

The Return of West Nile to Chatham County

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The Return of West Nile to Chatham County

Until this year, West Nile virus had not been detected in Chatham County since 2007.

In 2011 the virus returned, and was remarkable in a number of ways:

- Earliest detection: June 20
- Highest total number of WNV+ pools: 214
- Highest percentage of WNV+ pools: 5.6%
- Highest number of human cases (tied w/ 2003): 9

The Return of West Nile to Chatham County

Overview:

History of WNV surveillance efforts

Summary of past and current WNV activity

2011 WNV activity

Current WNV action plan

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West Nile virus Surveillance

- Dead Bird Data
- Sentinel Program
- Larval Surveys
- Light Traps
- Gravid Traps
- Mosquito ID's and testing

West Nile virus Surveillance

● Dead Bird Data

- WNV surveillance began in 2001 in response to dead bird reports
- Resident-reported dead birds were critical in determining surveillance area
- Bird reports now rare; no longer an important surveillance tool:
 - Lack of reporting?
 - Immunity in birds?
 - Mutation in virus?

● Sentinel Program

● Larval Surveys

● Light Traps

● Gravid Traps

● Mosquito ID's and testing



West Nile virus Surveillance

- Dead Bird Data
- Sentinel Program
 - Early use of sentinel chickens
 - Determined not to be effective:
 - Slow incubation
 - Low viremia
 - All bird testing now limited to dead crows, blue jays, and raptors
- Larval Surveys
- Light Traps
- Gravid Traps
- Mosquito ID's and testing



West Nile virus Surveillance

- Dead Bird Data
- Sentinel Program
- Larval Surveys
 - Identified potential WNV vector breeding sites
 - Targeted *Culex* varieties
 - implicated in disease transmission from New York area in 1999
- Light Traps
- Gravid Traps
- Mosquito ID's and testing



West Nile virus Surveillance

- Dead Bird Data
- Sentinel Program
- Larval Surveys
- Light Traps
 - CDC traps used initially
 - Unlikely to detect virus:
 - Did not capture high numbers of many *Culex* species
 - Primarily capture non-, or newly-bloodfed females
- Gravid Traps
- Mosquito ID's and testing



West Nile virus Surveillance

- Dead Bird Data
- Sentinel Program
- Larval Surveys
- Light Traps
- Gravid Traps
 - More likely to detect virus:
 - Capture higher numbers of certain *Culex* species
 - Attractive to older, bloodfed females
 - Mimic certain *Culex* oviposition sites
 - In 2011, 26 locations throughout the county were trapped on a weekly basis
- Mosquito ID's and testing



West Nile virus Surveillance

- Dead Bird Data
- Sentinel Program
- Larval Surveys
- Light Traps
- Gravid Traps
- Mosquito ID's and testing
 - One of our most important tools in WNV surveillance:
 - Originally helped confirm our primary vector, *Cx. quinquefasciatus*
 - Forecasts those areas at risk
 - Helps prioritize adulticide missions
 - Currently the quickest method for detecting virus activity in our area



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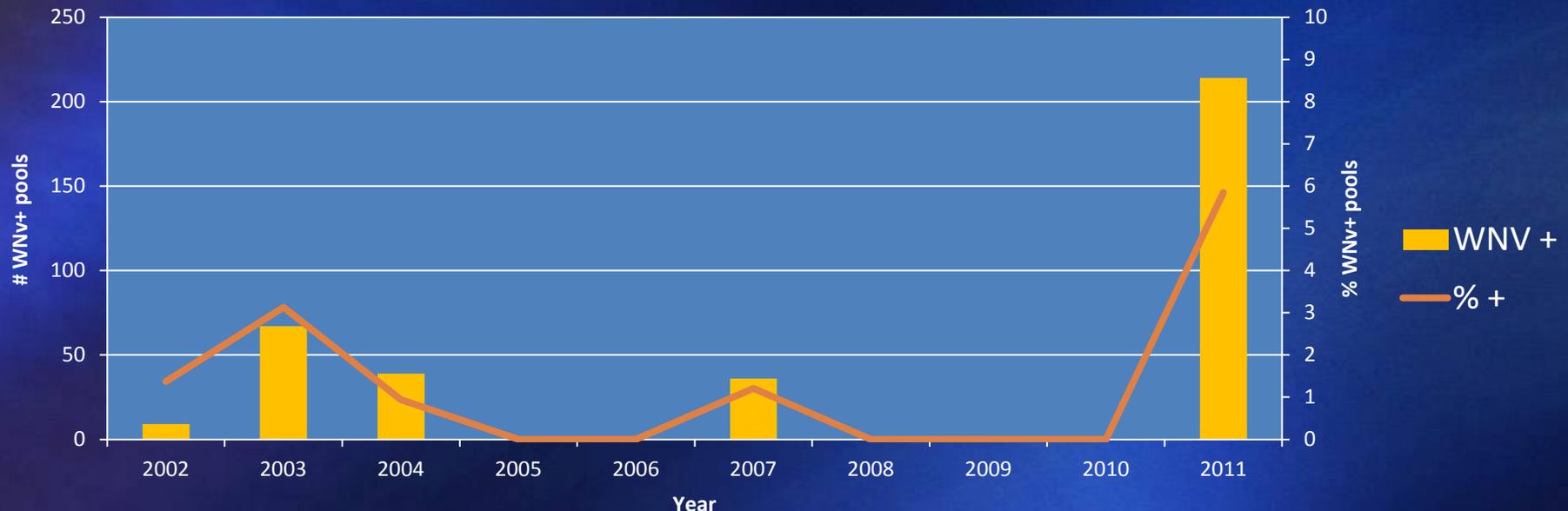
Summary of West Nile virus Activity in Chatham County

| Year | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---------------------|------|------|-------|------|------|------|------|------|------|------|------|
| Birds | 6 | 23 | 27 | | | | 1 | | | | |
| Horses | | 1 | 1 | | | | | | | | |
| Mosquito Pools | | 9 | 67 | 39 | | | 36 | | | | 214 |
| Human Cases (Fatal) | | | 9 (1) | 1 | | 1 | | | | | 9 |

Although positive dead birds were first recorded in Chatham County during the 2001 season, mosquito pools have been found to be a much more reliable means of determining virus activity in our area.

Summary of West Nile virus Activity in Chatham County

Number and percentage of WNV+ mosquito pools in Chatham County since 2002



- WNV first detected in Chatham County in 2002-2004 seasons
- No positive mosquitoes 2005-2006
- WNV again detected in mosquitoes 2007
- Not again seen until 2011

Summary of West Nile virus Activity in Chatham County

| History of WNV data in Chatham County | | | | | |
|---------------------------------------|-------------|------------------|--------------|-------------------------------|-------------|
| Year | Total pools | Total WNV+ pools | % WNV+ pools | Dates of WNV+ pool collection | Human cases |
| 2001 | 137 | 0 | 0% | - | 0 |
| 2002 | 659 | 9 | 1.4% | 5 Sept - 12 Nov | 0 |
| 2003 | 2141 | 67 | 3.1% | 11 July - 23 Sept | 9 |
| 2004 | 4144 | 39 | 0.9% | 30 June - 22 Sept | 0 |
| 2005 | 6262 | 0 | 0% | - | 0 |
| 2006 | 2078 | 0 | 0% | - | 1 |
| 2007 | 2981 | 36 | 1.2% | 12 July - 26 Sept | 0 |
| 2008 | 3042 | 0 | 0% | - | 0 |
| 2009 | 1010 | 0 | 0% | - | 0 |
| 2010 | 2123 | 0 | 0% | - | 0 |
| 2011 (as of 4 Oct) | 3798 | 214 | 5.6% | 20 June - 27 Sept | 9 |
| TOTAL (as of 4 Oct) | 28375 | 365 | 1.3% | - | 19 |

