex spp.	292	7623		
	Culiseta melanura	4	12		
Essex		**176**	**3256**		
	Aedes albopictus	12	41		
	Aedes japonicus	17	107		
	Aedes sticticus	1	1		
	Aedes triseriatus	9	14		
	Aedes vexans	9	25		
	Anopheles punctipennis	1	1		
	Coquillettidia perturbans	1	1		
	Culex spp.	124	3063		
	Psorophora ferox	2	3		
Hunterdon		**42**	**2100**		
	Culex spp.	42	2100		
Mercer		**343**	**6003**		
	Aedes albopictus	29	73		
	Aedes japonicus	43	105		
	Aedes triseriatus	7	9		
	Culex pipiens	80	585		
	Culex restuans	113	1533		
	Culex salinarius	3	3		
	Culex spp.	68	3695		
Ocean		**2**	**3**		
	Aedes albopictus	1	1		
	Culex spp.	1	2		
Somerset		**22**	**557**		
	Aedes albopictus	1	4		
	Culex spp.	21	553		
Grand Total		**1642**	**36814**		

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

La Crosse Encephalitis (LAC) through 25 August 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 Hygiene 24(5):876-880).

County	Species	Pools	Mosquitoes	Positives	MFIR
Cape May		**200**	**984**		
	Aedes albopictus	43	152		
	Aedes japonicus	108	480		
	Aedes triseriatus	39	129		
	Anopheles bradleyi	1	34		
	Culex pipiens	1	41		
	Culex restuans	1	8		
	Culex salinarius	2	77		
	Culex spp.	5	63		
Passaic		**2**	**17**		
	Aedes triseriatus	2	17		
Grand Total		**202**	**1001**		

Risk Assessment

Our goal for this risk modeling is to implement a multivariate model for the assessment of risk of human WNV cases. This model was developed using both climatic and biotic variables in predicting the number of weekly New Jersey human cases from 2002-2006 data. We began by using greater than 30 variables, eliminating those that did not have an explanatory value toward predicting risk of human cases. Five variables ultimately emerged, including *Culex* MFIR, Spring Rainfall, temperature variations from average, non-*Culex* MFIR values and the percent of dead birds. We were able to account for greater than 75 percent of the variability.

This model lagged variables so as to include the time from being bitten by an infected mosquito to showing symptoms (i.e., incubation time up to 14 days). A good model should make biological sense and this model uses features that one would expect to be important in the transmission of an arbovirus: weather conditions promoting mosquito populations (rain and heat), the infectivity of the enzootic vectors, and indication of other (potential bridge) mosquitoes becoming infected and the consequences to host populations (birds).

GIS Application: Data for all five variables used in the model are retrieved and prepared for GIS use. Because the data points representing the variables are not collected at the same place that pools of mosquitoes are collected, a method must be used to estimate the values of the 5 variables at pool collection points. This is done through 1) mapping the 5 variables into a GIS layer, 2) interpolating the data between known data points for each variable (Figure 1, Spring Rain), and then 3) extracting those points of each variable that correspond to the pool sites (Figure 2) to be included into the model to calculate the risk of human cases, y. We are currently in the process of developing the last of the interpolated maps (the variation in heating).

