

The Resurgence of West Nile virus in Chatham County



Robert A. Moulis

The Resurgence of West Nile virus in Chatham County



Chatham County is the northern most coastal county in Georgia.

The Resurgence of West Nile virus in Chatham County



In our area the two most often used traps are CDC light traps (baited with dry ice) and gravid traps (baited with a hay infusion water).

The Resurgence of West Nile virus in Chatham County



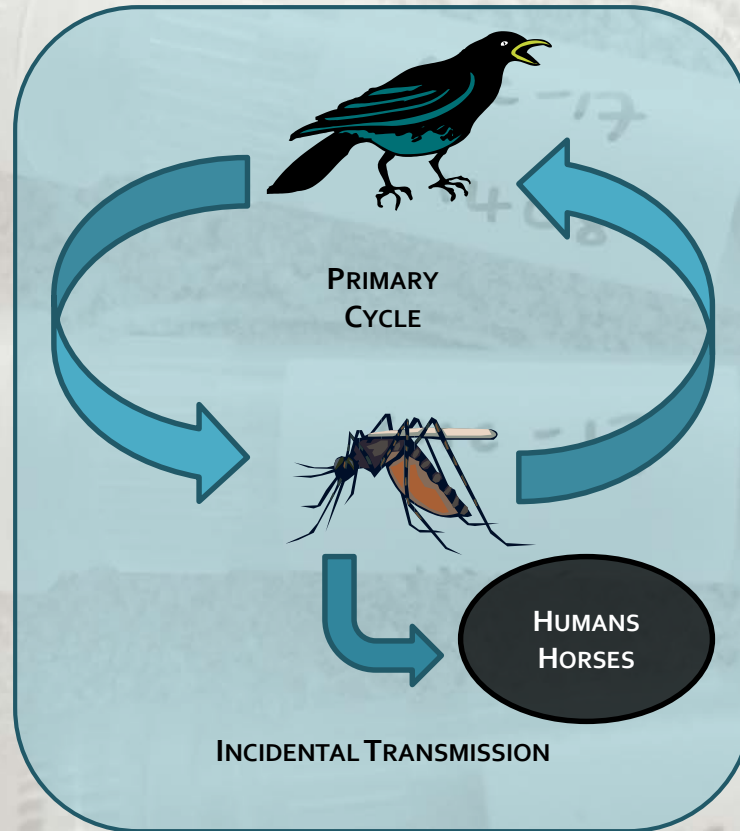
Chatham County Mosquito Control was established in 1957, solely for the control mosquitoes. At this time the two salt marsh mosquitoes were the major nuisance species, and *Aedes aegypti* was the primary container breeder.

The Resurgence of West Nile virus in Chatham County



Although the this area experienced bouts with mosquito borne diseases during the colonial times, little had been reported during the early history of an organized mosquito control.

The Resurgence of West Nile virus in Chatham County



The two most common types of arbovirus currently seen in our area (eastern equine encephalitis and West Nile virus) have similar cycles involving local bird populations serving as a reservoir for these viruses.

The Resurgence of West Nile virus in Chatham County



| DATE | DES # | SPECIES | COUNTY | VIRUS ISOLATION |
|----------|---------|----------------------|---------|-----------------|
| 09/01/01 | 942-01 | Blue Jay | Chatham | WN Virus |
| 10/07/01 | 1328-01 | Northern Mockingbird | Chatham | WN Virus |
| 10/17/01 | 1402-01 | Blue Jay | Chatham | WN Virus |
| 10/23/01 | 1415-01 | Crow | Chatham | WN Virus |
| 10/30/01 | 1451-01 | Hermit Thrush | Chatham | WN Virus |

West Nile virus was first detected in Chatham County during 2001 from dead birds.

The Resurgence of West Nile virus in Chatham County

| Occurrence of West Nile Virus in Chatham County | | | | | | | | | | | | | | | | | |
|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Sample Type | Year | | | | | | | | | | | | | | | | |
| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| Wild Birds | 5 | 24 | 27 | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - |



From 2001 through 2003 dead birds provided us a good deal of information on the presence of West Nile virus within the county. However, as time went on fewer dead birds were reported, and the number of positive birds drastically decreased.

The Resurgence of West Nile virus in Chatham County



Prior to 2001, mosquito borne virus in Chatham County was generally associated with our sentinel chicken program which remains a vital part of our eastern equine encephalitis detection program.

The Resurgence of West Nile virus in Chatham County

| Occurrence of West Nile Virus in Chatham County | | | | | | | | | | | | | | | | | |
|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Sample Type | Year | | | | | | | | | | | | | | | | |
| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| Wild Birds | 5 | 24 | 27 | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - |
| Sentinel Chickens | - | - | 6 | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - |



Because wild birds initially gave us the first reports of WNV in our area, we began to use sentinel chickens in our West Nile work. However, we found chickens to be unreliable in detecting WNV in a timely manner.

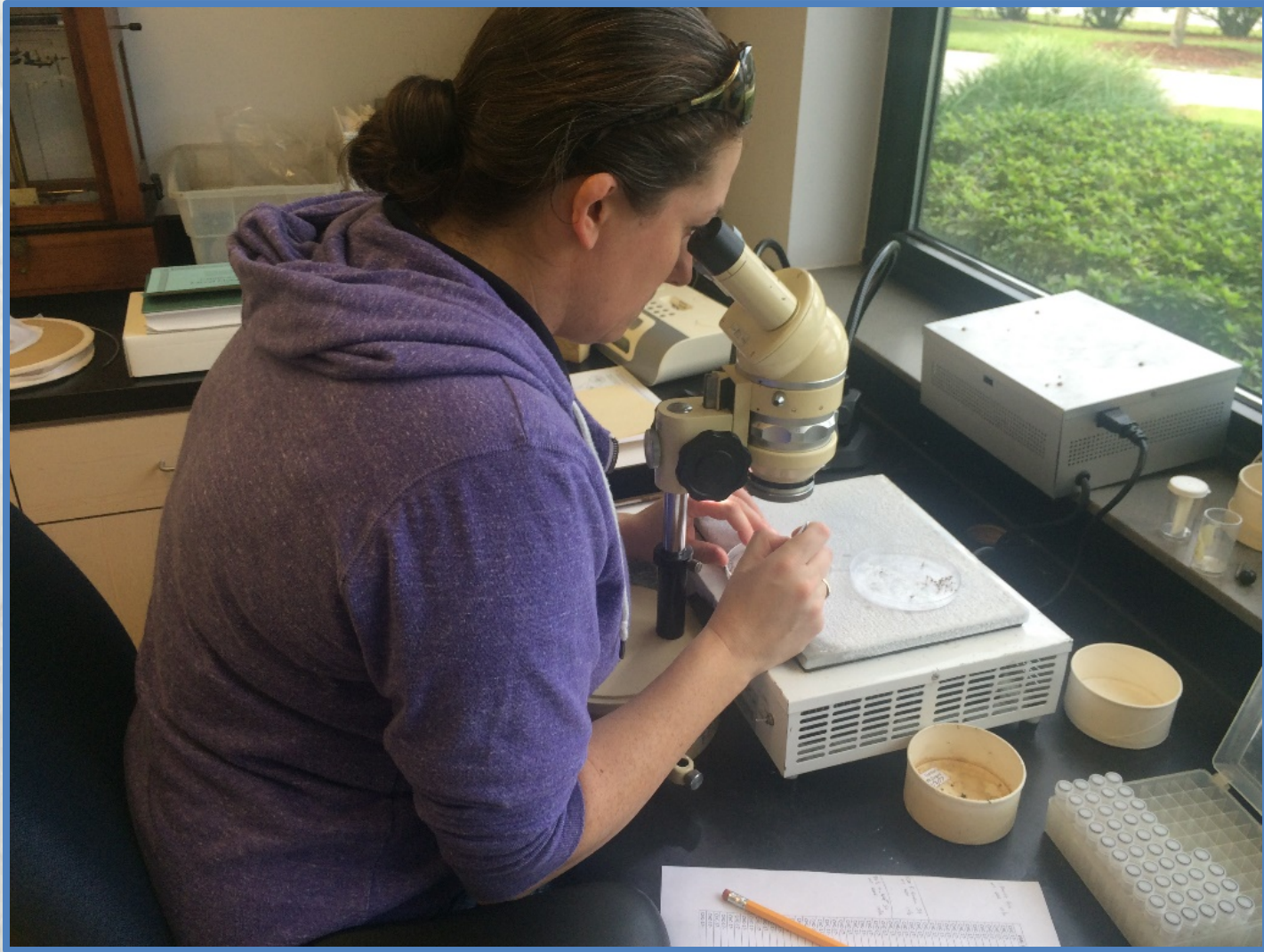
The Resurgence of West Nile virus in Chatham County

| Occurrence of West Nile Virus in Chatham County | | | | | | | | | | | | | | | | | |
|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Sample Type | Year | | | | | | | | | | | | | | | | |
| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| Wild Birds | 5 | 24 | 27 | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - |
| Sentinel Chickens | - | - | 6 | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - |
| Horses | - | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



Horse cases of West Nile have also provided little useful data concerning WNV.

The Resurgence of West Nile virus in Chatham County



However, we found that collecting mosquitoes and separating vectors for virus analysis in the lab provides the best information in the most timely manner

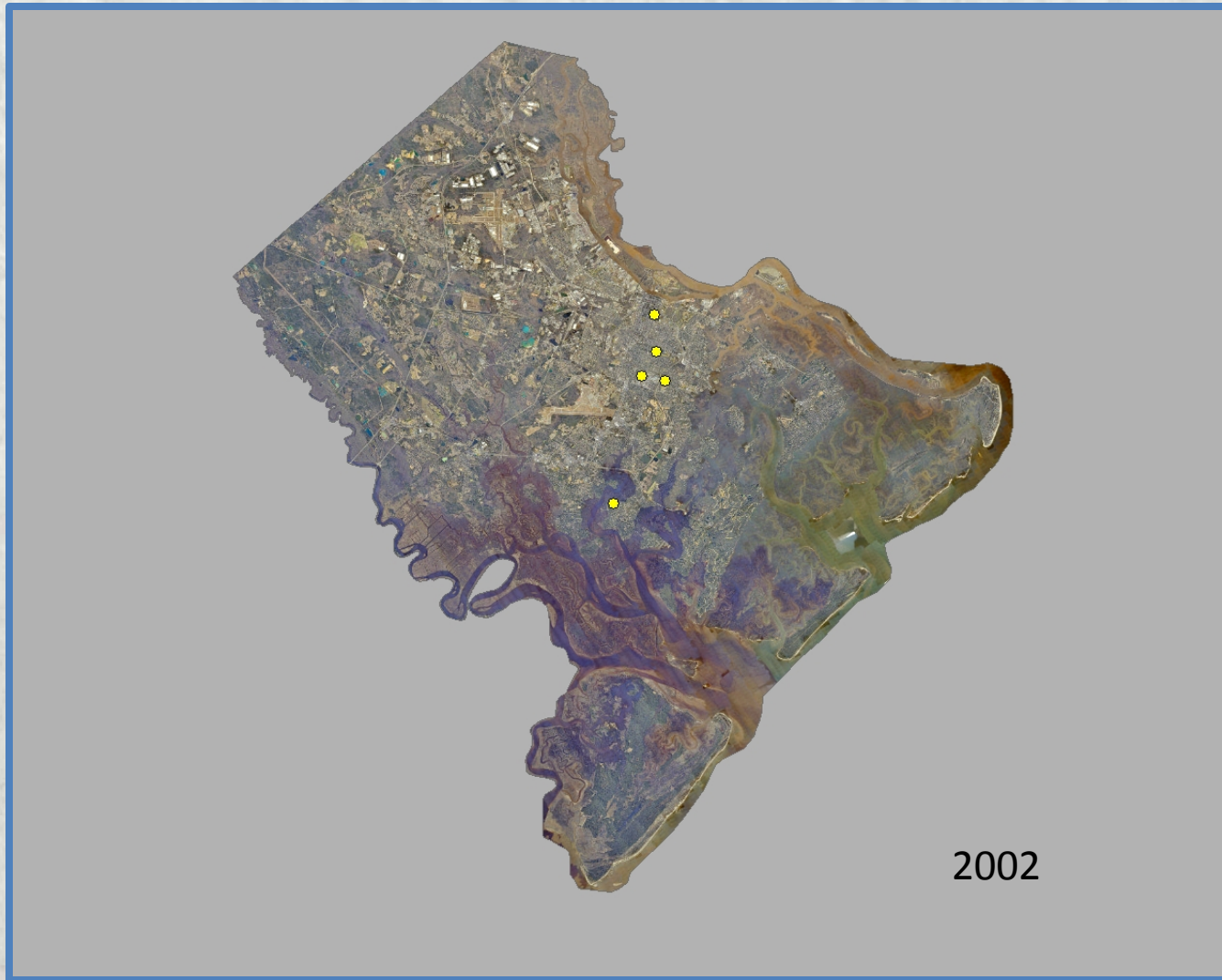
The Resurgence of West Nile virus in Chatham County

| Occurrence of West Nile Virus in Chatham County | | | | | | | | | | | | | | | | | |
|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Sample Type | Year | | | | | | | | | | | | | | | | |
| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| Wild Birds | 5 | 24 | 27 | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - |
| Sentinel Chickens | - | - | 6 | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - |
| Horses | - | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mosquito Pools | - | 9 | 67 | 39 | - | - | 36 | - | - | - | 214 | 38 | 108 | 7 | 1 | - | 92 |



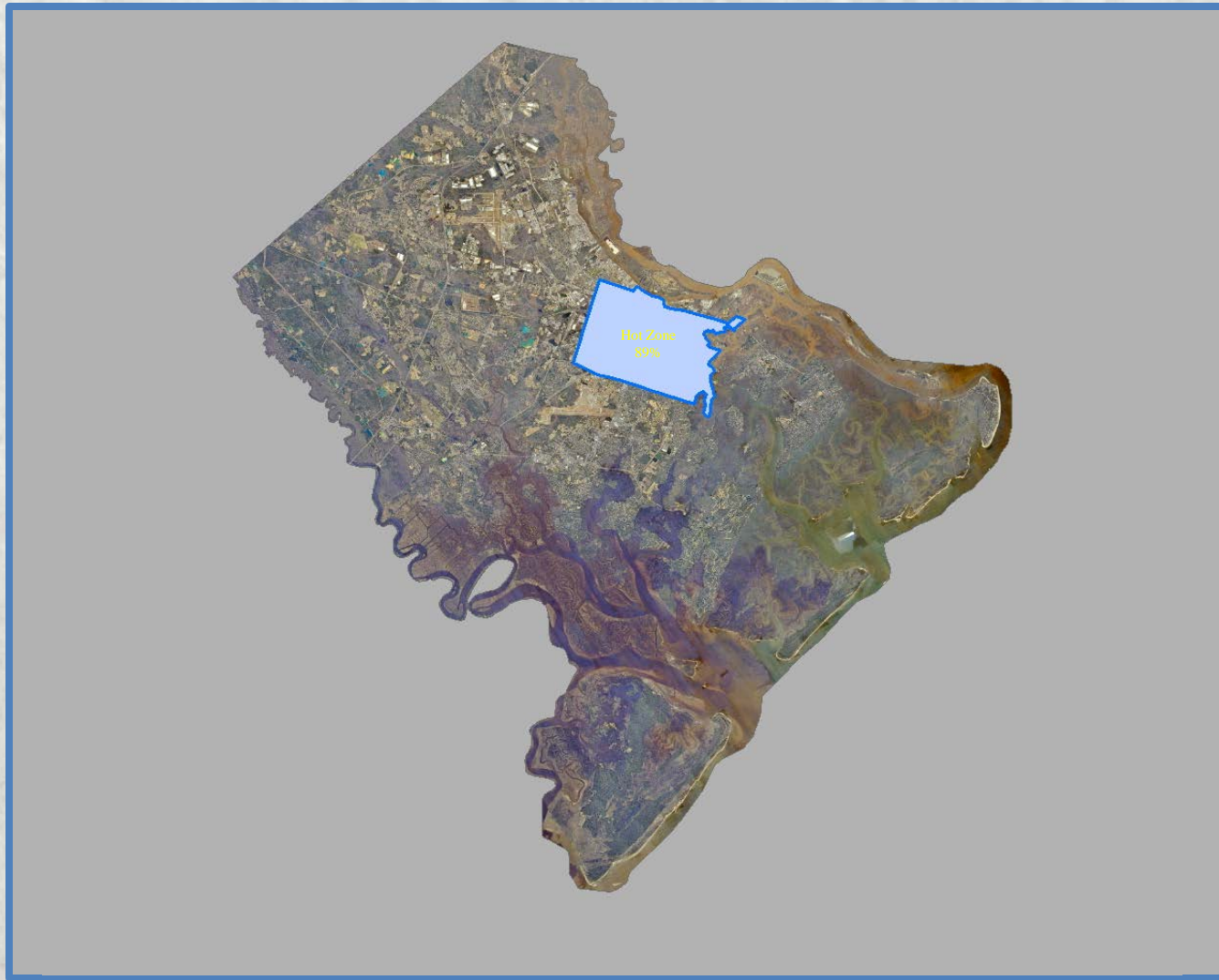
Over time we found that virus detection from mosquito samples gave us the quickest and most useful results.