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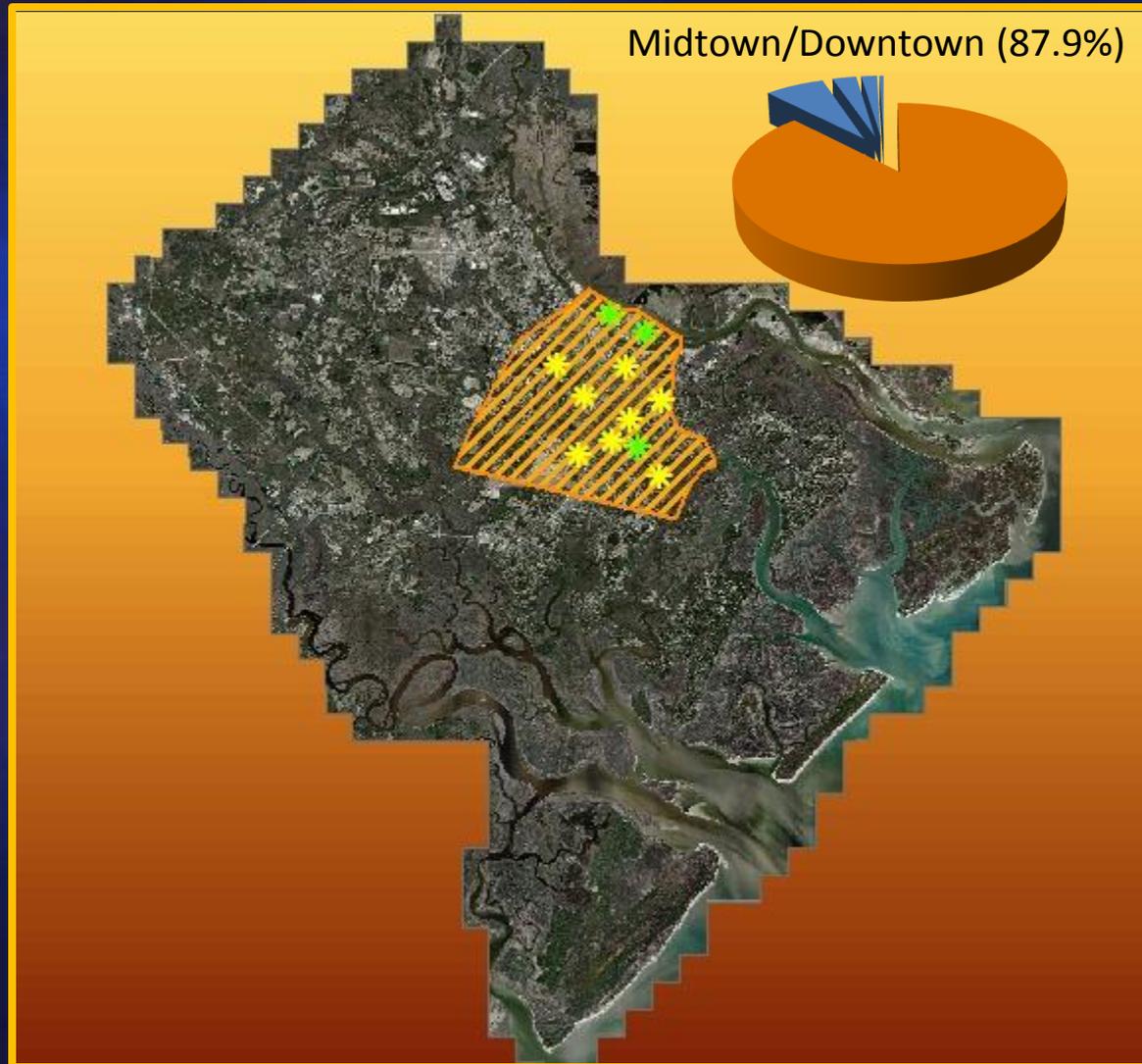
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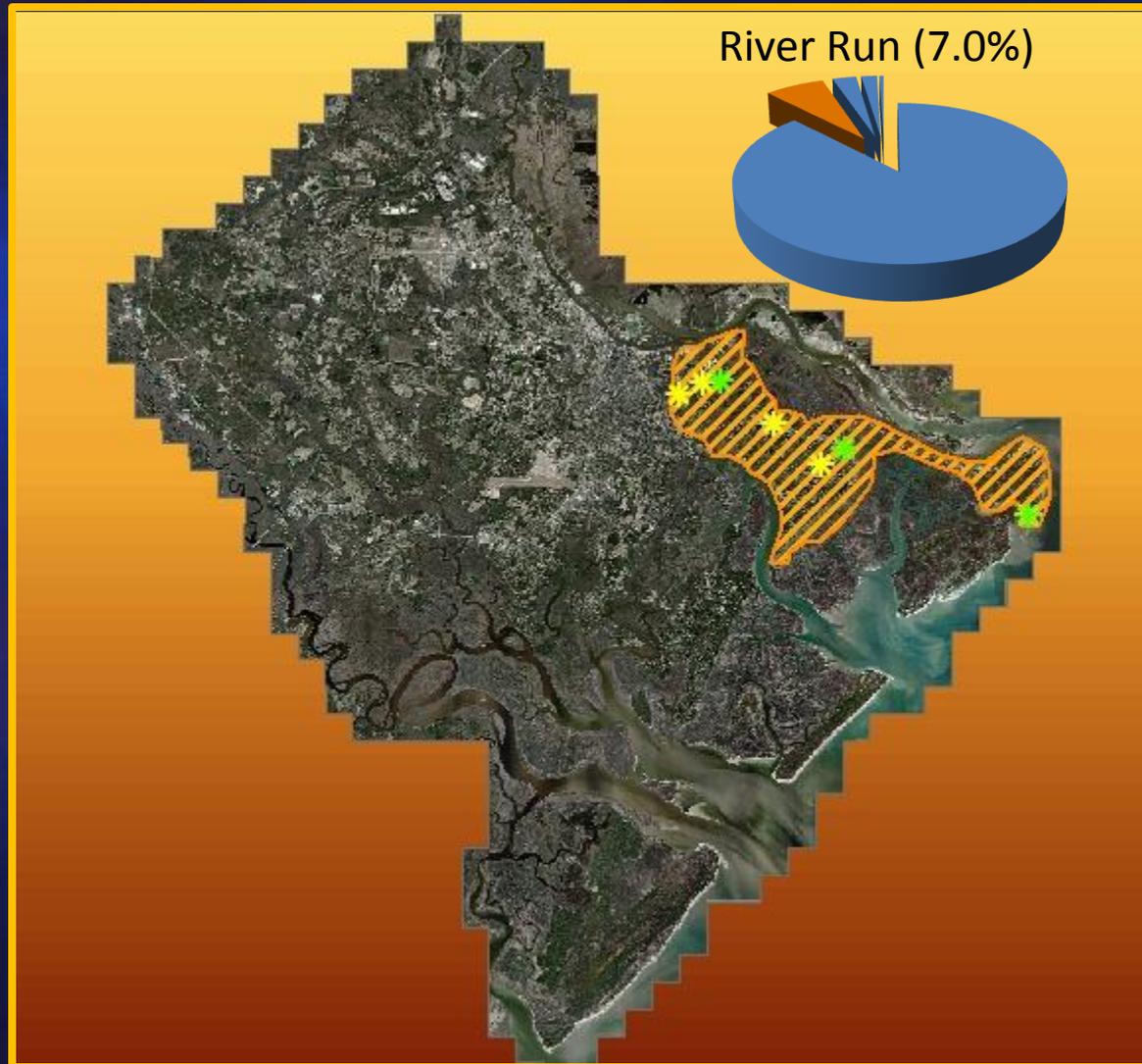
2011 WNV activity