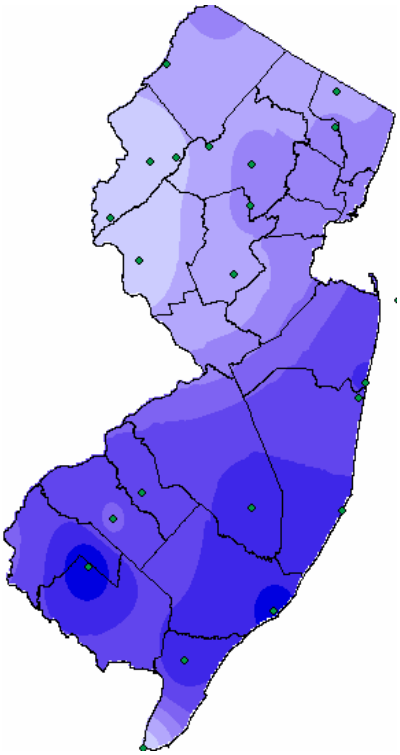
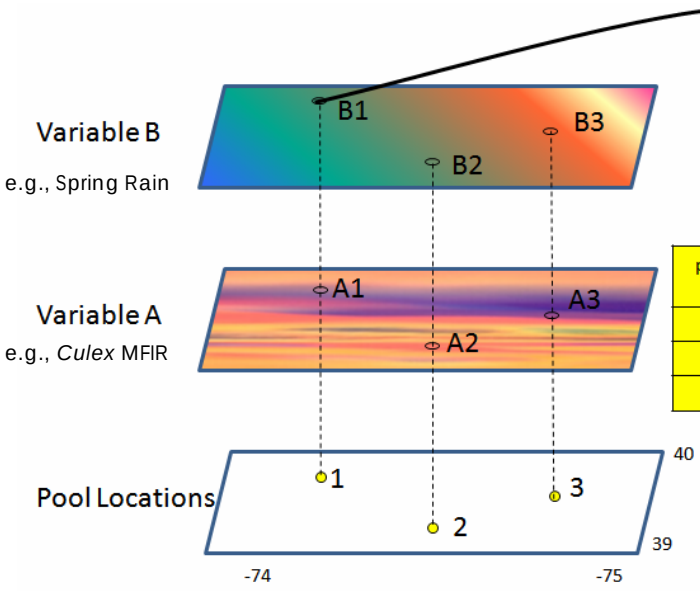


Figure 1. Spring rain amounts interpolated into a GIS layer.



pool	Lat	Long	Extract. Var A	Extract. Var B	Y
1	39.8	-74.3	A1	B1	Calc.
2	39.2	-74.5	A2	B2	Calc.
3	37.7	-74.8	A3	B3	Calc.

Figure 2. Extraction of data points for 2 variables of the model. Extracted points are used in the model to determine potential for human cases y and then mapped as was done with the simple model.

Since we are developing the final variable in the multivariate model for interpolation, we present the last of the simple linear regression model (Figure 3).
Positive pools have been detected in most counties in New Jersey, yet the total number of positive pools as compared to last year is down considerably. Activity is high in Bergen and Camden counties, reflecting their high number of positive *Culex* pools. It should be noted that most of the calculated risk was at the low range, far below a risk potential for a single human case.

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.

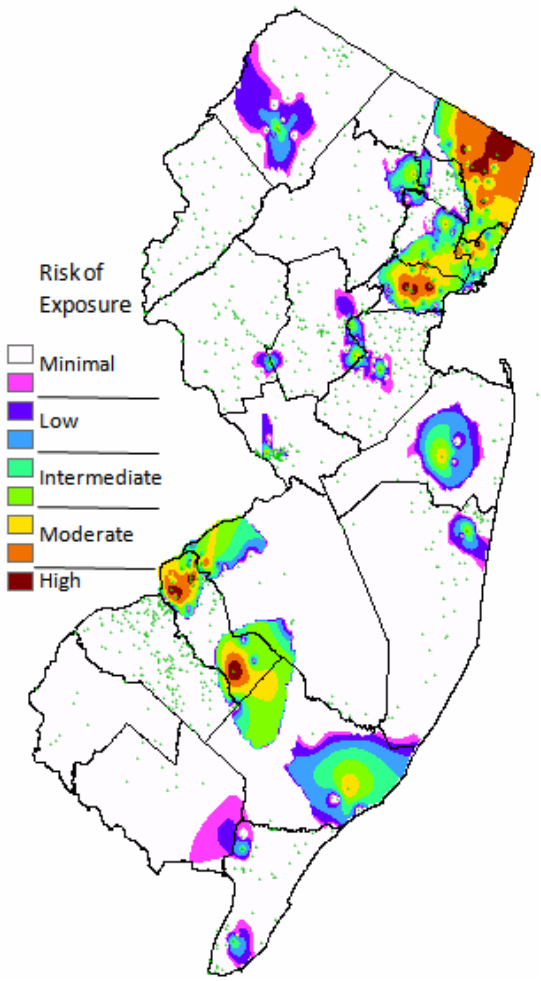


Figure 3. GIS map of risk of human cases based on a linear relationship between cases and MFIR values calculated from all mosquitoes collected. Points represent collected pools.