The Resurgence of West Nile virus in Chatham County



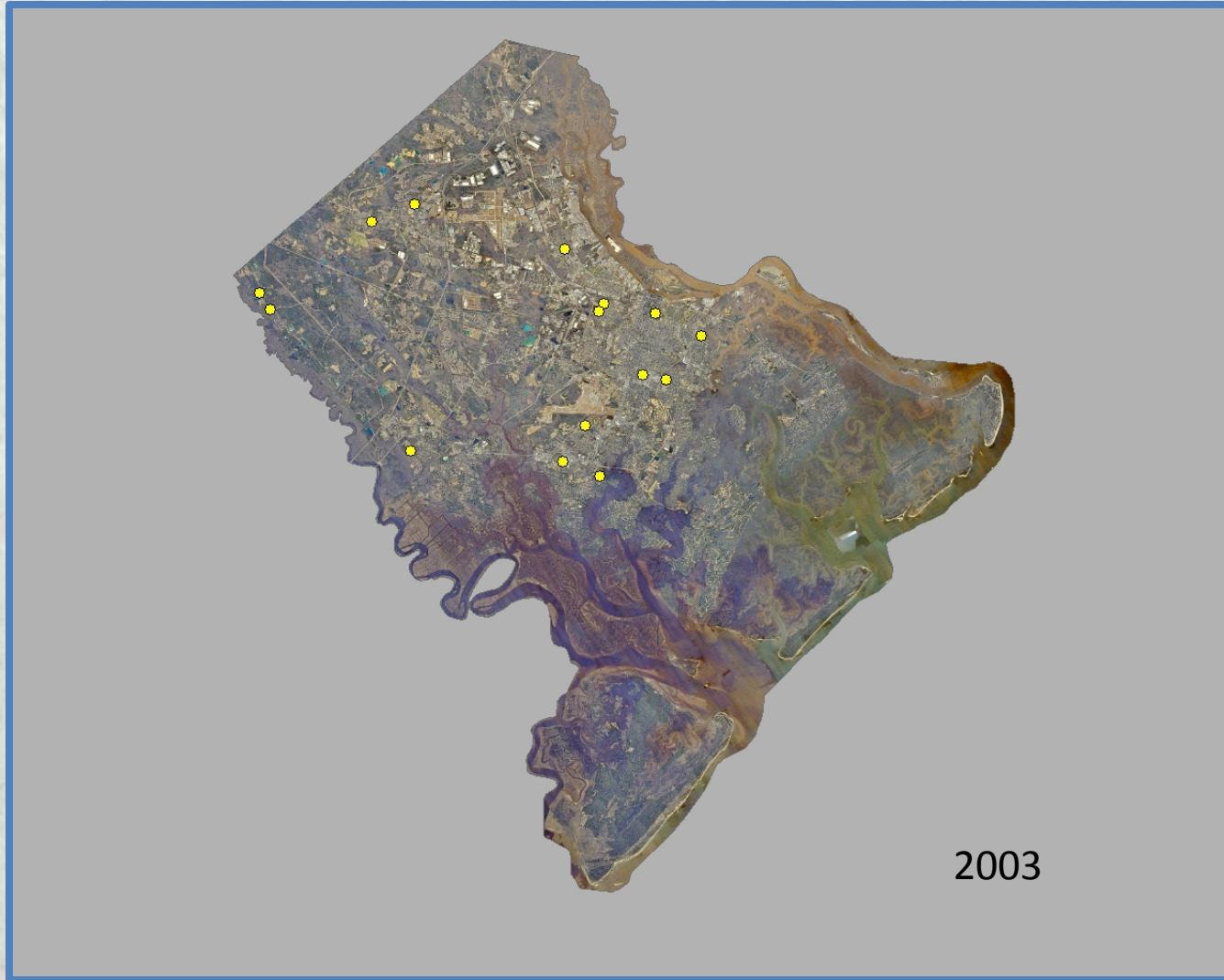
In 2002 all but 1 positive pool was found in the metro Savannah area of the county.

The Resurgence of West Nile virus in Chatham County



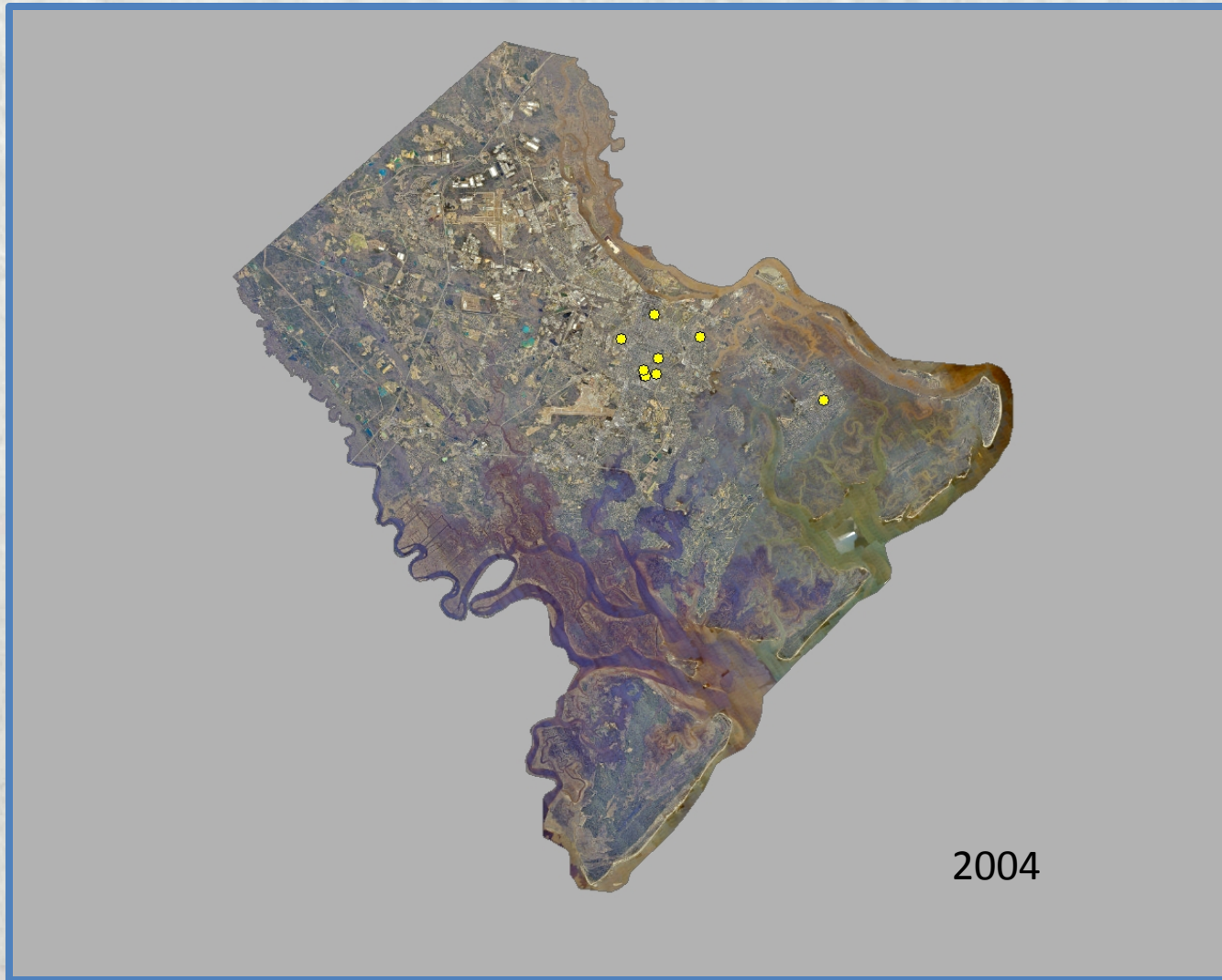
After the 2002 season, we designated the metro Savannah area as our “hot spot” for West Nile virus.

The Resurgence of West Nile virus in Chatham County



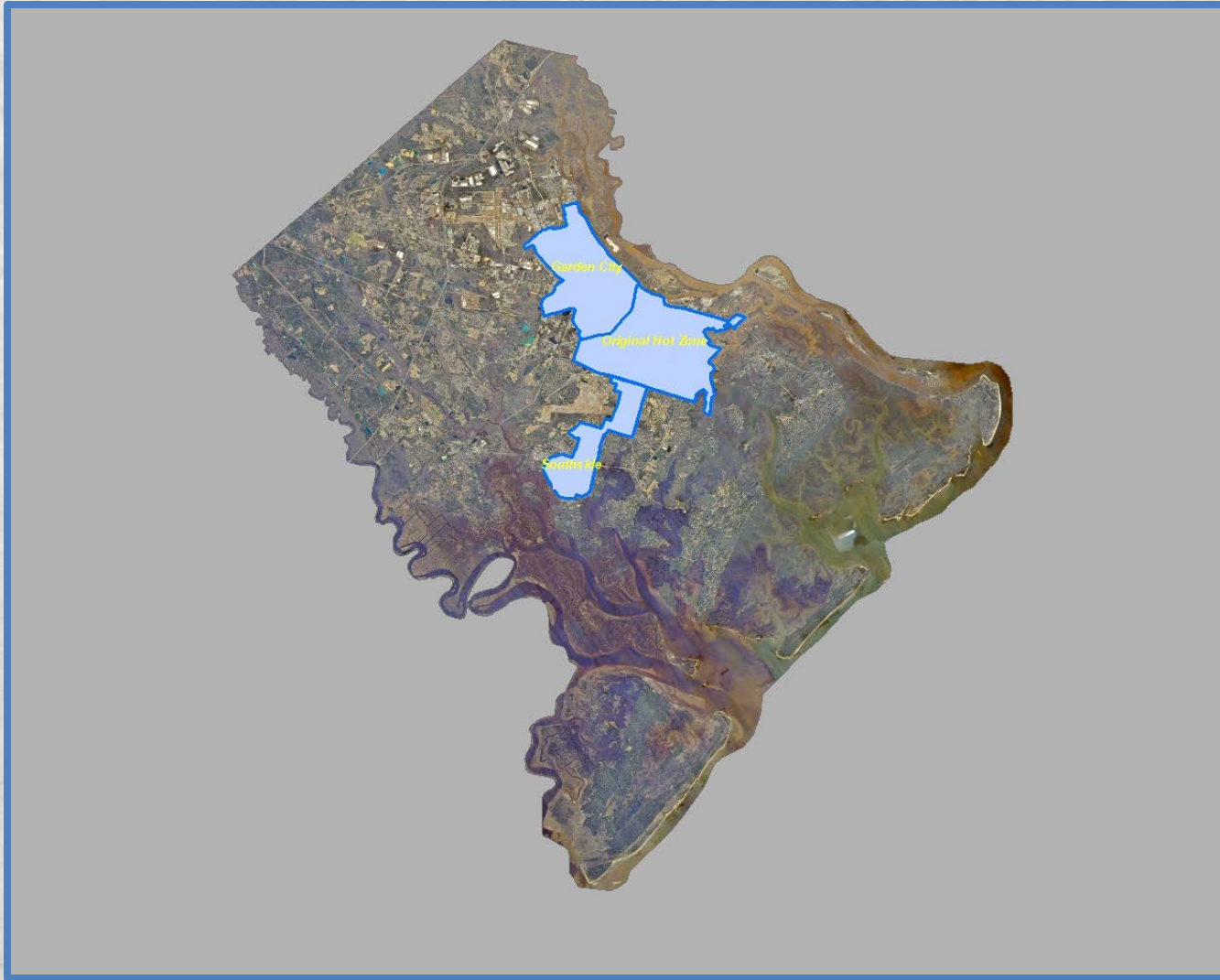
However, in 2003 positive pools were collected at a number of sites outside of the metro Savannah area.