Current WNV action plan

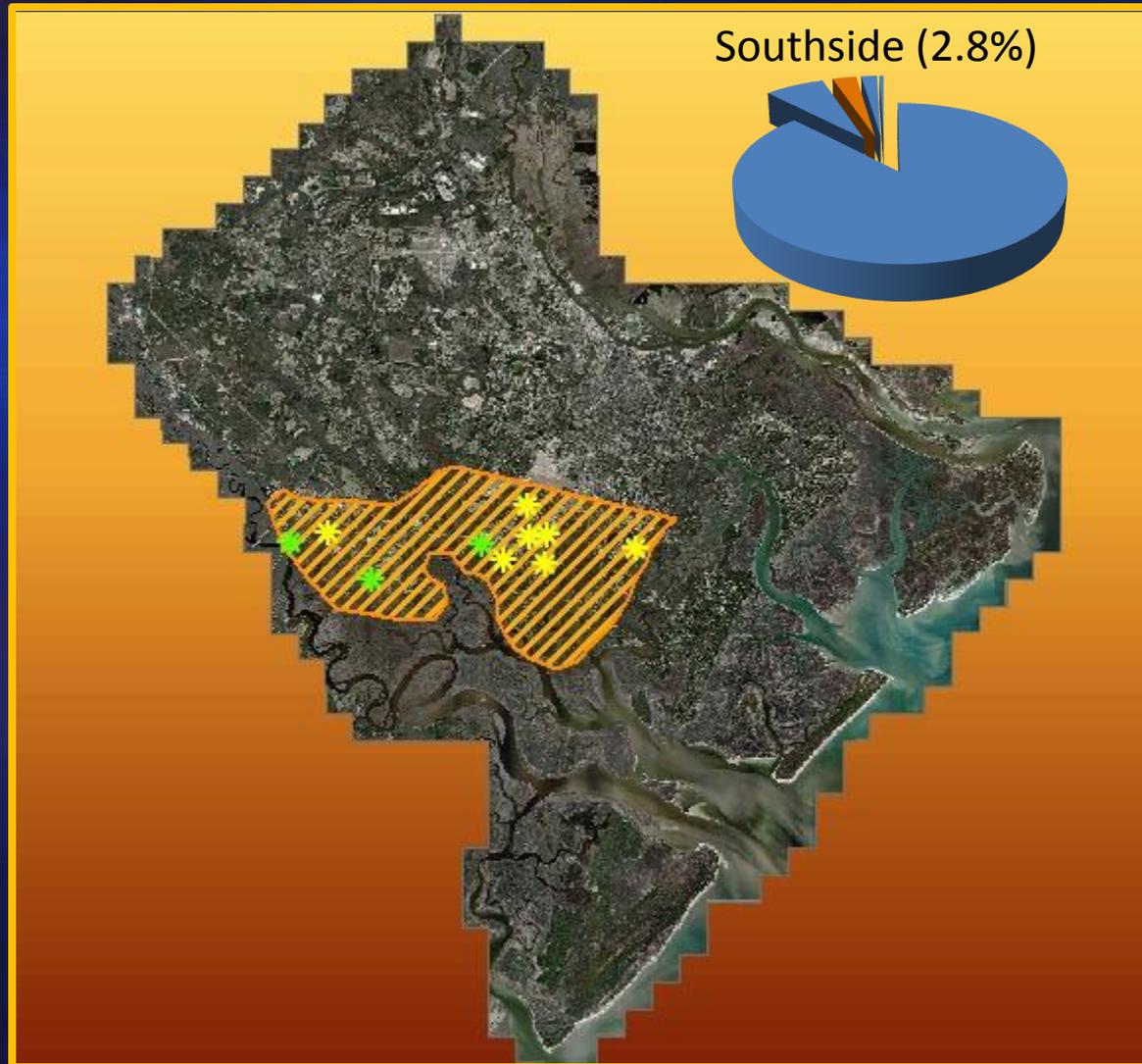
West Nile virus Activity



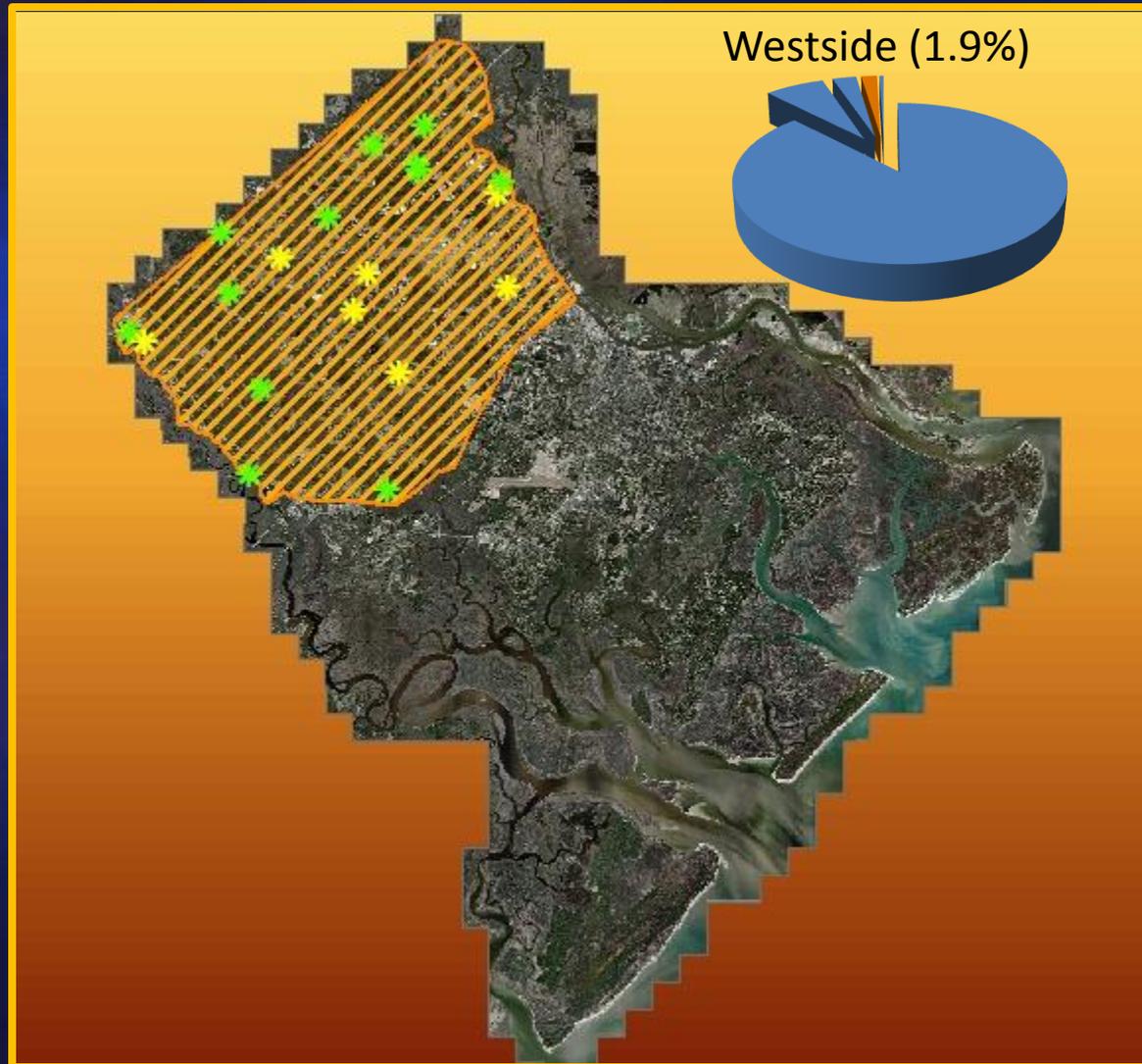
West Nile virus Activity



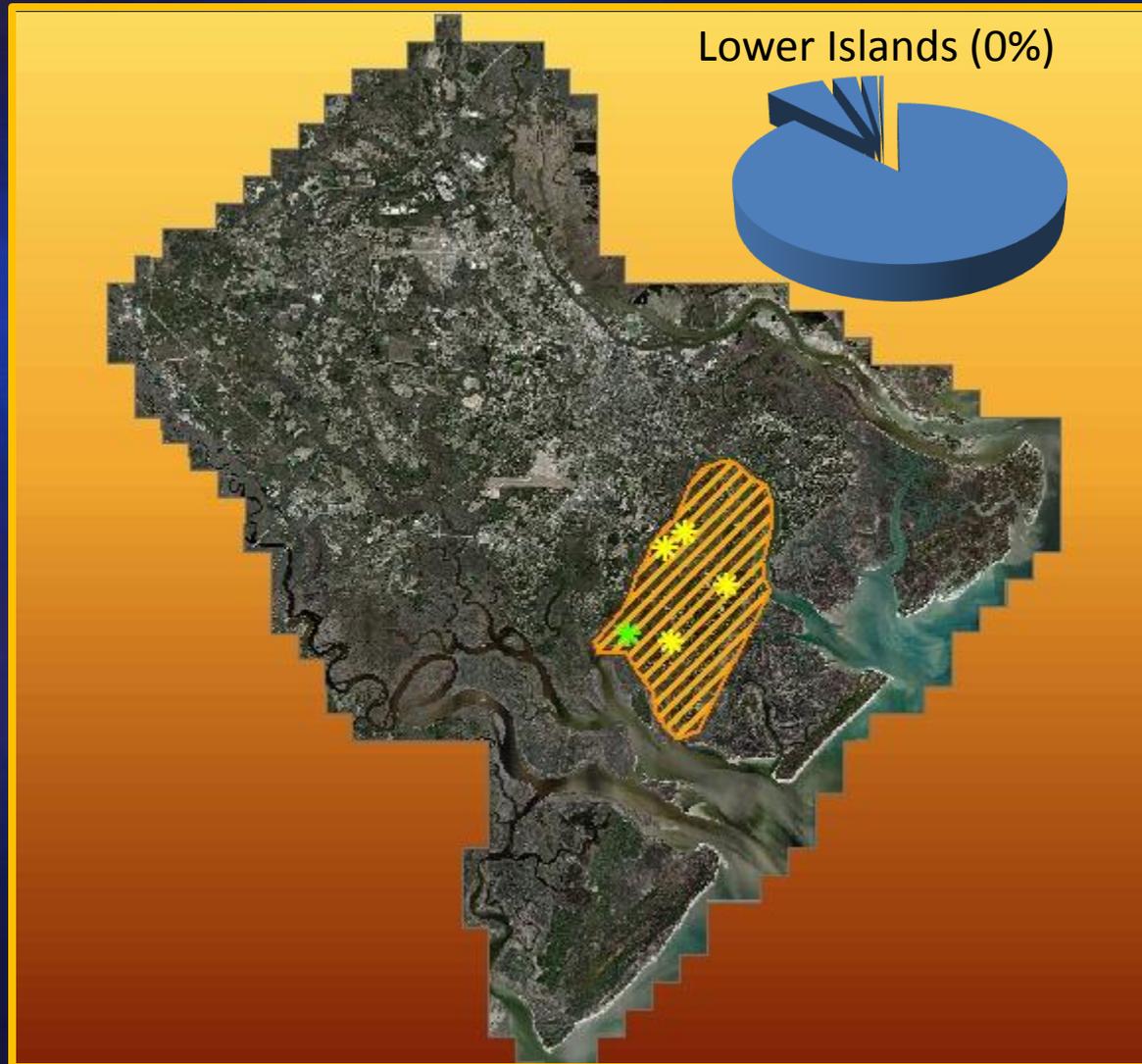
West Nile virus Activity



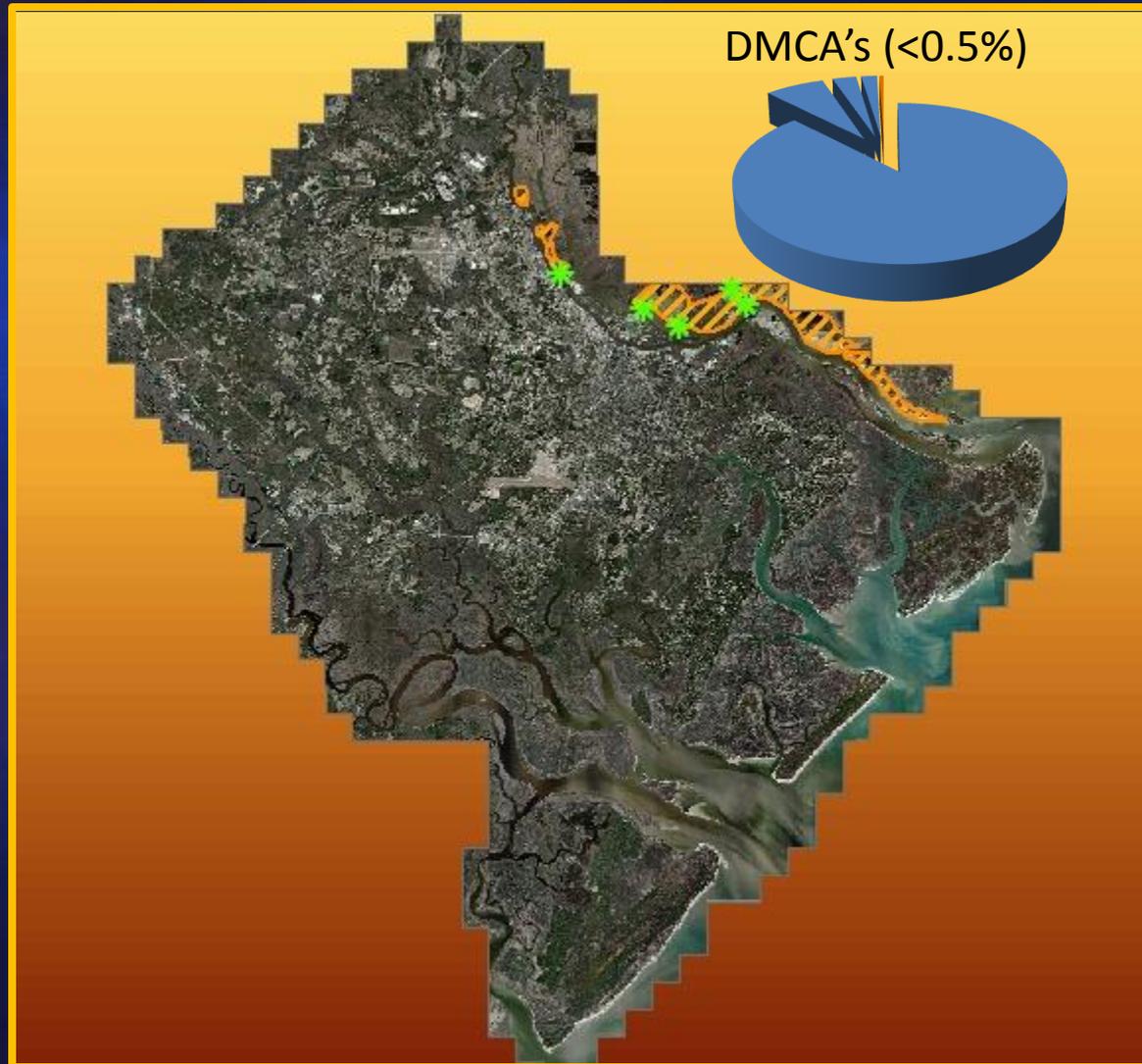
West Nile virus Activity



West Nile virus Activity

