Geographic variation in vector prevalence and West Nile virus detection within Lowndes County

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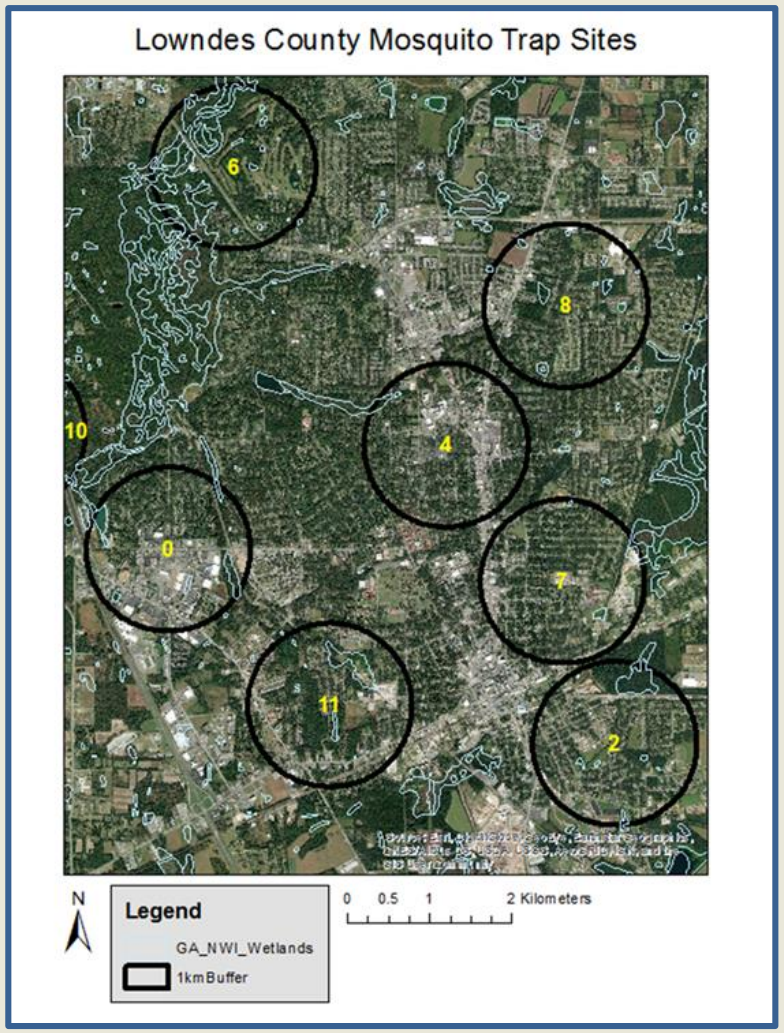
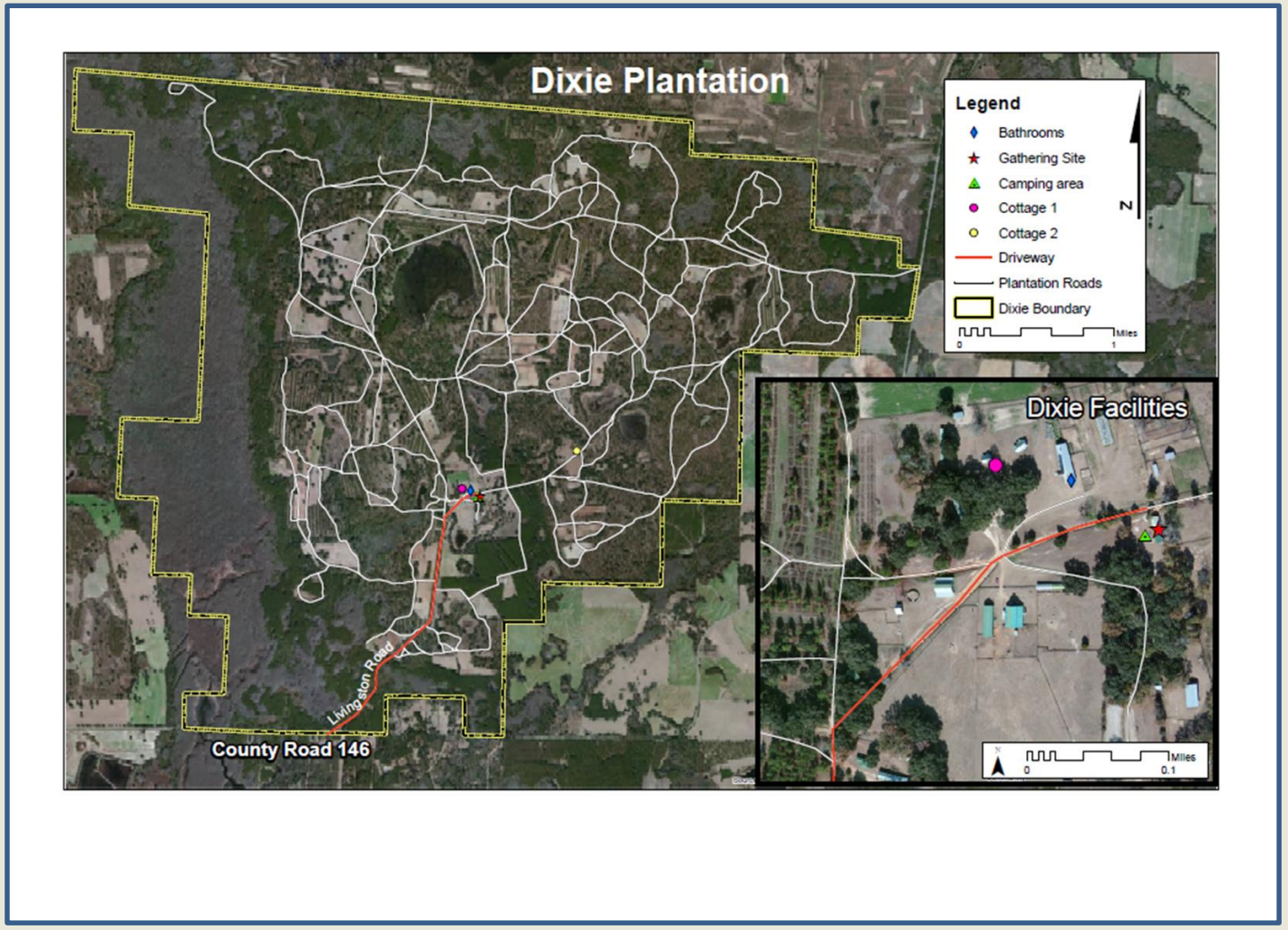
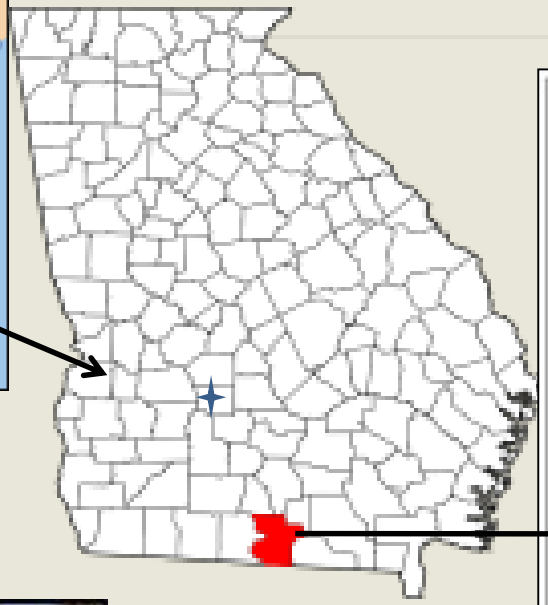
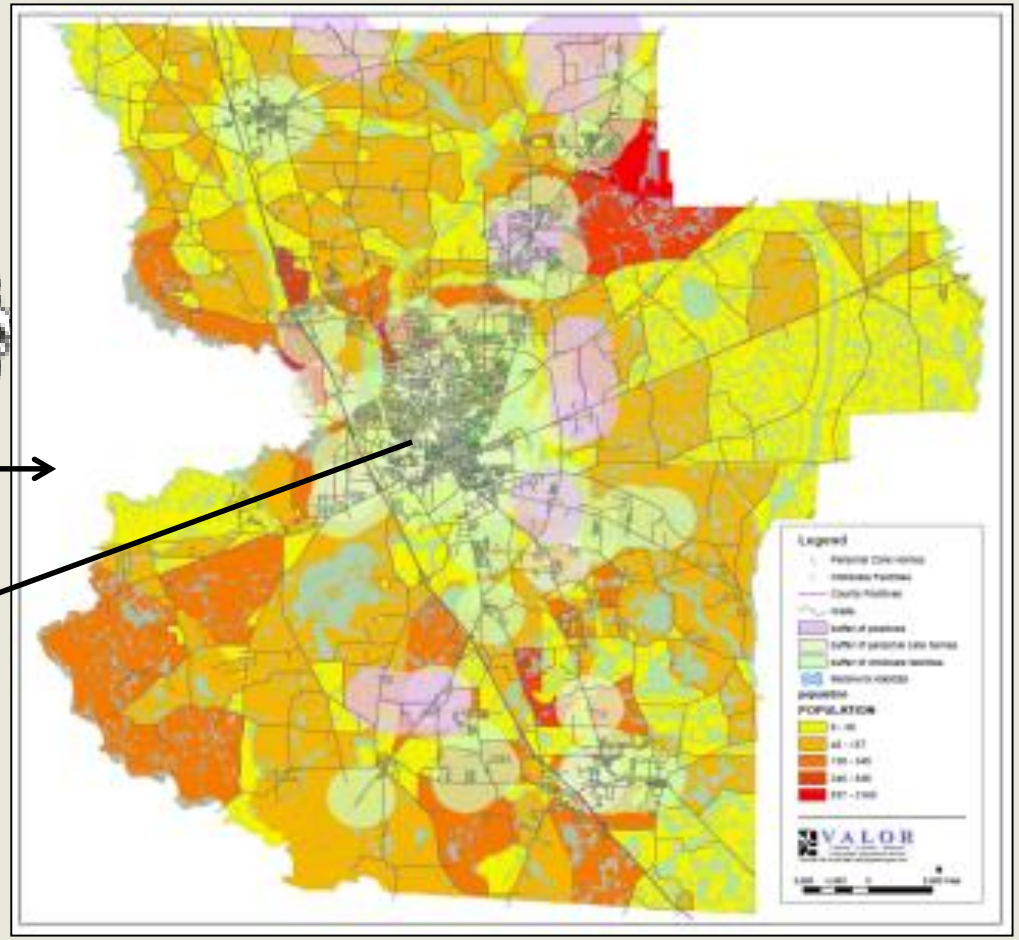
“Geographic”?