The Resurgence of West Nile virus in Chatham County



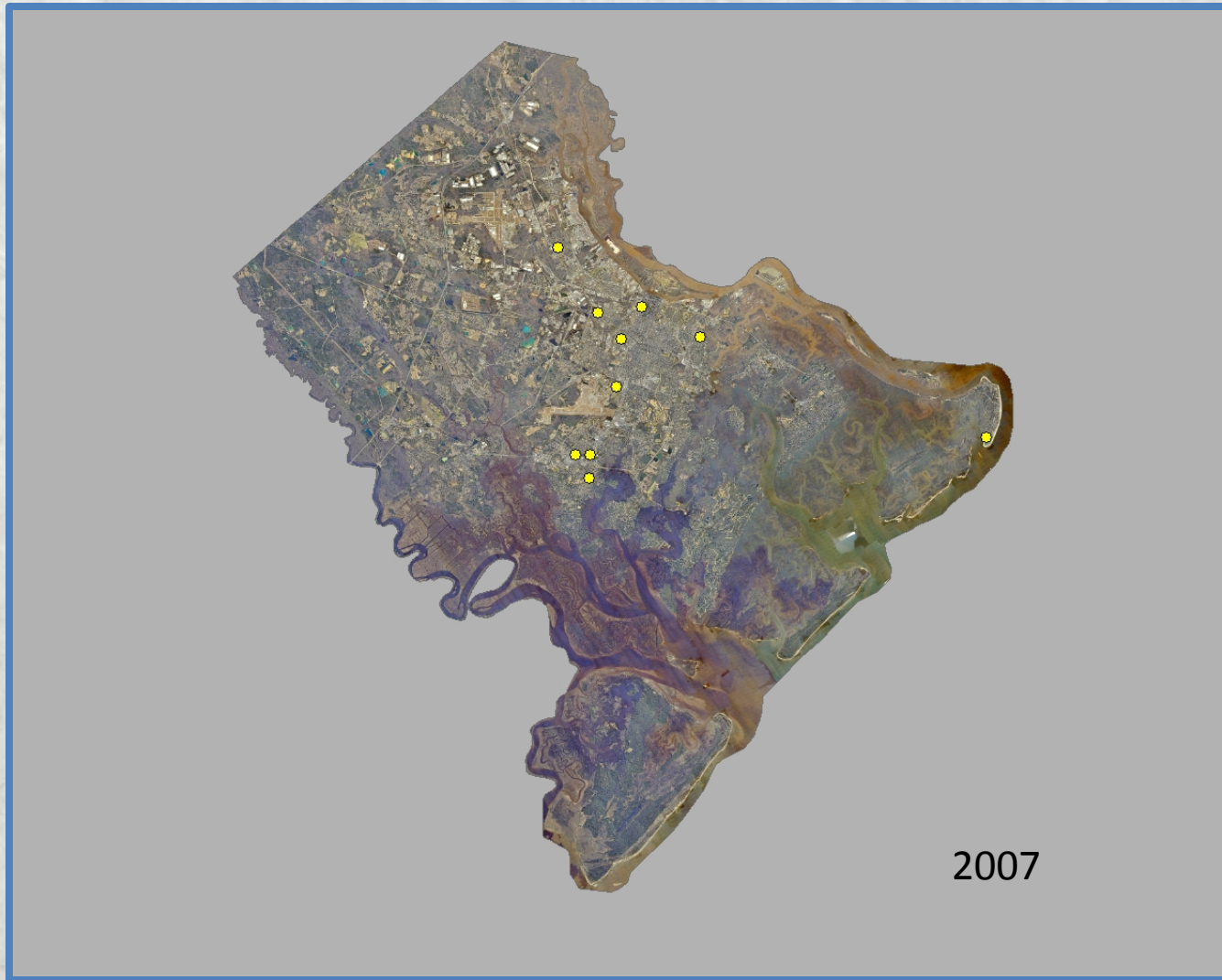
The amount of virus dropped in 2004.

The Resurgence of West Nile virus in Chatham County



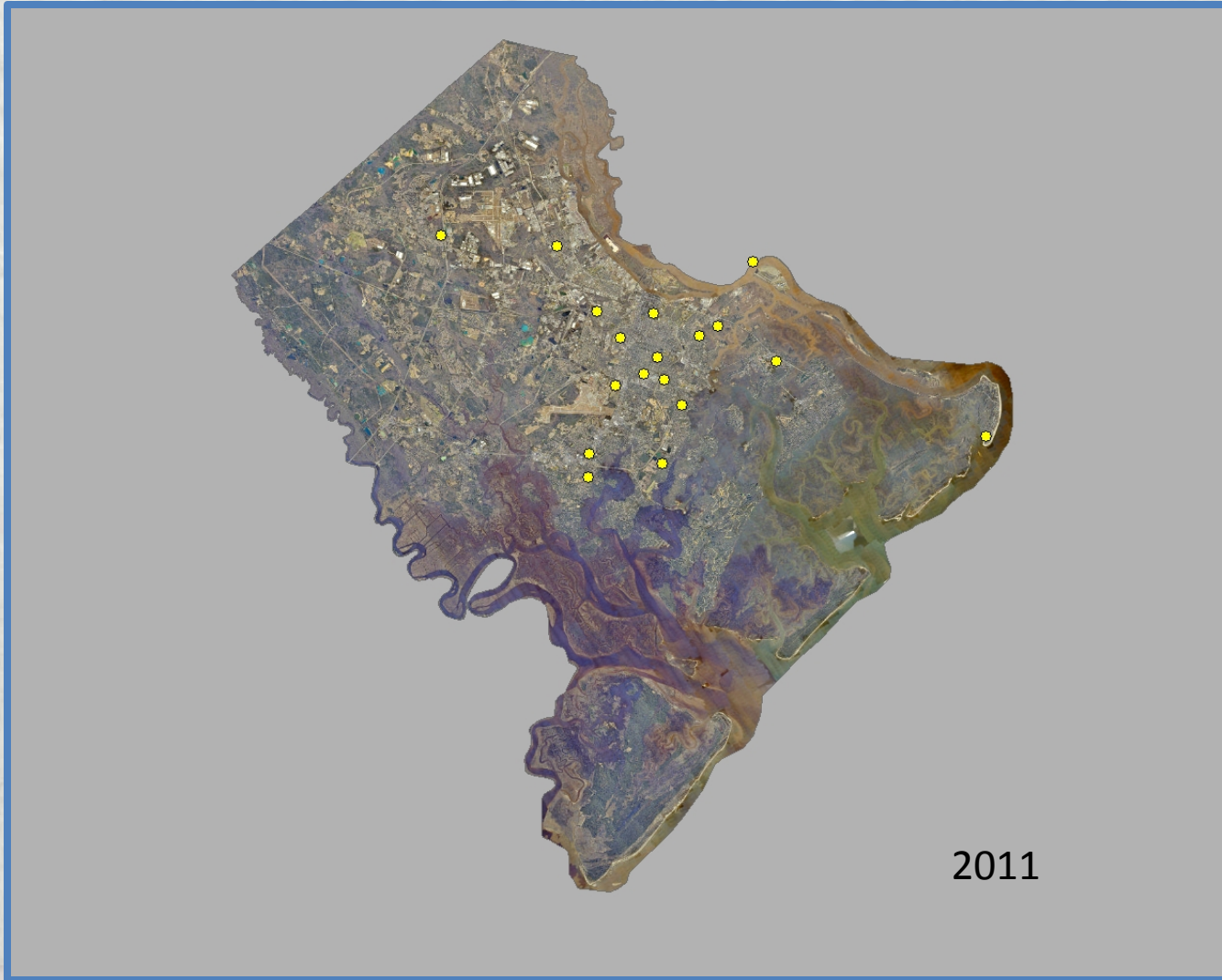
We increased our “hot spot” to include the Garden City area and the Savannah south side.

The Resurgence of West Nile virus in Chatham County



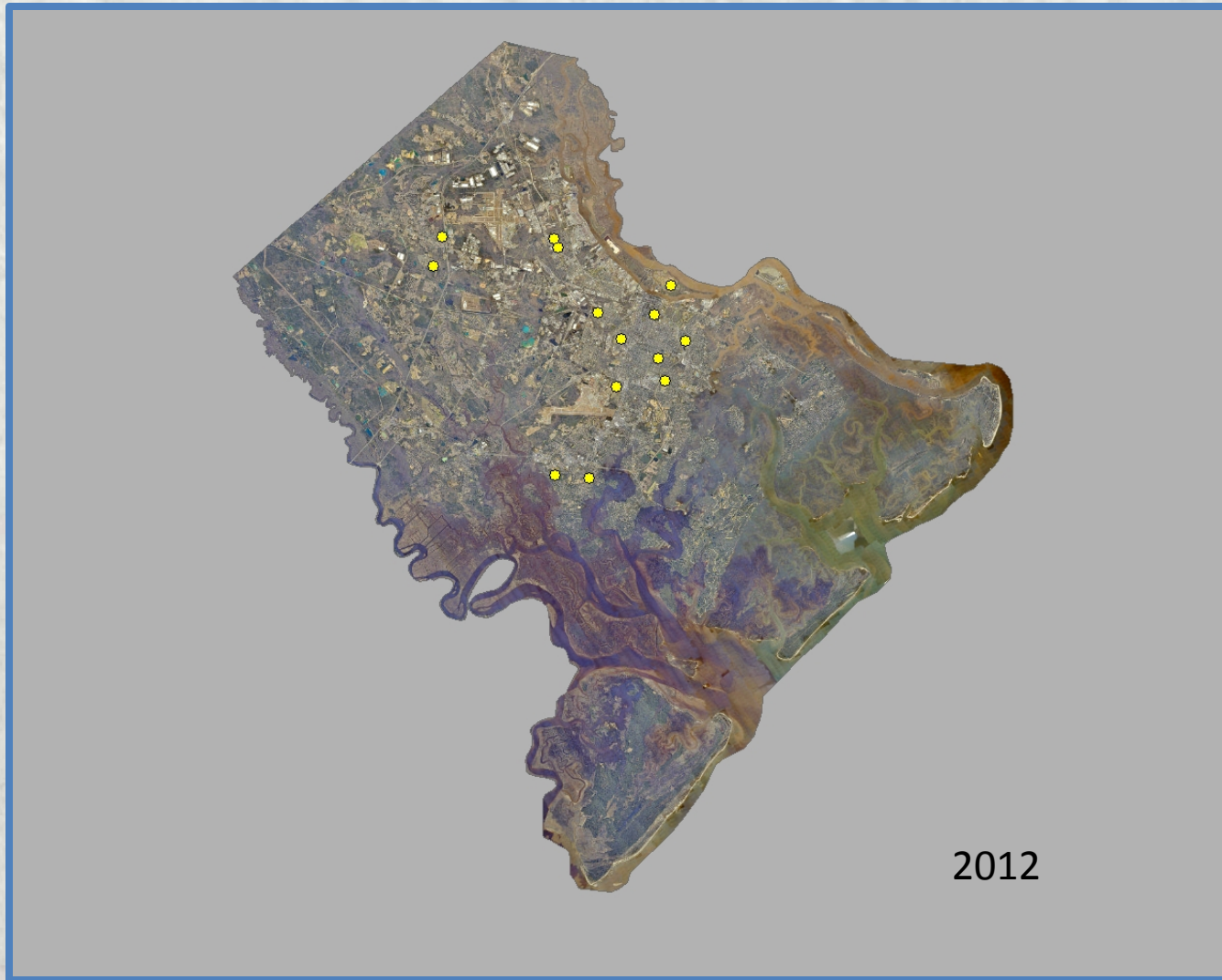
West Nile seemingly disappeared in 2005 and 2006, but returned in 2007.

The Resurgence of West Nile virus in Chatham County



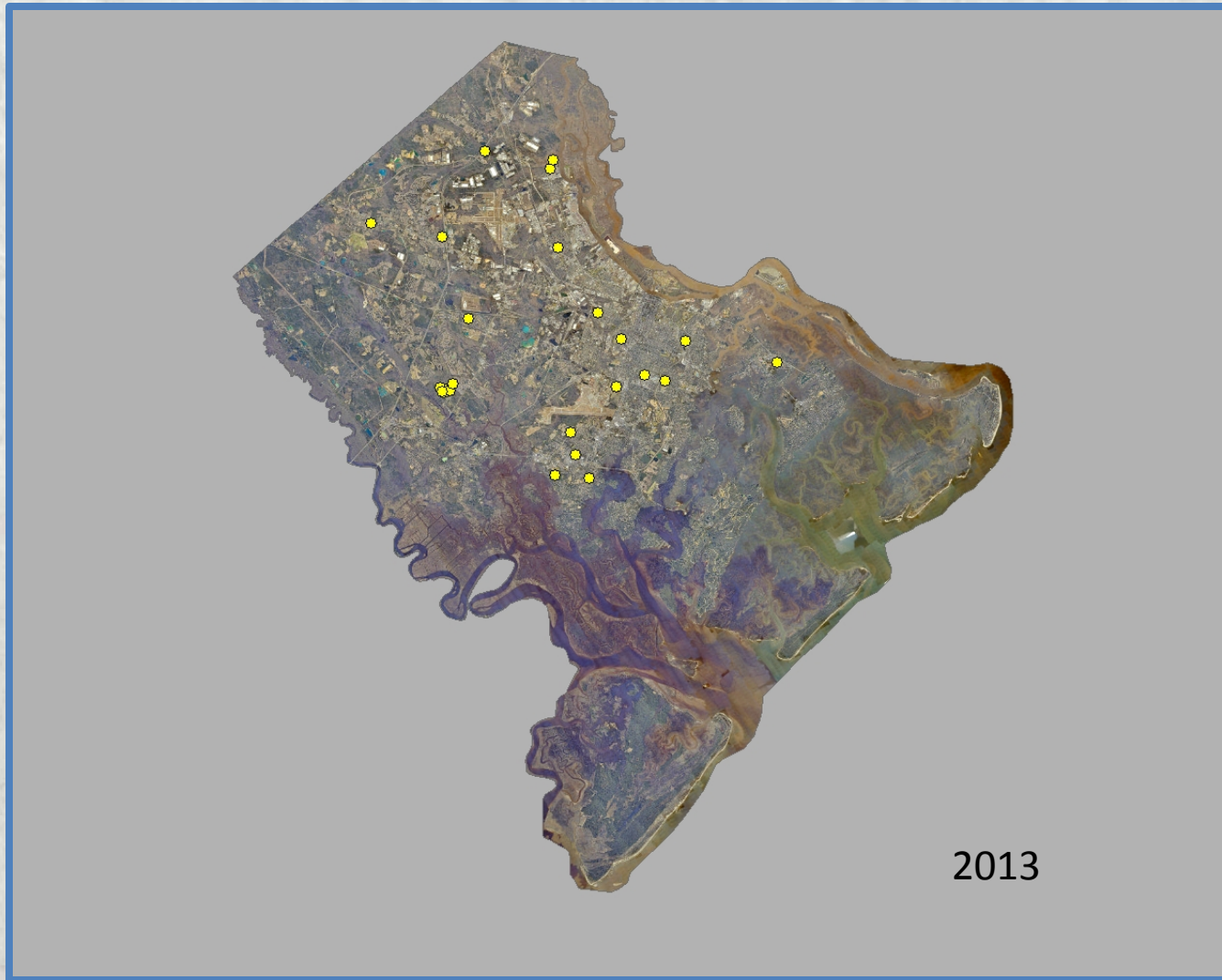
After 2007, we did not detect West Nile until 2011, when 214 positive pools were recorded.