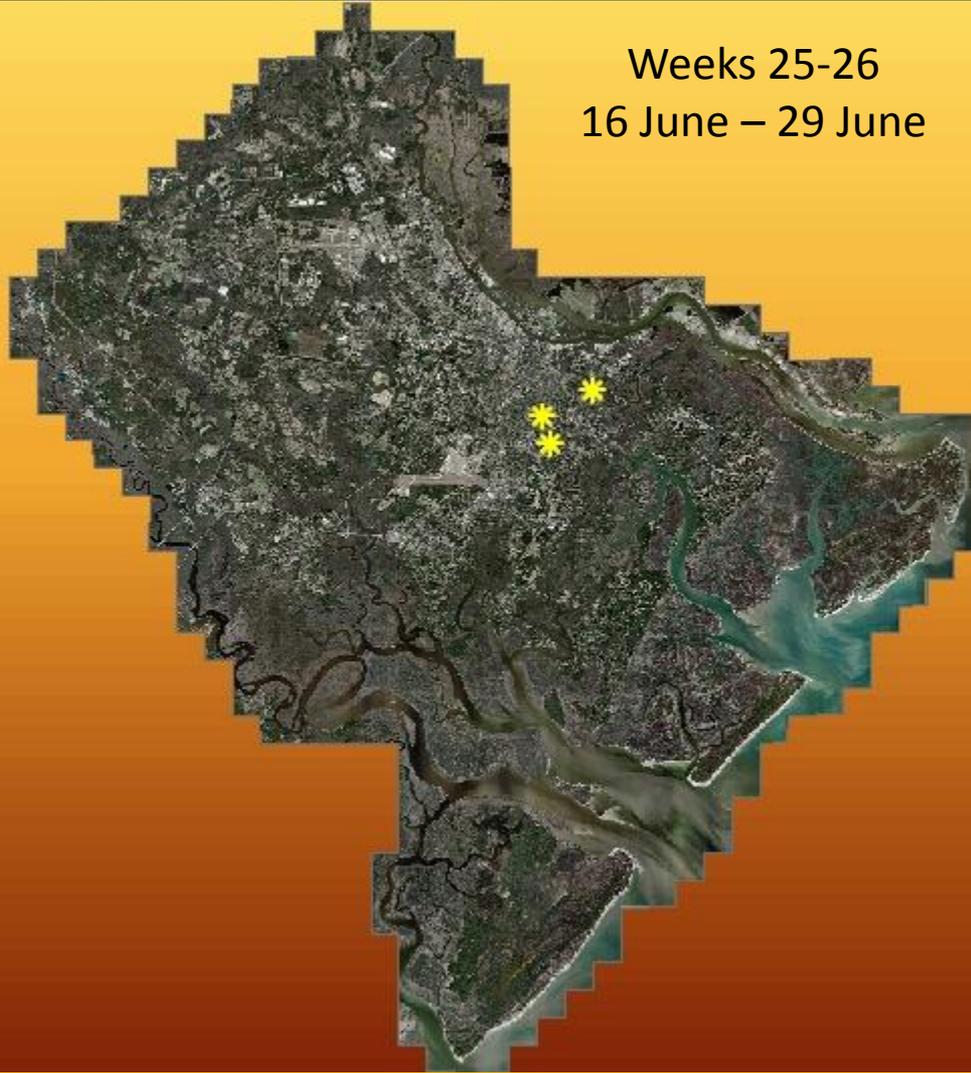


West Nile virus Activity



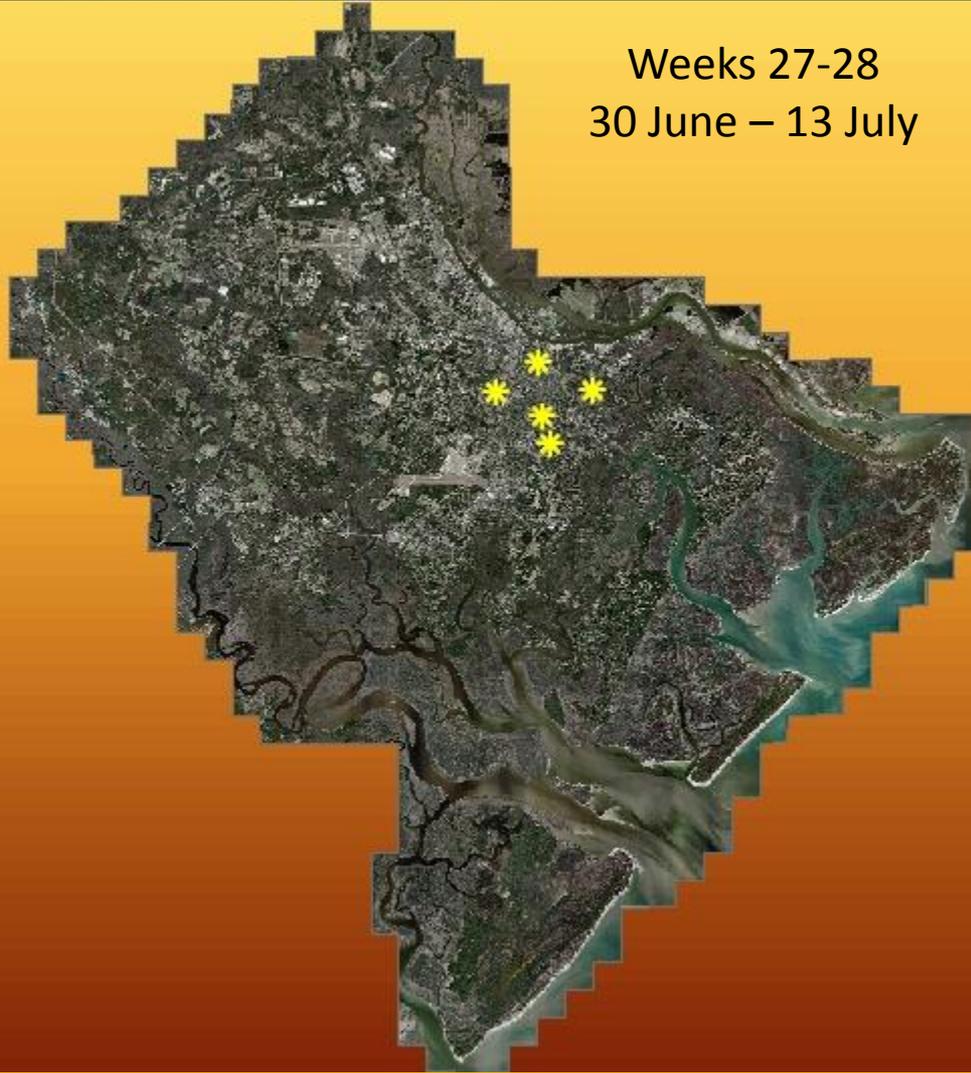
West Nile virus Activity

Weeks 25-26
16 June – 29 June



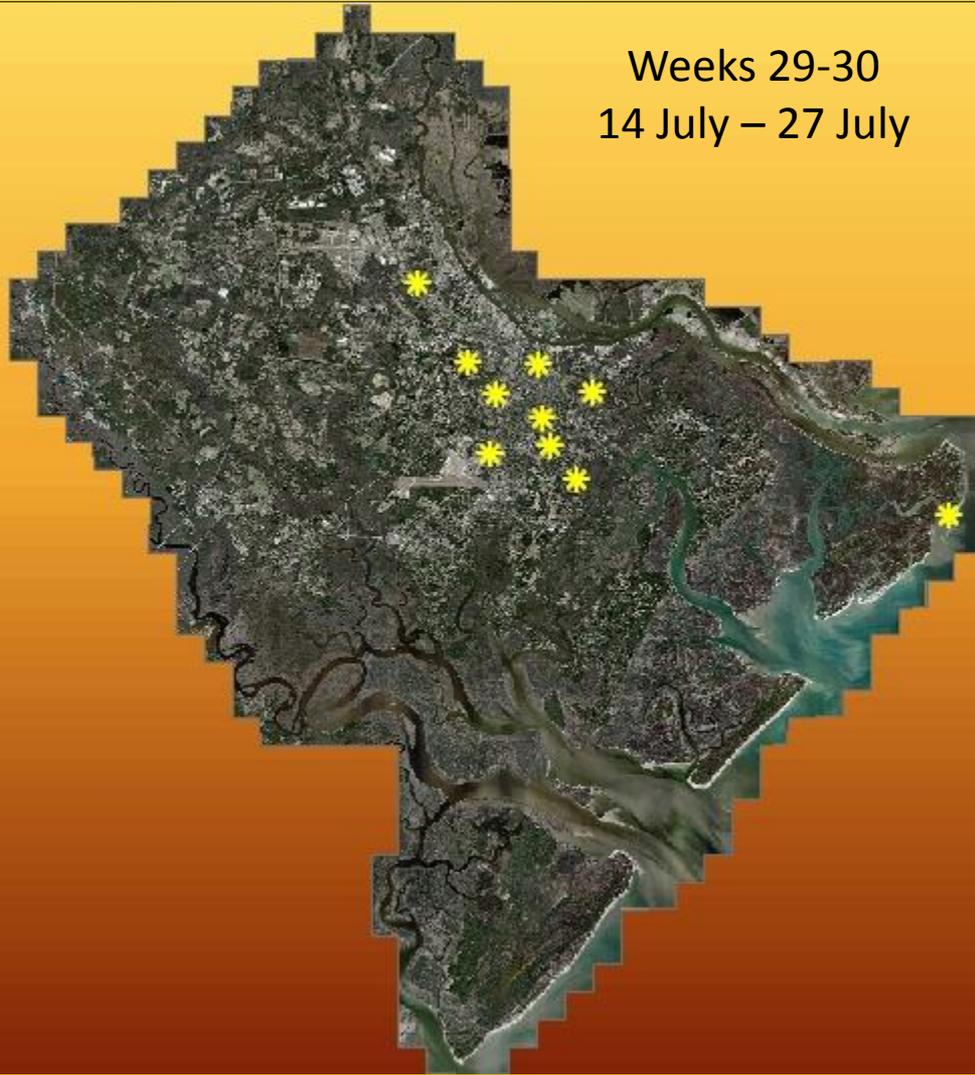
West Nile virus Activity

Weeks 27-28
30 June – 13 July



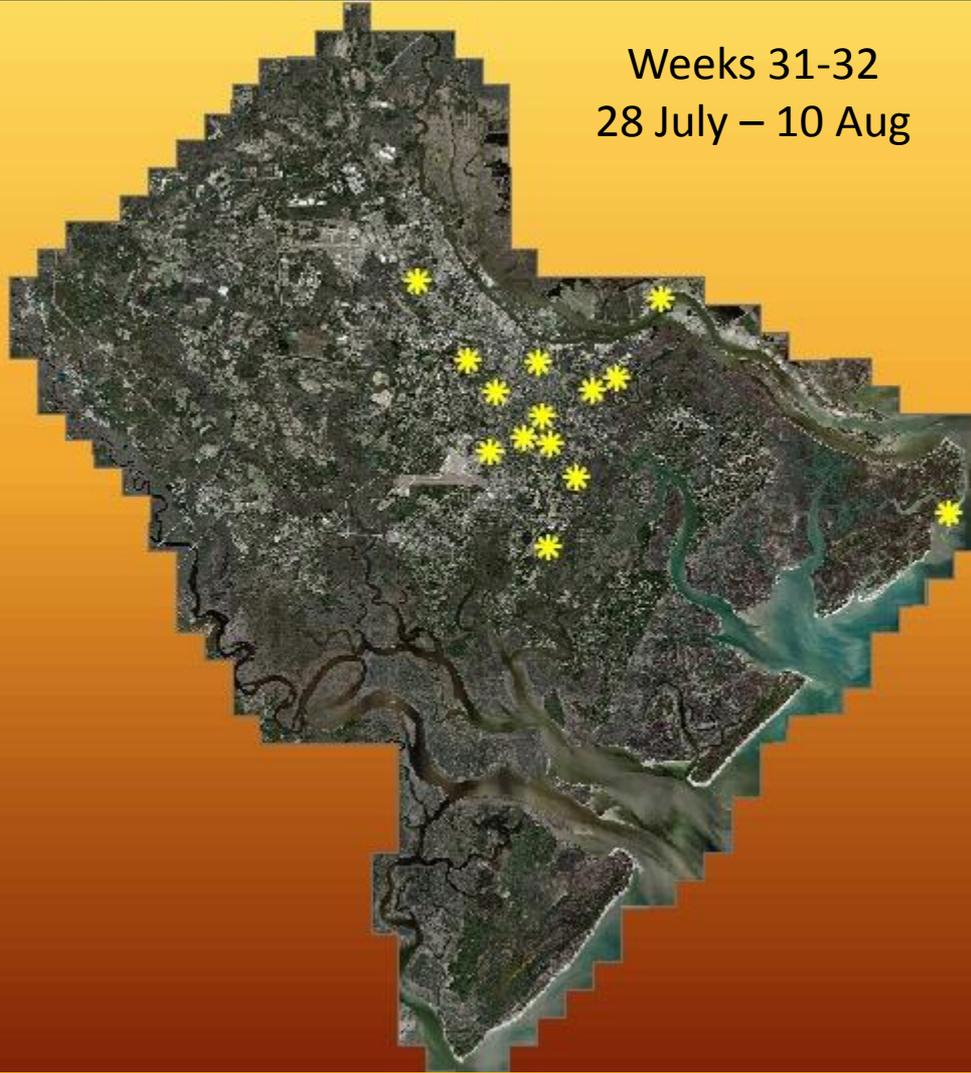
West Nile virus Activity

Weeks 29-30
14 July – 27 July

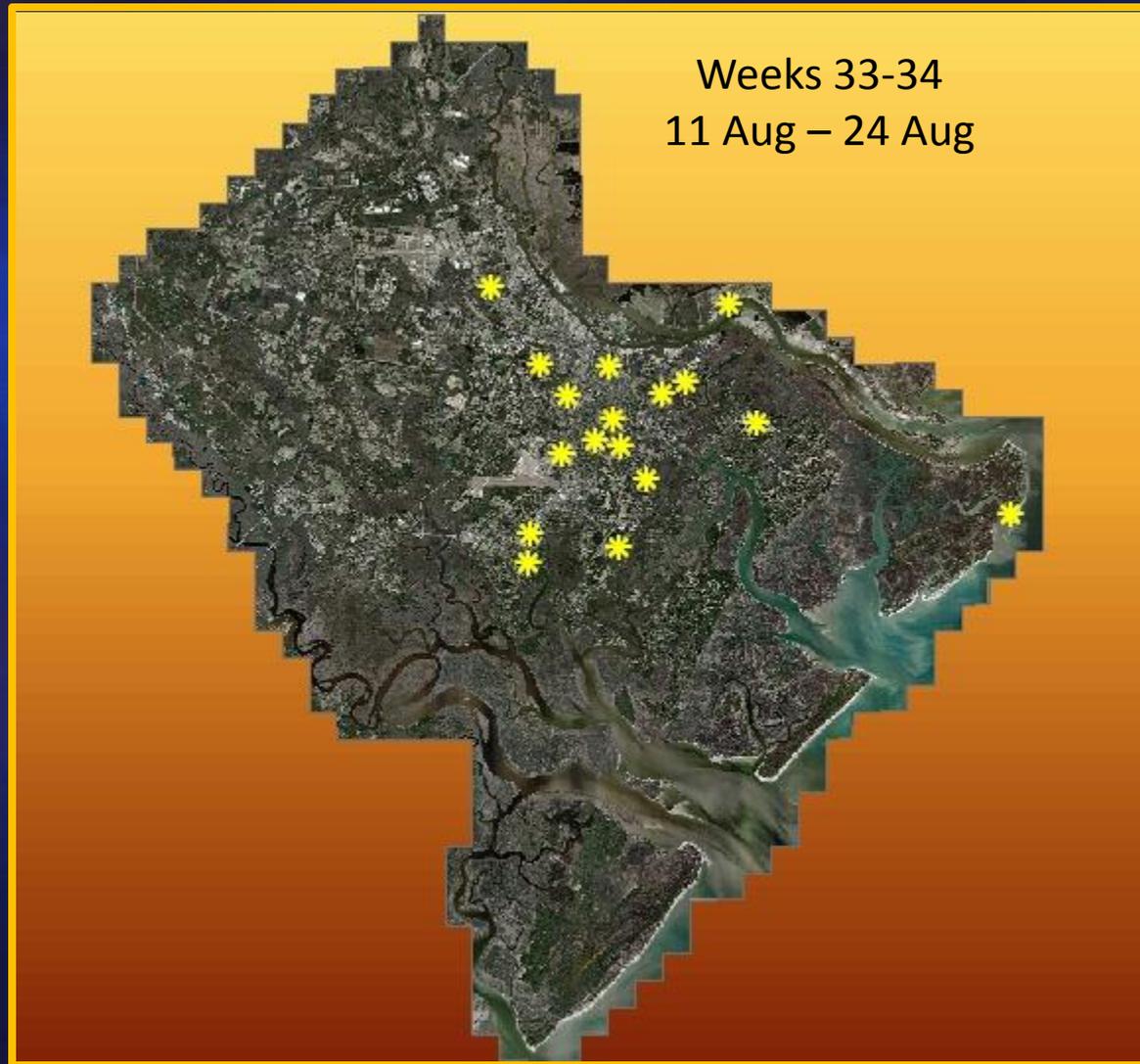


West Nile virus Activity

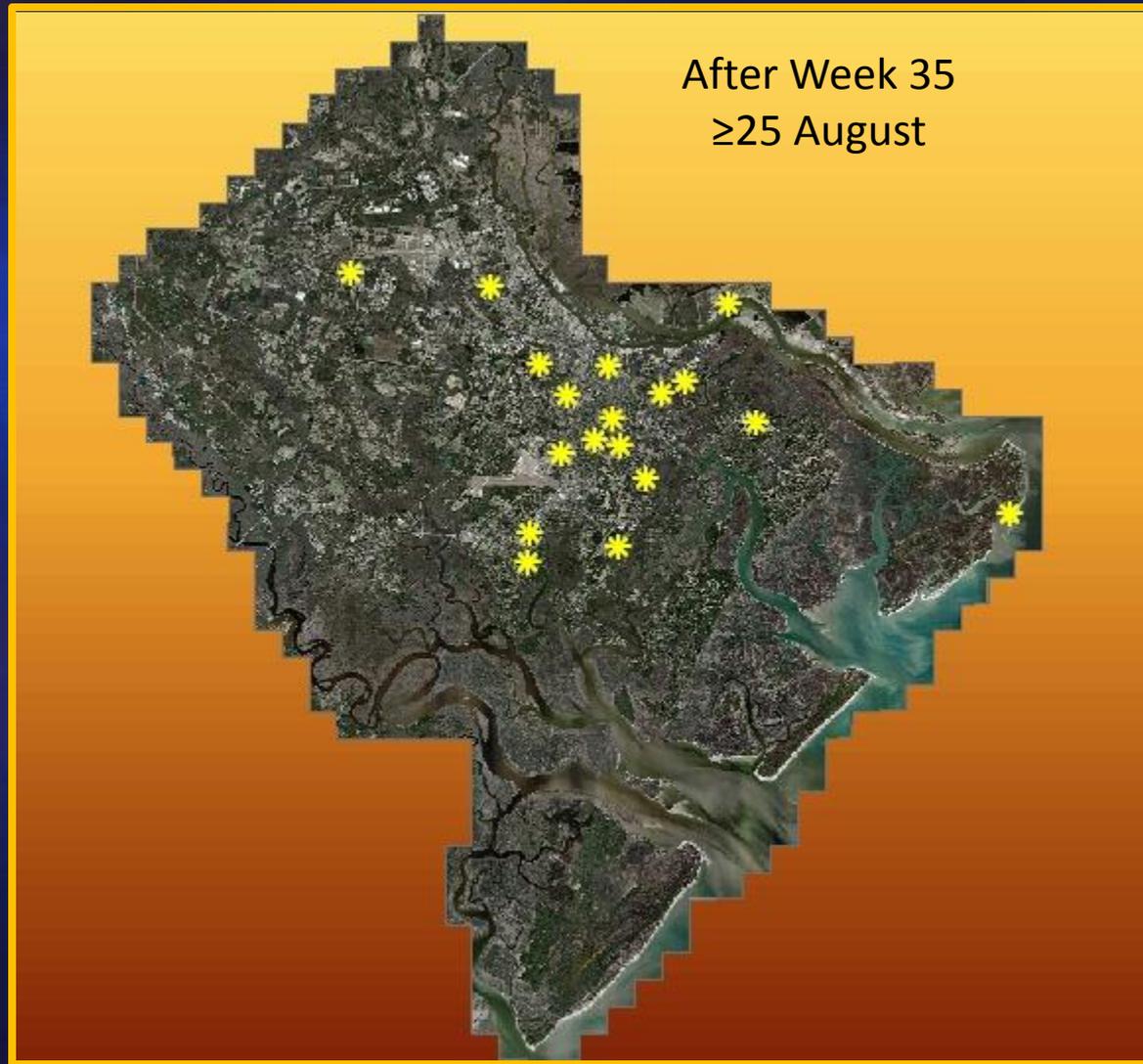
Weeks 31-32
28 July – 10 Aug



West Nile virus Activity



West Nile virus Activity



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West Nile virus Action Plan

- Treatment thresholds
- Monitoring of “Hot Zone”
- Catch basin treatments
- Adulticiding

West Nile virus Action Plan

Treatment Thresholds

Based on gravid trap surveillance, our thresholds consider:

- # of *Cx. quinquefasciatus* per trap
- any current WNV activity in the county
- specific trap location in relation to WNV activity

Current Thresholds

Before WNV detection: >300 in a gravid trap

After WNV detection: >200 (negative trapping areas)

>100 (positive* trapping areas)

*Traps are considered “positive” once they have produced one or more pools that have tested positive for WNV.