The Resurgence of West Nile virus in Chatham County



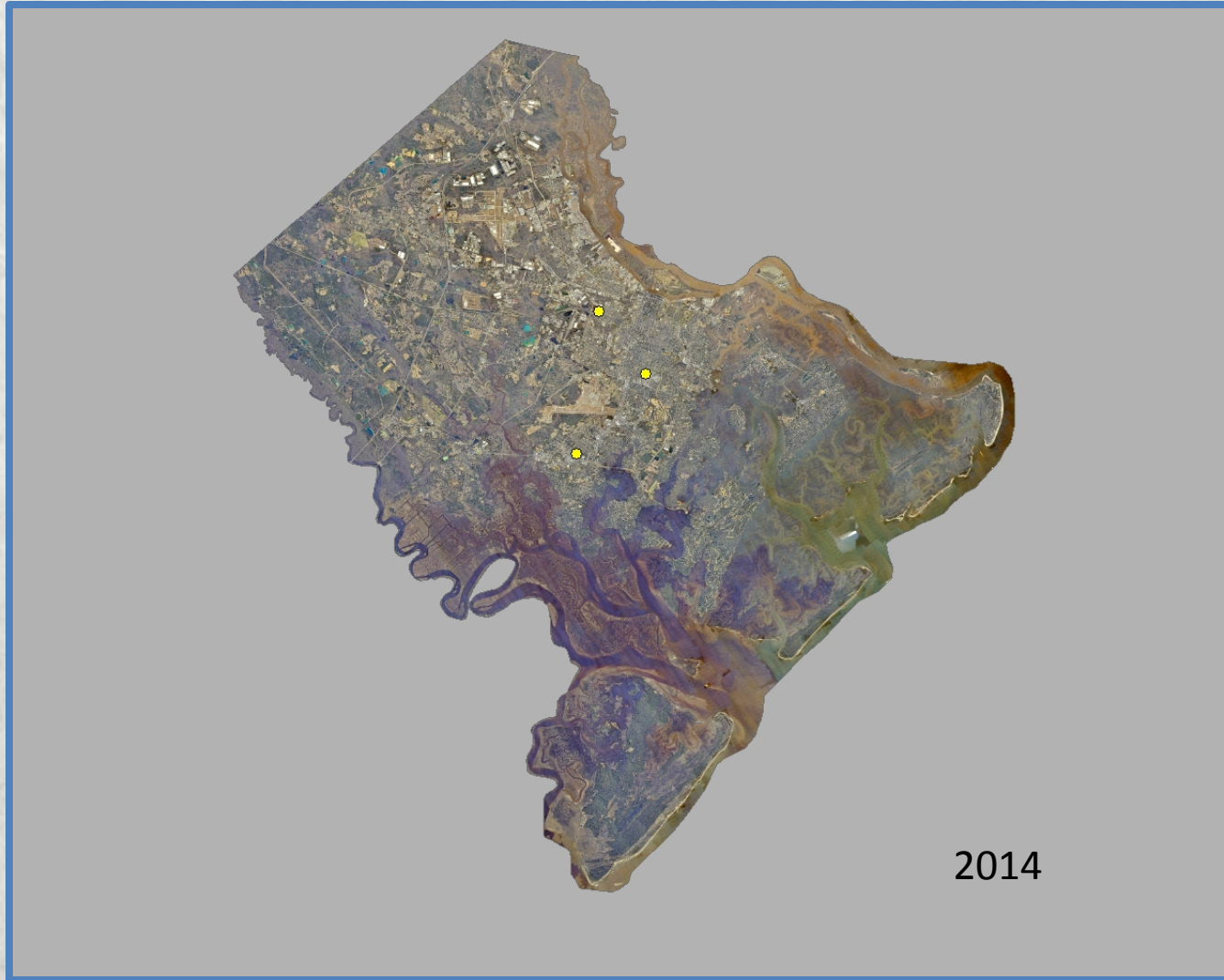
The number of positive pools dropped dramatically in 2012
(x=38).

The Resurgence of West Nile virus in Chatham County



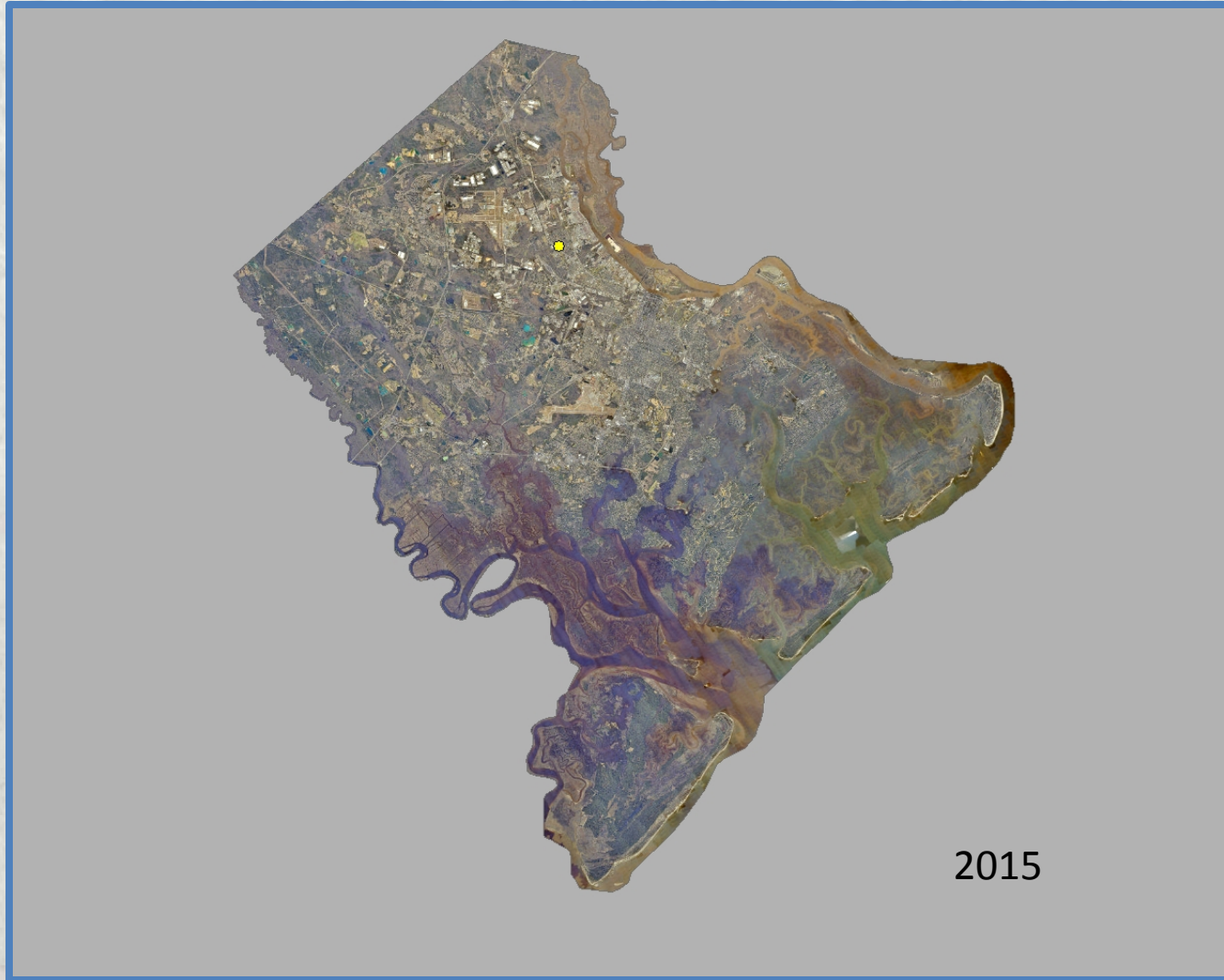
However, in 2013 we again experienced a substantial amount of West Nile ($x=108$).

The Resurgence of West Nile virus in Chatham County



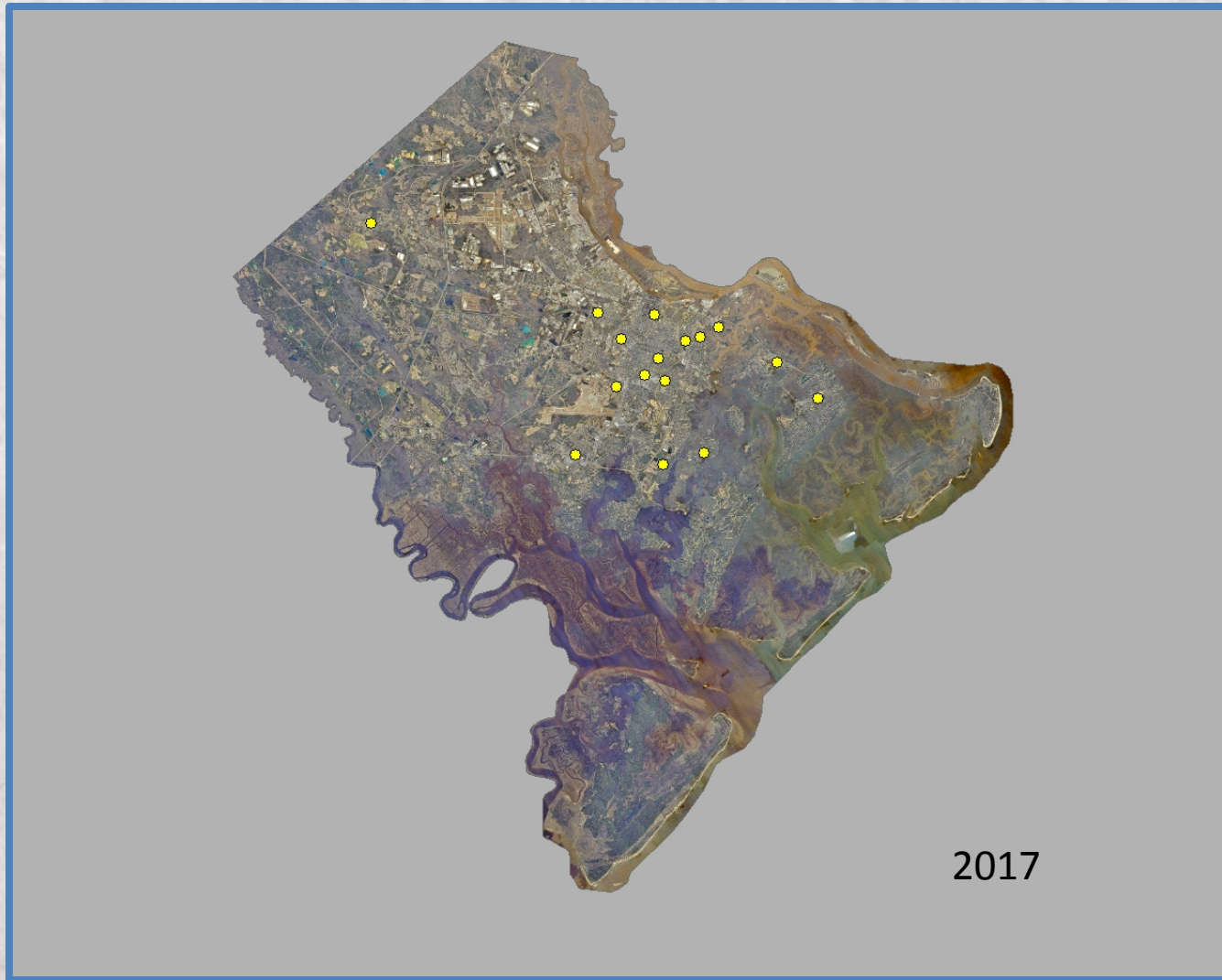
In 2014 very little West Nile was found in the county (7 positive pools from 3 sites).

The Resurgence of West Nile virus in Chatham County



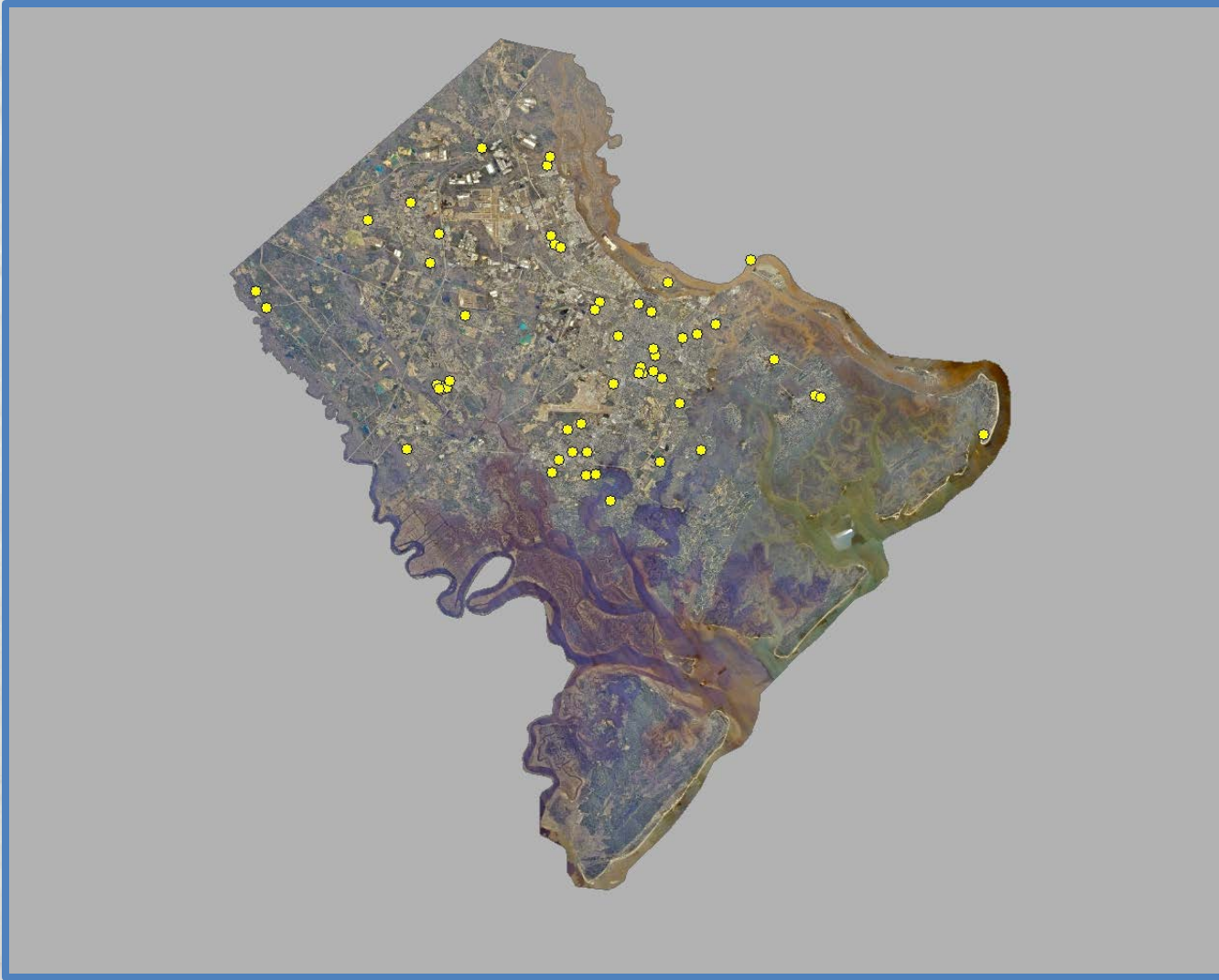
In 2015 only a single positive pool was recorded.

The Resurgence of West Nile virus in Chatham County



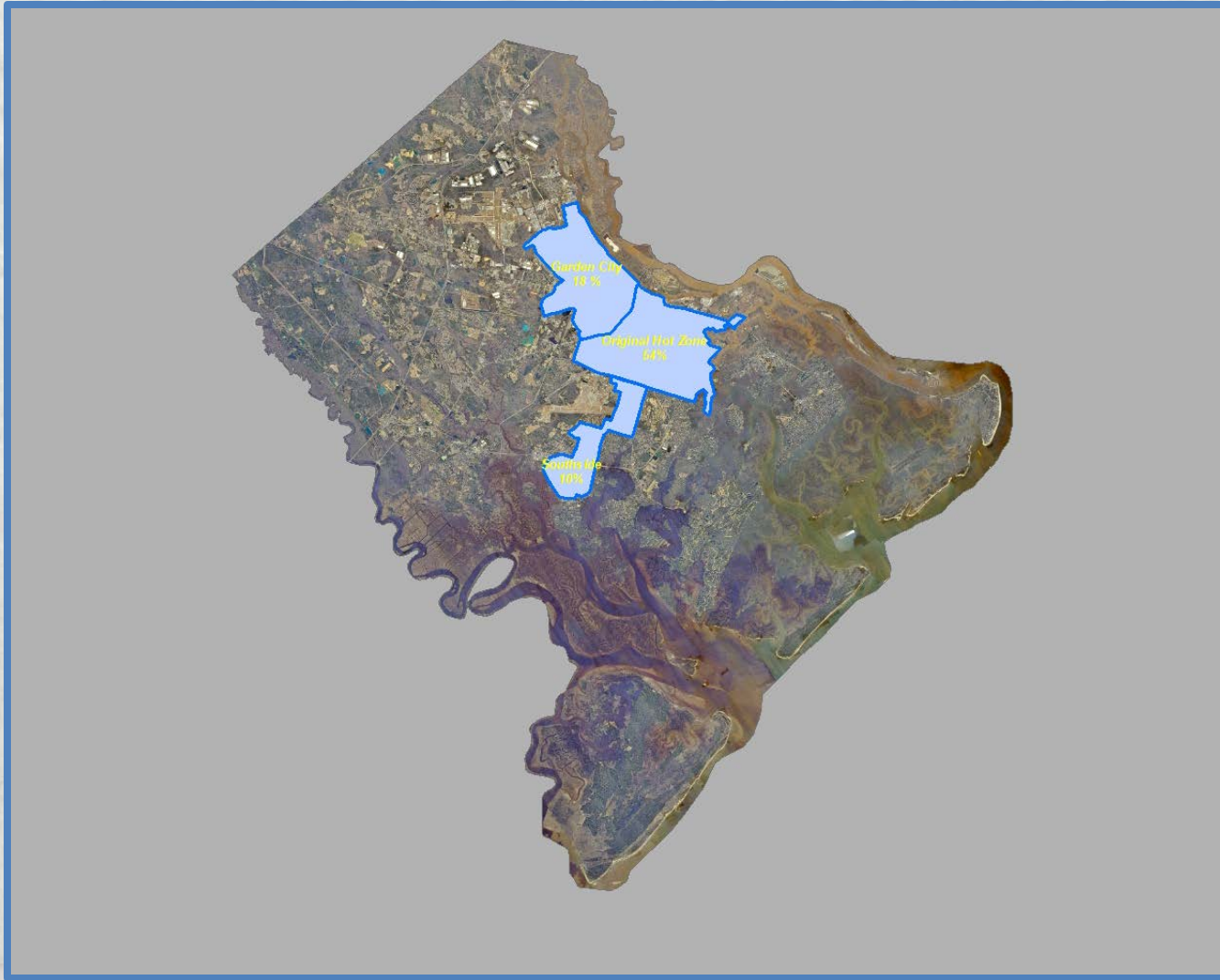
To this point in 2017, 92 positive pools have been recorded from 16 sites.

The Resurgence of West Nile virus in Chatham County



Over 600 positive pools have been recorded from more than 50 sites in Chatham County since 2002

The Resurgence of West Nile virus in Chatham County



Considering all West Nile positive pools as a whole, more than 80% have been collected from our expanded "hot zone."

The Resurgence of West Nile virus in Chatham County



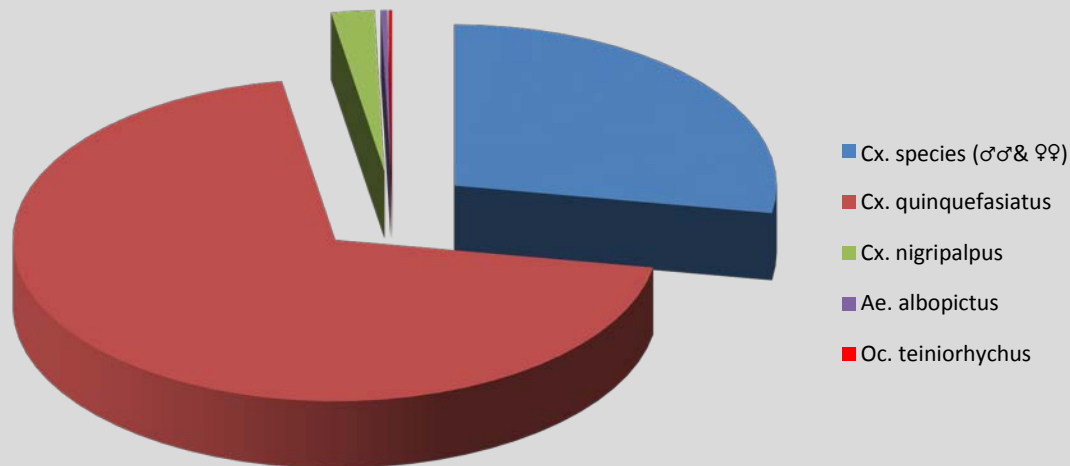
Florida Medical Entomology Laboratory
©1999 UNIVERSITY OF FLORIDA



In our area *Culex quinquefasciatus* is our primary WNV vector, but *Cx. nigripalpus*, *Aedes taeniorhynchus*, & *Ae. albopictus* have been positive for WNV as well

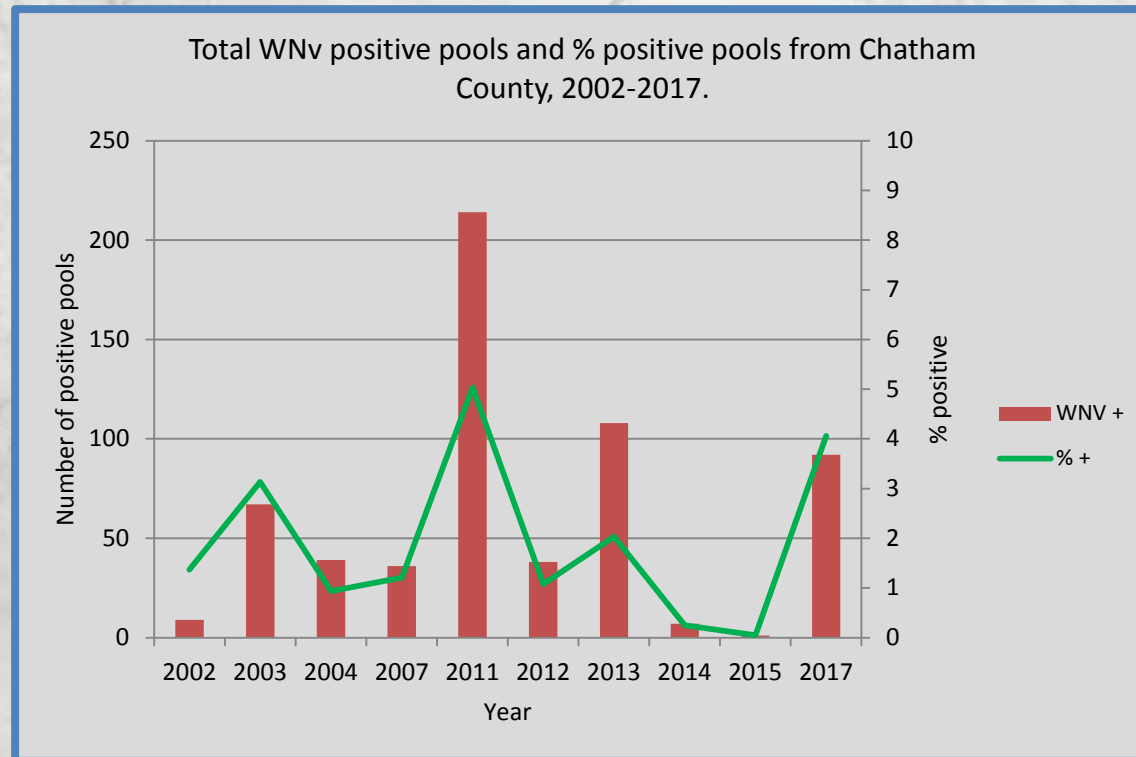
The Resurgence of West Nile virus in Chatham County

Species detected with WNV, 2002-17



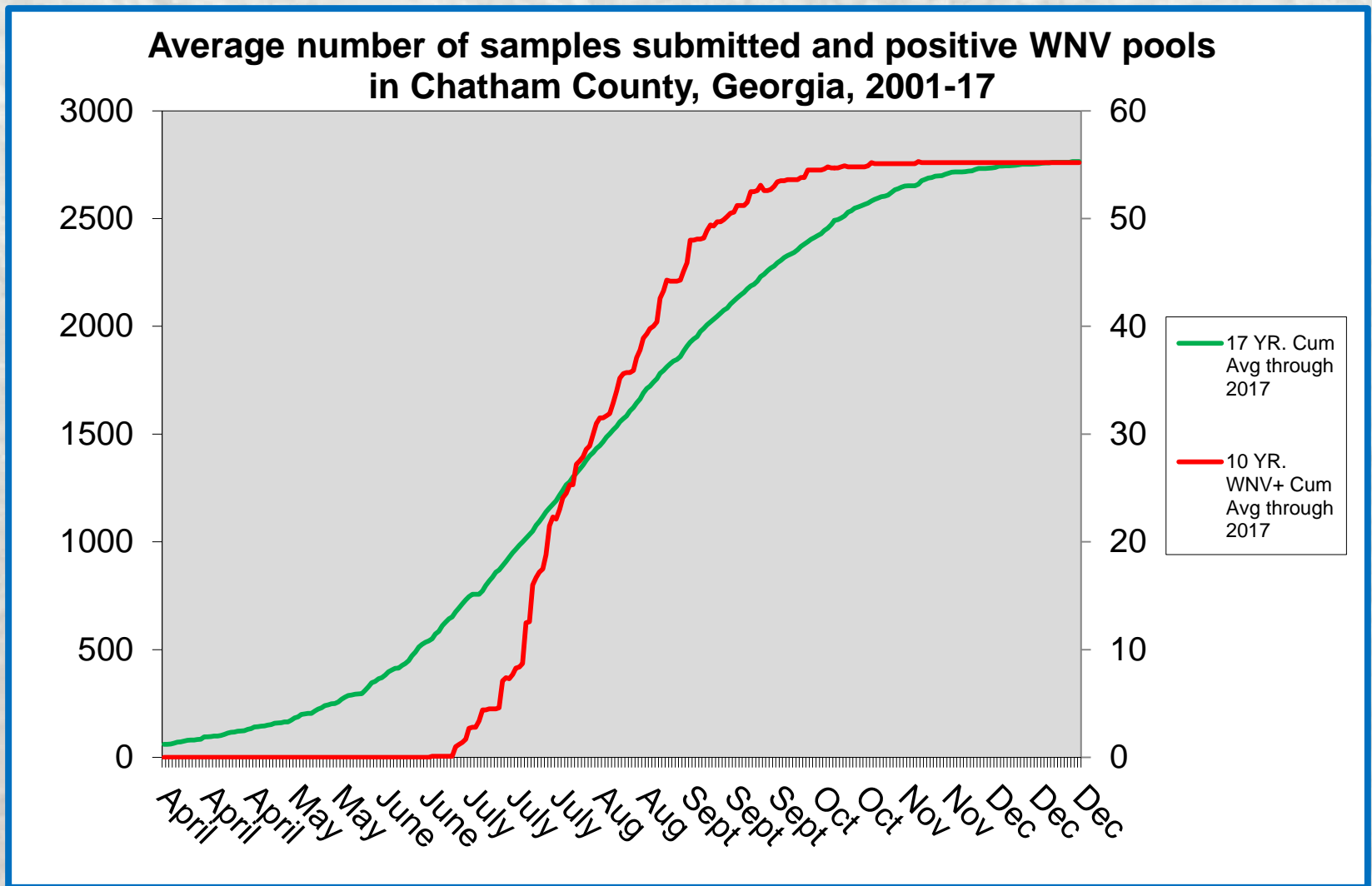
Pooling mosquitoes has several advantages over collecting and testing dead birds, as it showed which species of mosquito is primarily involved in local transmission

The Resurgence of West Nile virus in Chatham County



During an active WNV year, the ratio of positive pools to total pools is generally low

The Resurgence of West Nile virus in Chatham County



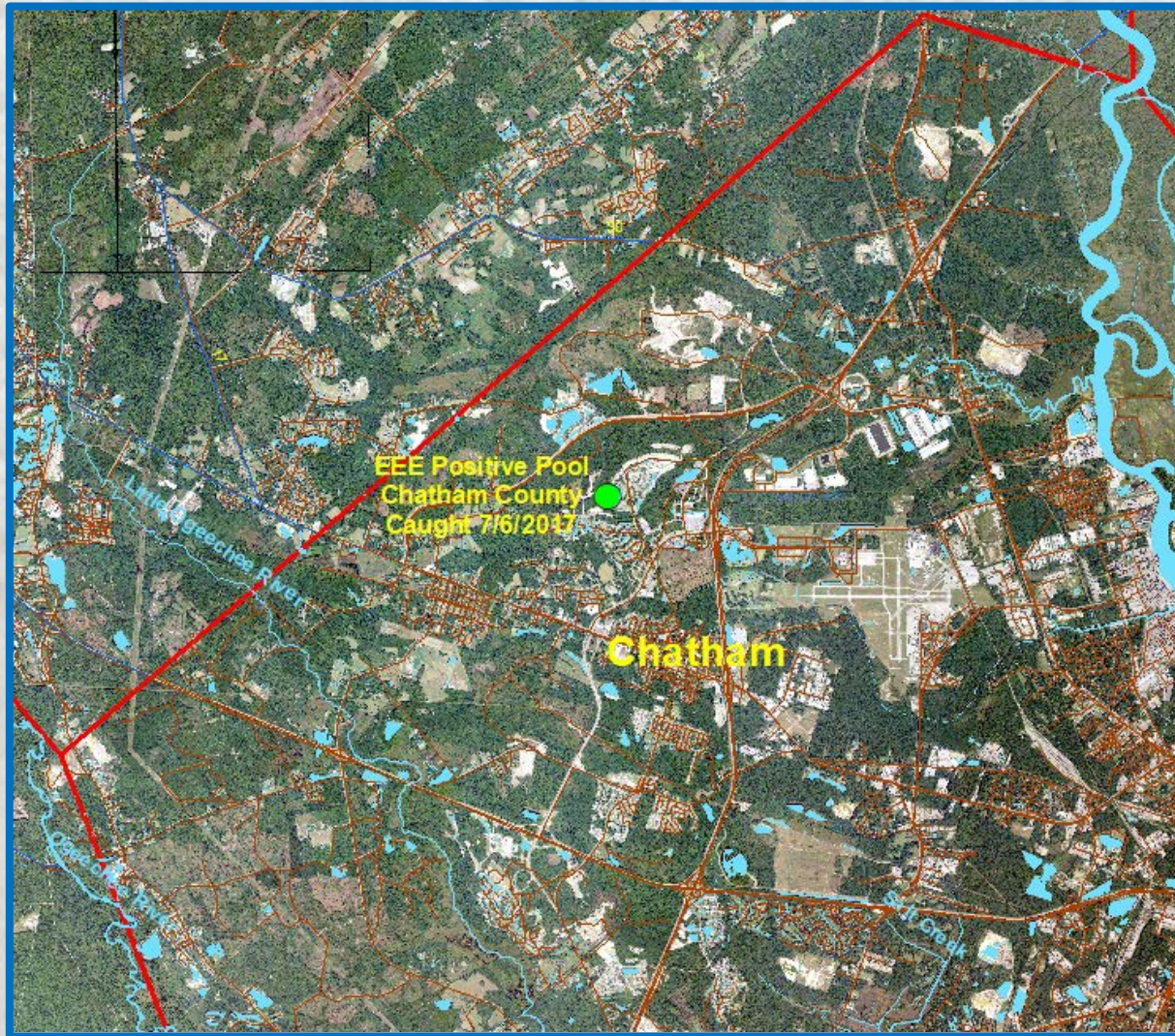
Pooling mosquitoes has several advantages over collecting and testing dead birds, as it shows when mosquitoes carry virus as well