West Nile virus Action Plan

The “Hot Zone”

Sites experiencing higher WNV risk

Originally (2003-2006) focused on historic areas with the oldest drainage infrastructure

Targeted for monthly catch basin treatments when gravid traps begin capturing >300 *Cx. quinquefasciatus* per night



The original extent of the Hot Zone, 2003-2006

West Nile virus Action Plan

The “Hot Zone”

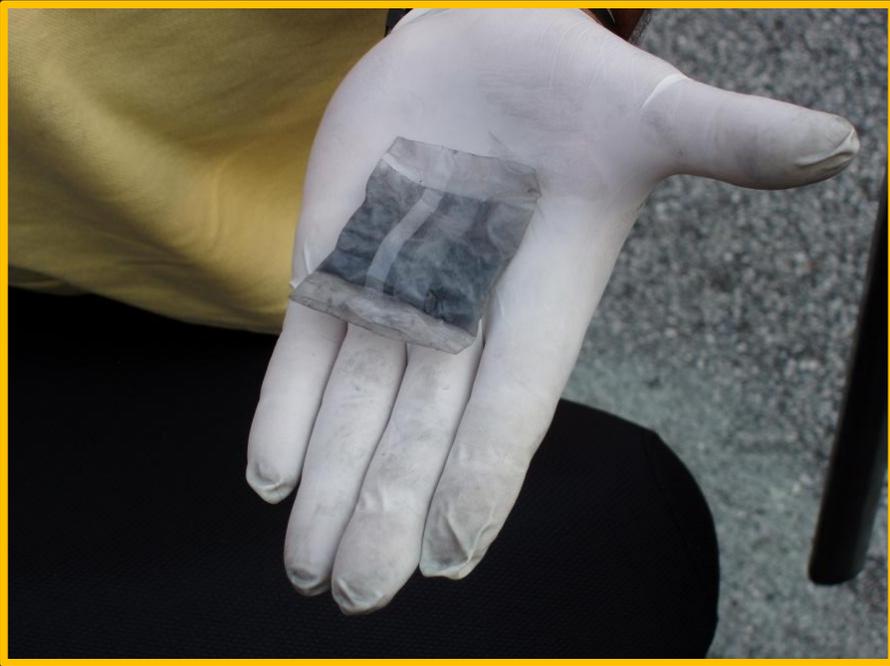
In 2007, the treatment area was expanded based on high *Culex* numbers and increased WNV activity outside of the historic areas.

Currently, we treat ~12,000 catch basins during a single treatment cycle.



The expanded Hot Zone, 2007-present

West Nile virus Action Plan



- Catch basin treatments conducted on a monthly basis when triggered by protocol
- WSP's: methoprene or *Bacillus sphericus* (alternate years)
- 2011: began treating with both products mid-season due to high WNV threat

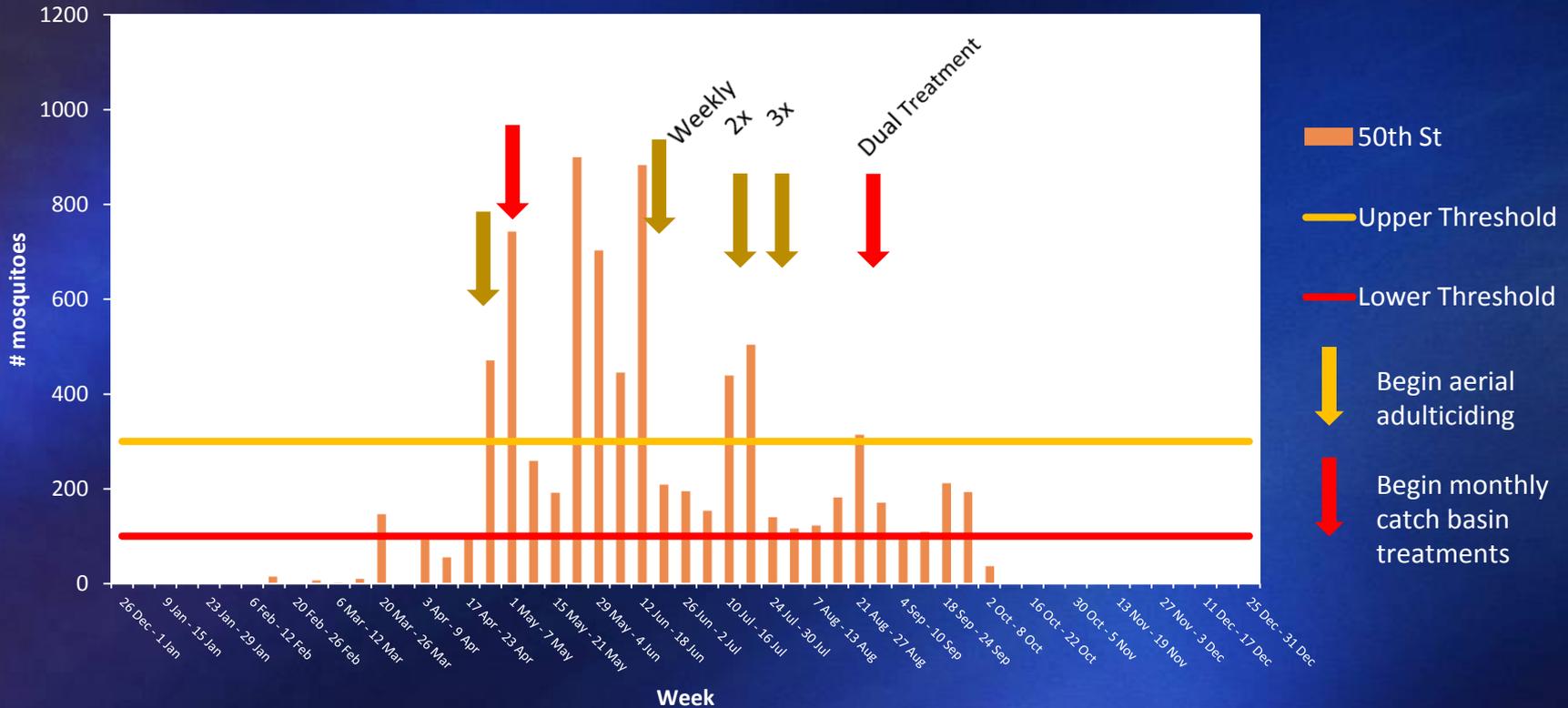
West Nile virus Action Plan



- Adulthood triggered by protocol
- Primarily aircraft using naled
- Resistance issues with local *Cx. quinquefasciatus* vs. malathion, many pyrethroids
- Aerial adulticide missions timed just prior to sunset to coincide with the beginning of this species activity cycle.

West Nile virus Action Plan

Cx. quinquefasciatus captured in a downtown gravid trap, 2011 (with treatments)



- Adulticide and catch basin treatments triggered by protocol
- Trap route regions can be adulticided by aircraft in 1-2 evenings
- 2011: *Cx. quinquefasciatus* numbers climbed earlier in the season

In conclusion: What have we learned?

2011 presented a challenging year in terms of mitigating WNV risk.

Flexible program:

- Can review the season to prepare better for future threat years.
- Possible tweaks to protocols
 - Lowered thresholds in high risk areas?
 - Earlier catch basin treatments?
 - Did certain treatments appear more effective?
- Will continue to monitor for resistance in local populations.

In conclusion: What have we learned?

It ain't over till . . .



and Danny's still singin'

Thank You



?Questions?