The Resurgence of West Nile virus in Chatham County

| Eastern equine encephalitis detection form mosquito samples, 2001-2017 | | | | | | | | | |
|--|-------------|-------------------------|----------------------|---------|---------|-----------|------------|-------|---------|
| Date | Sample # | Site | Species | # mosq. | Total # | Trap type | Conf. date | Virus | MIR |
| 7/17/2003 | CHC-1066 | Monteith | <i>Cs. melanura</i> | 7 | 7 | CDC | 9/2/2003 | EEE | 142.86 |
| 5/16/2005 | CHC-05-1477 | 6801 Basin Road | <i>Cs. melanura</i> | 20 | 54 | CDC | 6/6/2005 | HJV | 18.52 |
| 7/5/2005 | CHC-05-3106 | 1230 Bloomingdale Road | <i>Cs. melanura</i> | 16 | 16 | CDC | 7/14/2005 | EEE | 62.50 |
| 7/18/2005 | CHC-05-3486 | 6801 Basin Road | <i>Cs. melanura</i> | 6 | 6 | CDC | 7/25/2005 | EEE | 166.67 |
| 7/25/2005 | CHC-05-3709 | 108 Huckleberry Road | <i>Cs. melanura</i> | 20 | 64 | CDC | 7/29/2005 | HJV | 15.63 |
| 7/25/2005 | CHC-05-3713 | 627 Ft. Argyle Road | <i>Cs. melanura</i> | 15 | 35 | CDC | 7/29/2005 | EEE | 28.57 |
| 7/26/2005 | CHC-05-3820 | 130 Bald Cypress | <i>Cs. melanura</i> | 6 | 6 | CDC | 8/3/2005 | EEE | 166.67 |
| 8/23/2005 | CHC-05-5325 | Halyard Drive - Newport | <i>Cs. melanura</i> | 13 | 13 | CDC | 9/6/2005 | HJV | 76.92 |
| 6/16/2009 | CHC-09-0315 | 108 Huckleberry Road | <i>Cs. melanura</i> | 20 | 53 | CDC | 6/23/2009 | HJV | 18.87 |
| 9/4/2012 | CHC-12-2032 | 6801 Basin Road | <i>Cx. erraticus</i> | 1 | 7 | CDC | 9/17/2013 | EEE | 142.86 |
| 9/4/2012 | CHC-12-2057 | 6801 Basin Road | <i>Cs. melanura</i> | 6 | 6 | CDC | 9/17/2013 | EEE | 166.67 |
| 10/2/2012 | CHC-12-2688 | 108 Huckleberry Road | <i>Cs. melanura</i> | 13 | 13 | Exit | 10/15/2012 | EEE | 76.92 |
| 10/21/14 | CHC-14-2735 | 627 Fort Argyle Road | <i>Cs. melanura</i> | 2 | 2 | CDC | 11/23/2014 | EEE | 500.00 |
| 7/6/2017 | CHC-17-0399 | 149 White Dogwood | <i>Cs. melanura</i> | 1 | 1 | CDC | 7/17/2017 | EEE | 1000.00 |

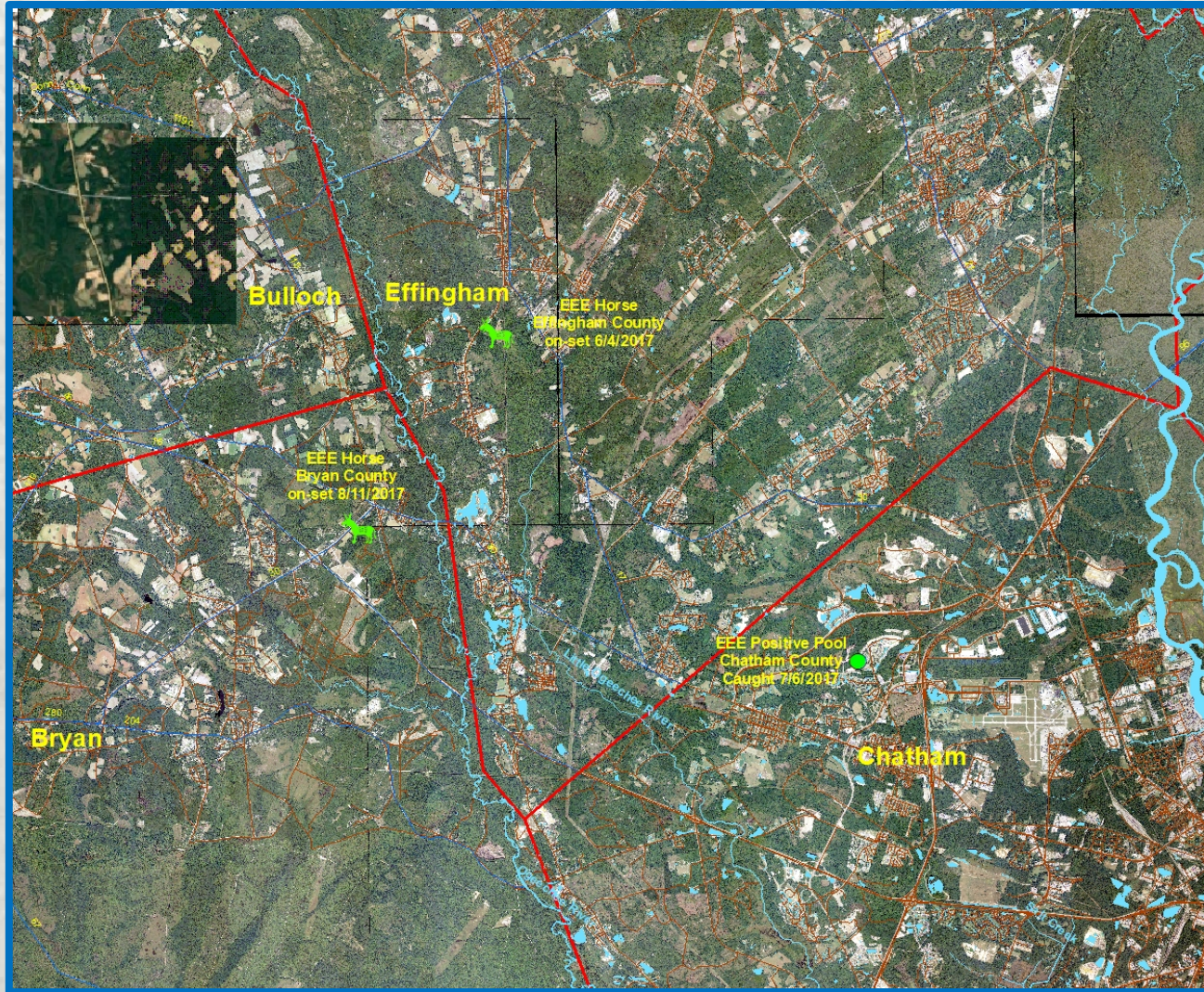
Pooling mosquitoes also can reveal viruses other than West Nile, such as EEE or HJV

The Resurgence of West Nile virus in Chatham County



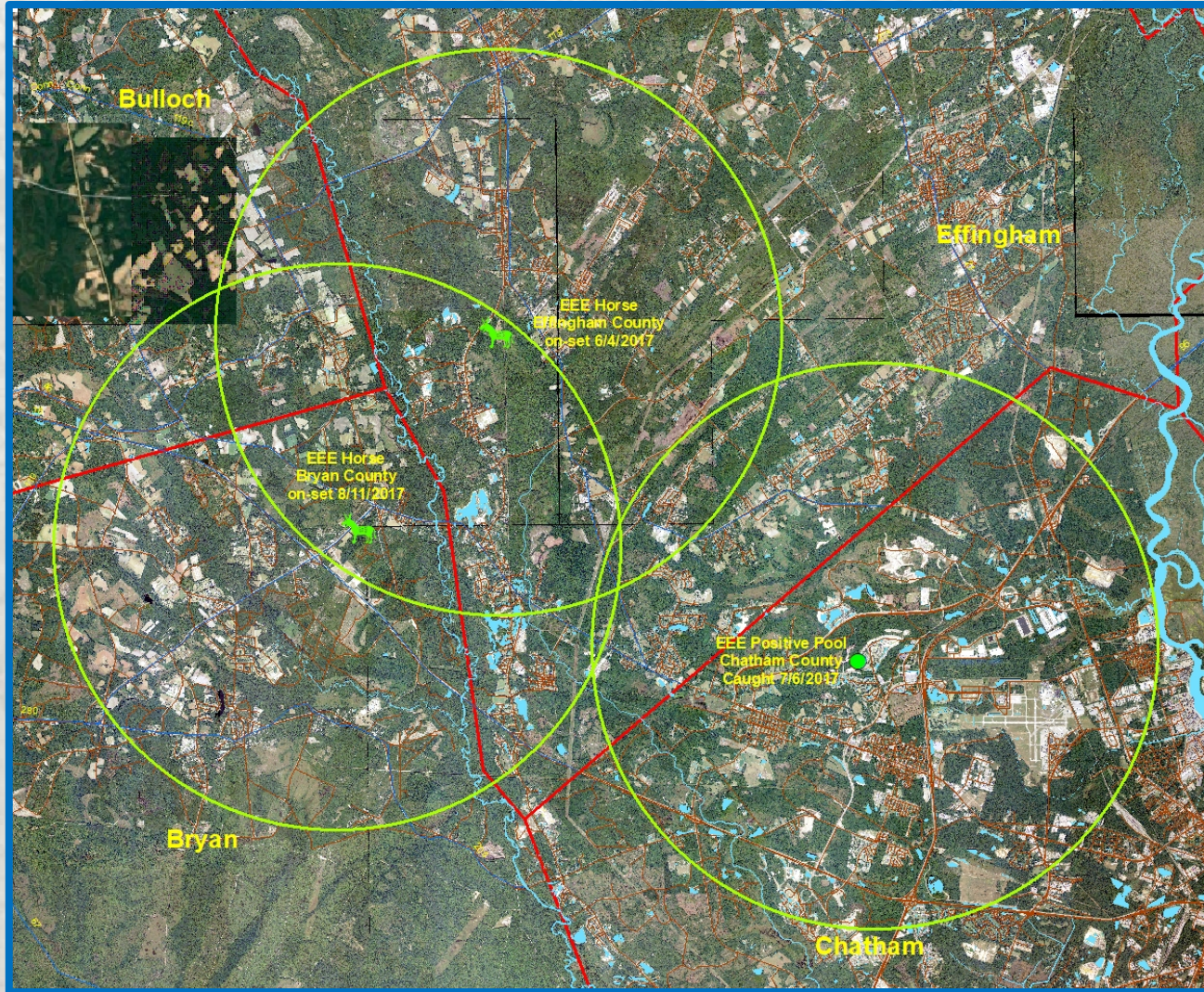
In 2017 EEE was recorded in a pool from western Chatham County (on 7/17/17)

The Resurgence of West Nile virus in Chatham County



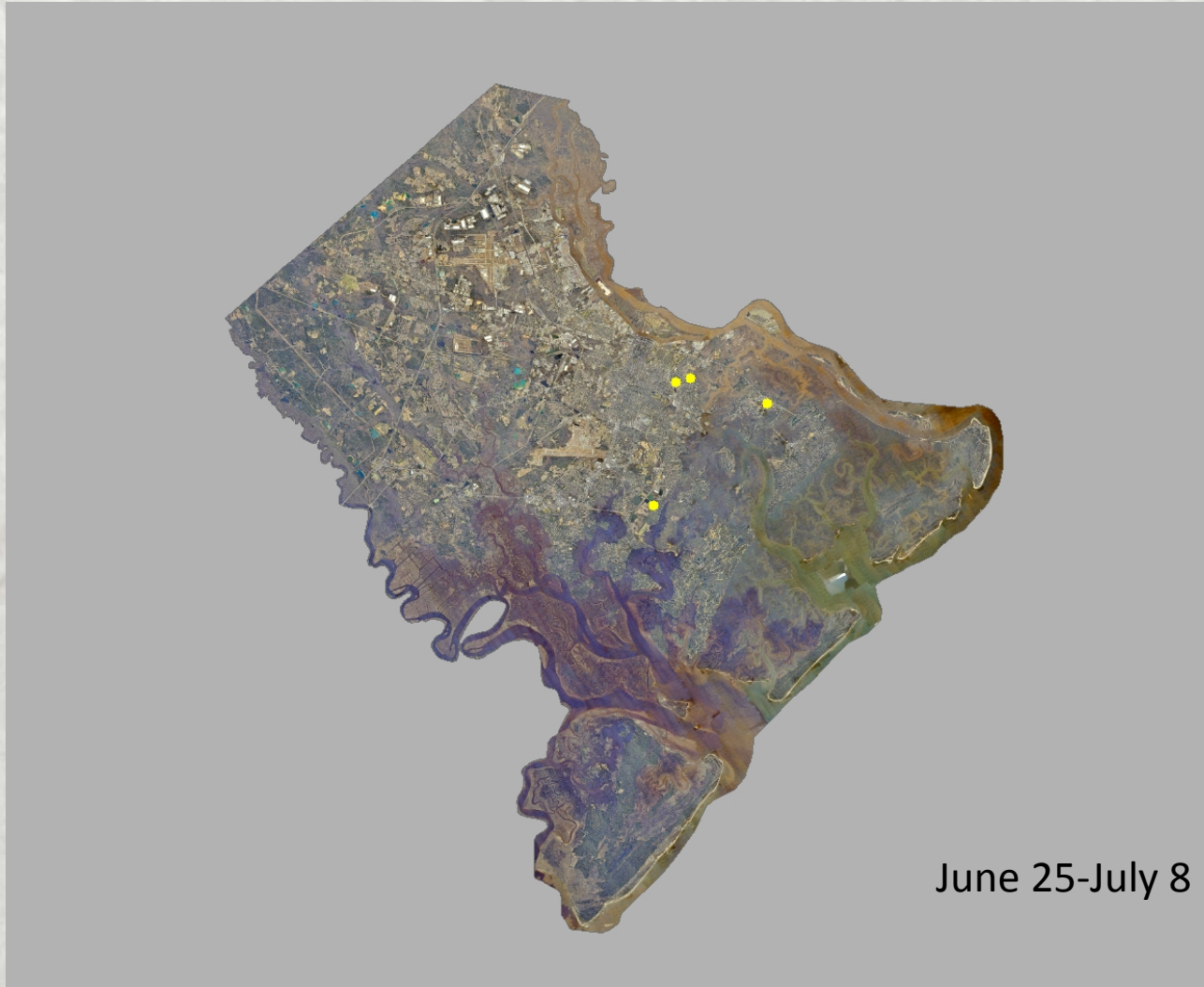
EEE activity was also recorded in neighboring counties as well (the Effingham report was made 8/7/17, the Bryan report was made 8/25/17)

The Resurgence of West Nile virus in Chatham County



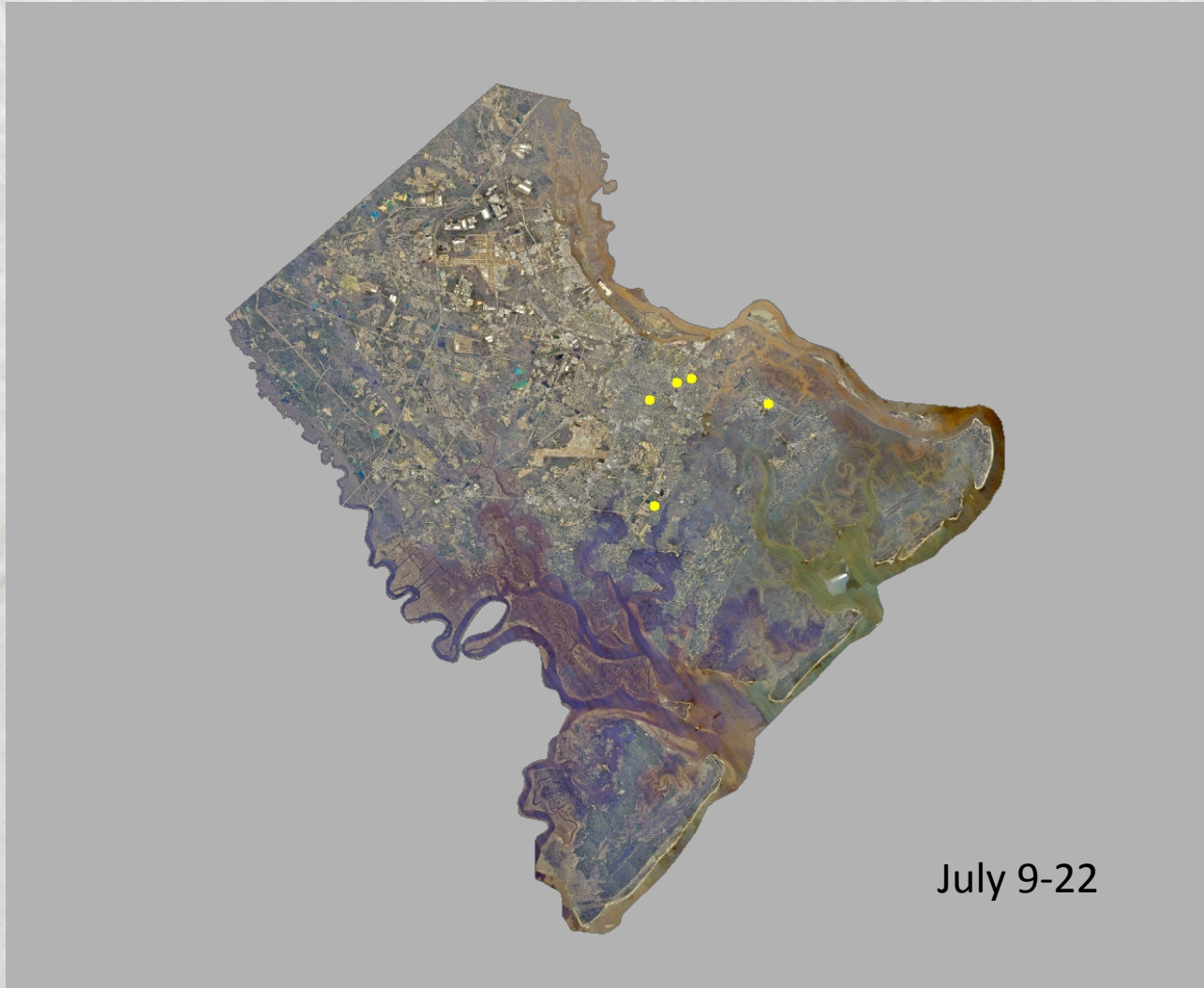
These sites are located near two river flood plains, the Ogeechee and Little Ogeechee

The Resurgence of West Nile virus in Chatham County



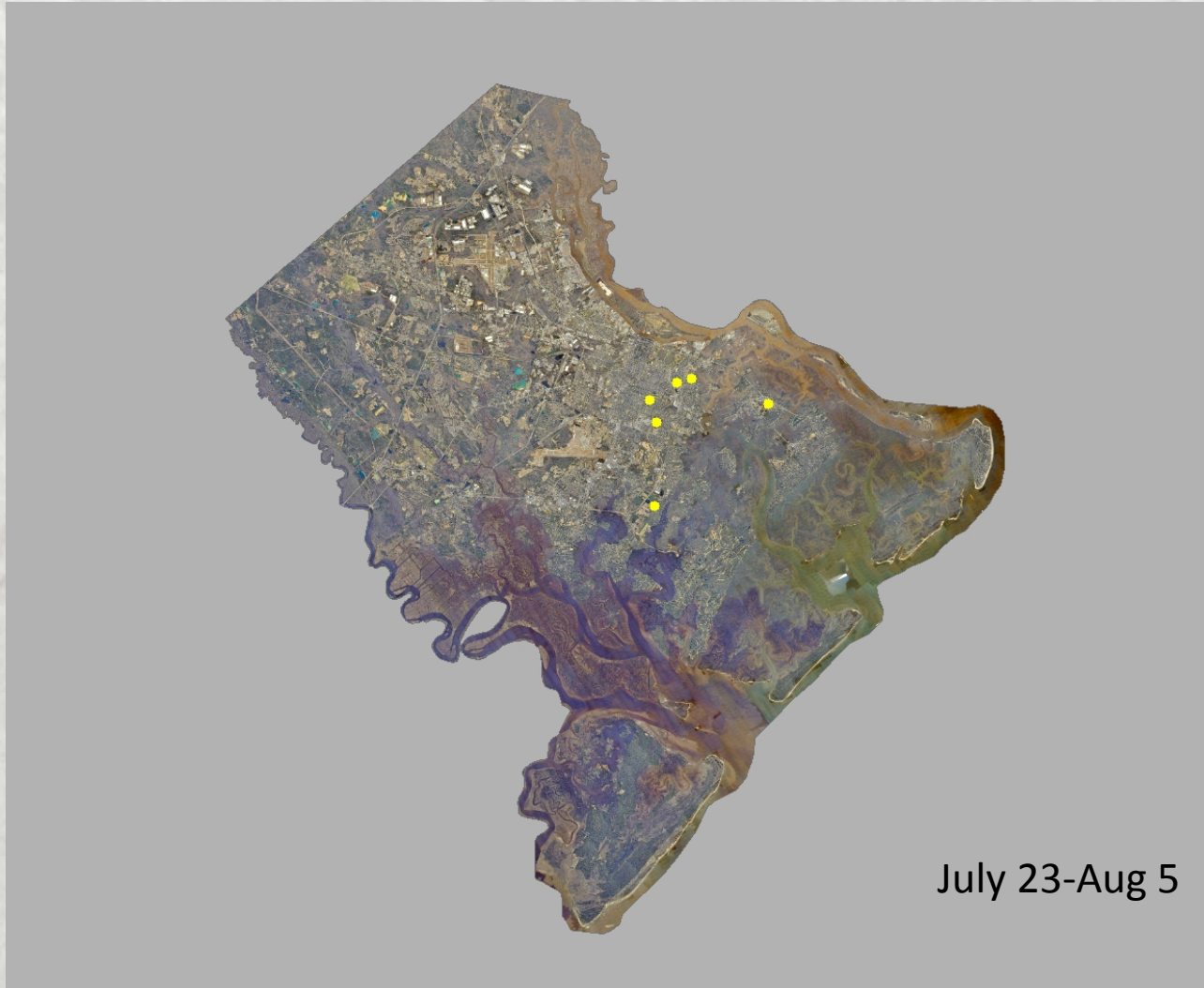
In 2017, the virus was first detected in the more eastern sections of Savannah.

The Resurgence of West Nile virus in Chatham County



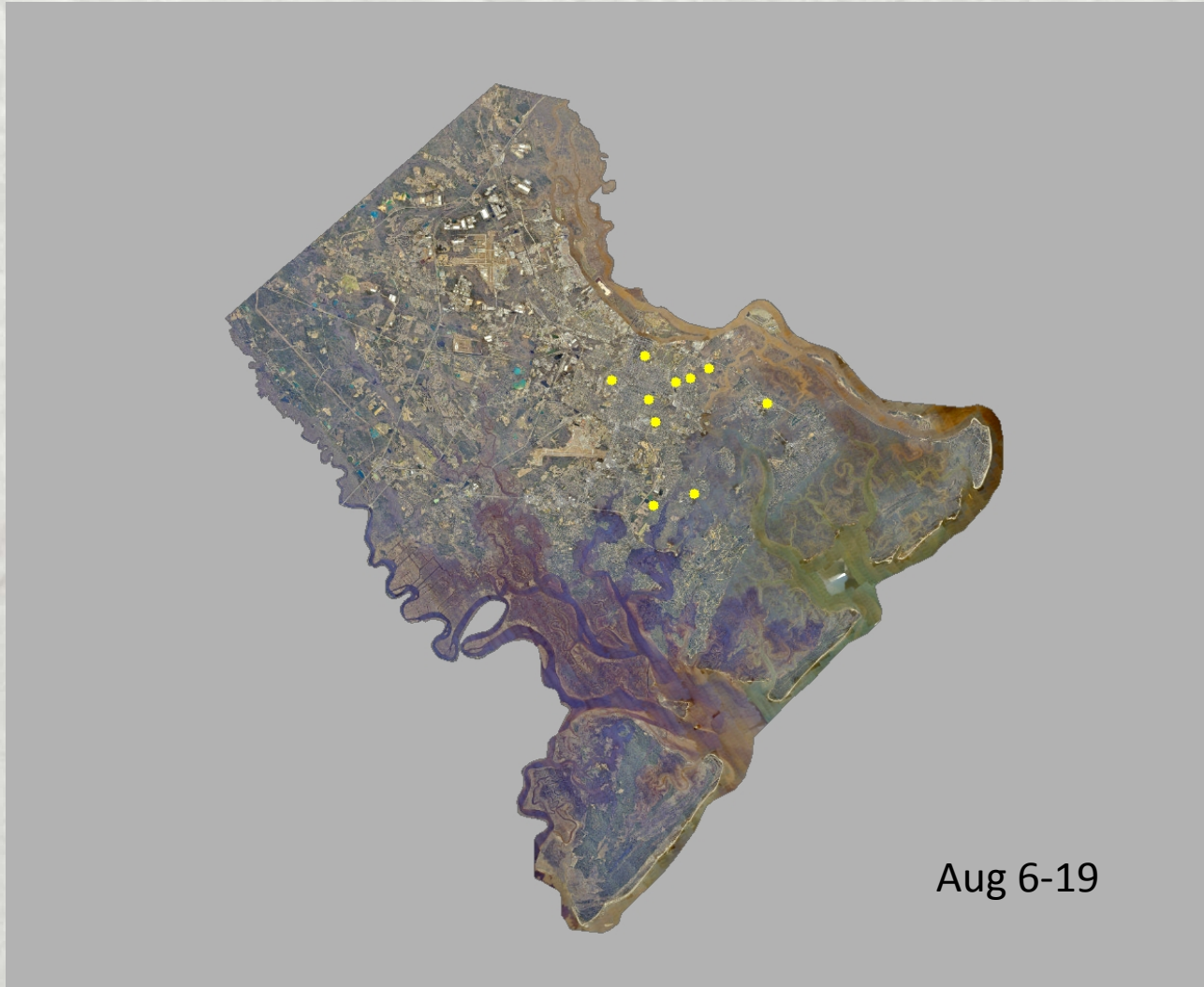
The virus expanded as the summer progressed.

The Resurgence of West Nile virus in Chatham County



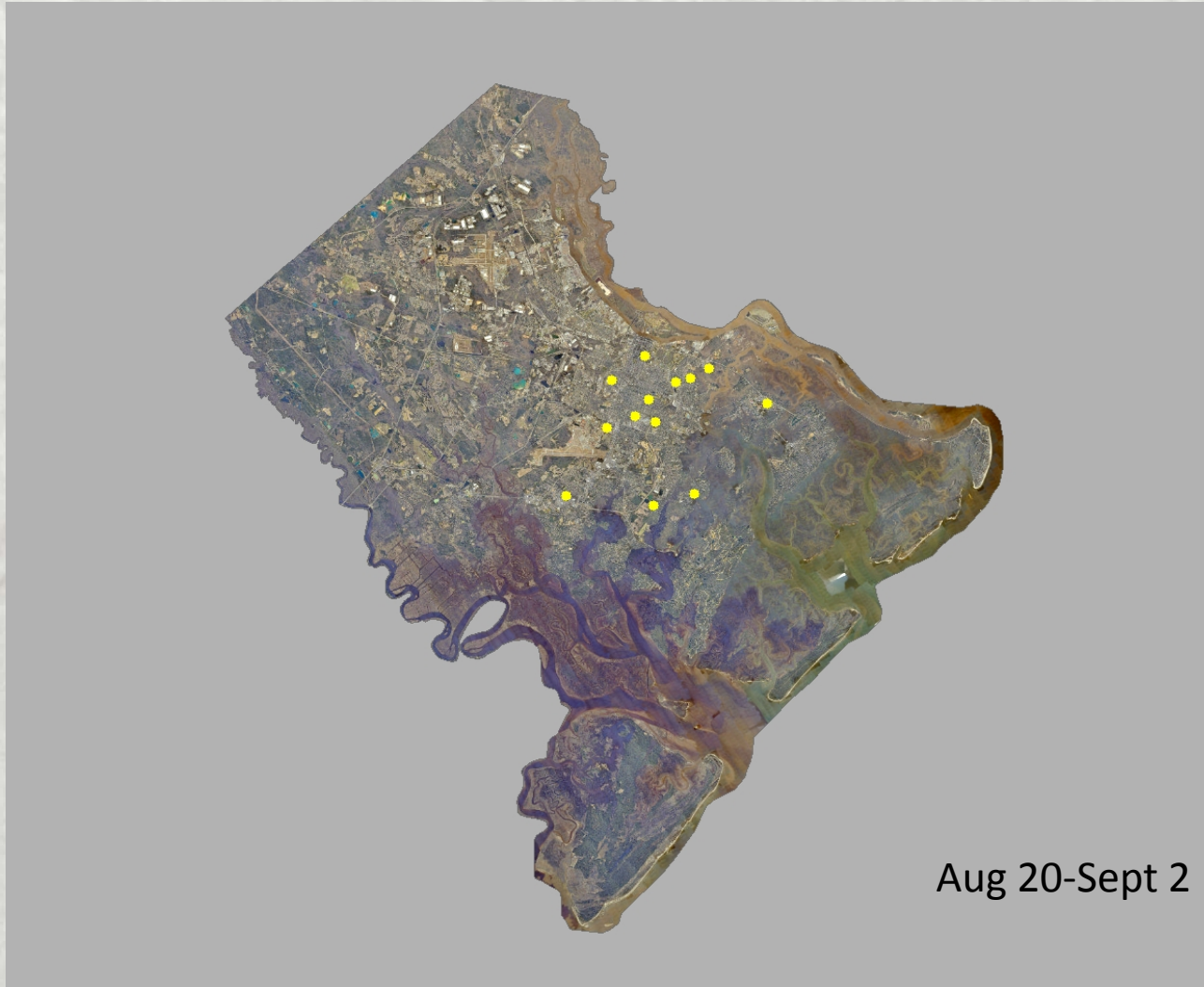
The virus expanded as the summer progressed.

The Resurgence of West Nile virus in Chatham County



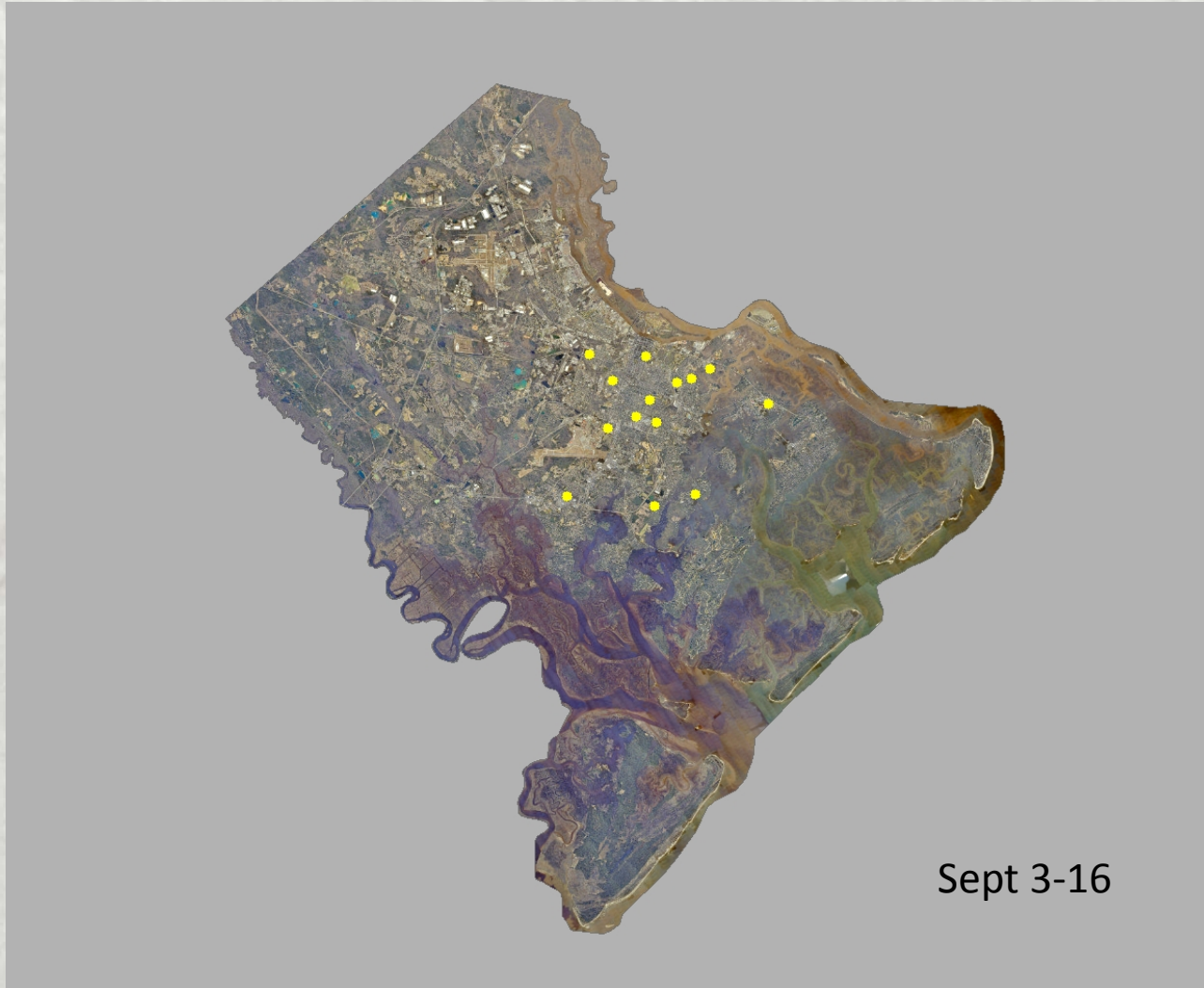
The virus expanded as the summer progressed.

The Resurgence of West Nile virus in Chatham County



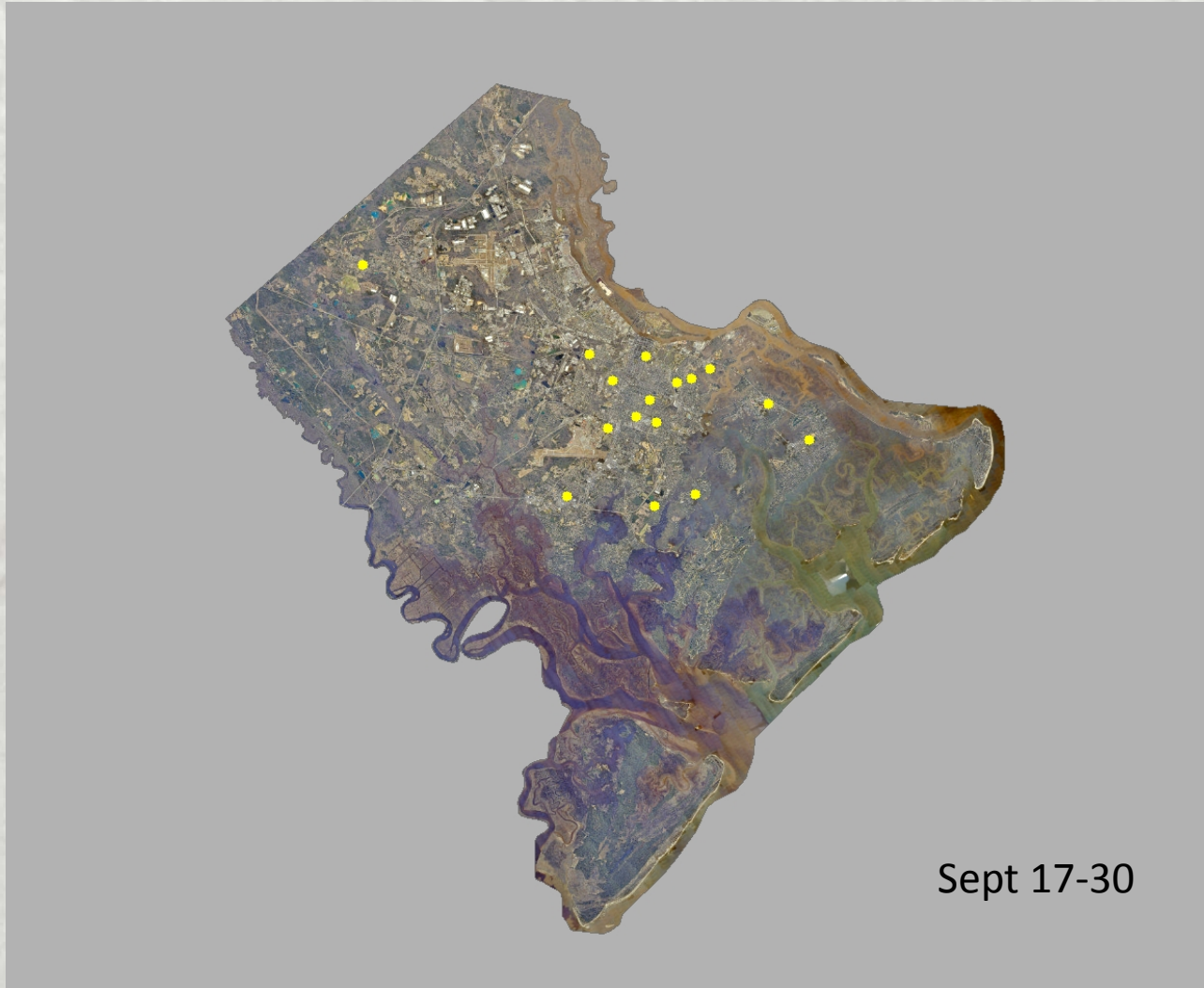
The virus expanded as the summer progressed.

The Resurgence of West Nile virus in Chatham County



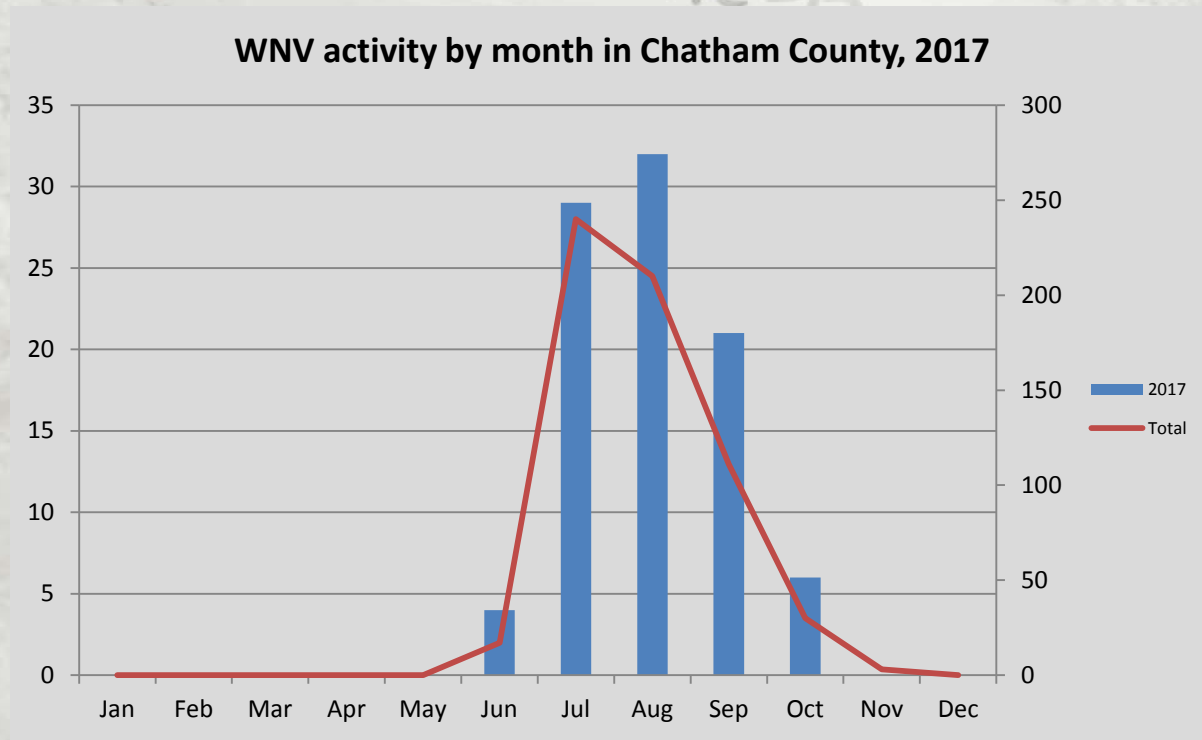
The virus expanded as the summer progressed.

The Resurgence of West Nile virus in Chatham County

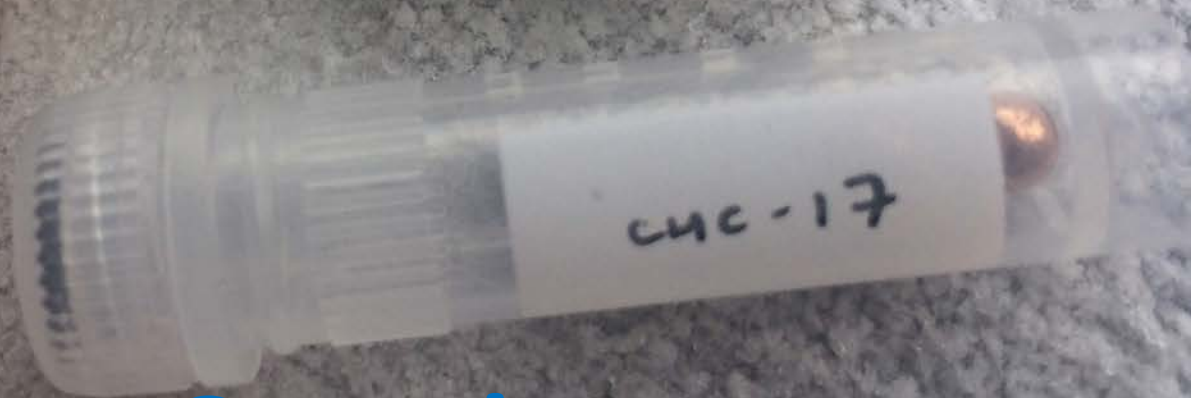
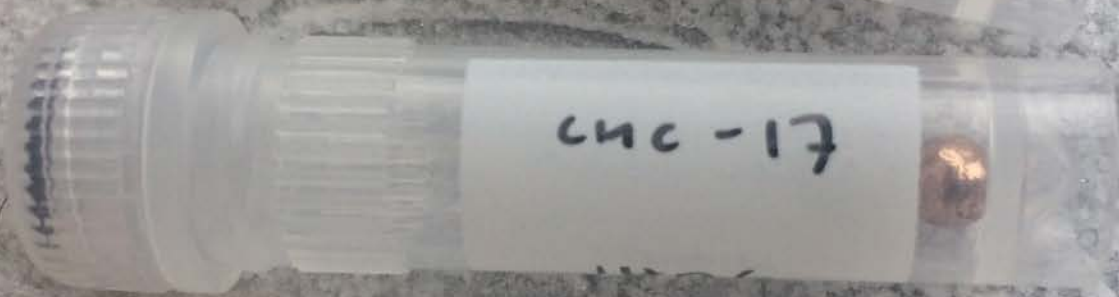
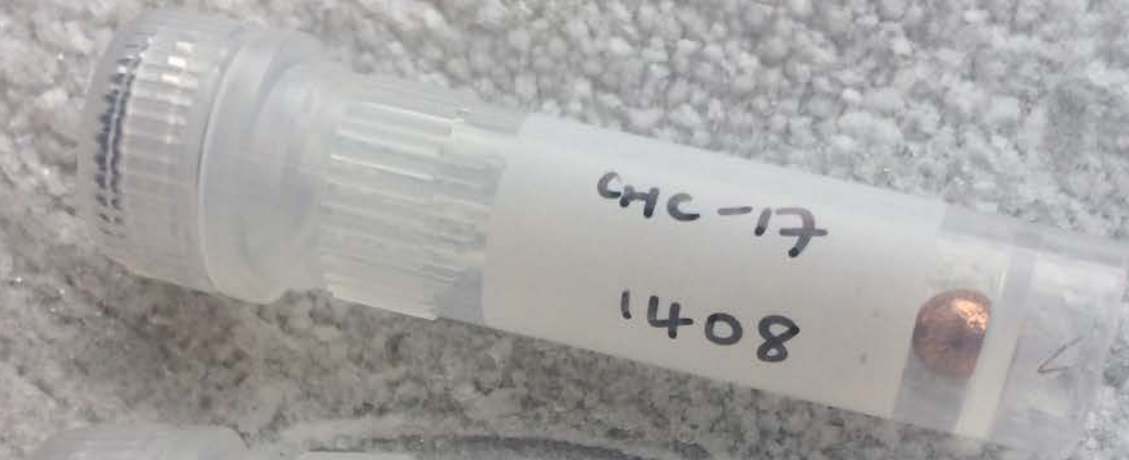


The virus expanded as the summer progressed.

The Resurgence of West Nile virus in Chatham County



The monthly activity in 2017 was similar to the overall West Nile activity experienced in the past.



Questions