Lowndes County Mosquito Trap Sites
6
8
10
4
0
7
11
2
N
Legend
GA_NWI_Wetlands
1km Buffer
0 0.5 1 2 Kilometers


Dixie Plantation
Legend
Bathrooms
Gathering Site
Camping area
Cottage 1
Cottage 2
Driveway
Plantation Roads
Dixie Boundary
N
Miles
0
1
Dixie Facilities
Livingston Road
County Road 146
Miles
0
0.1

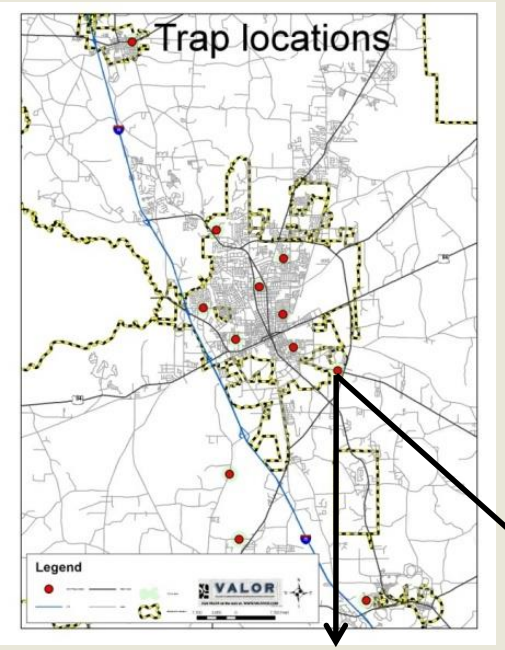
Lowndes County, Georgia

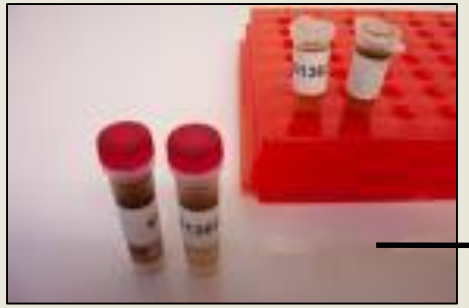


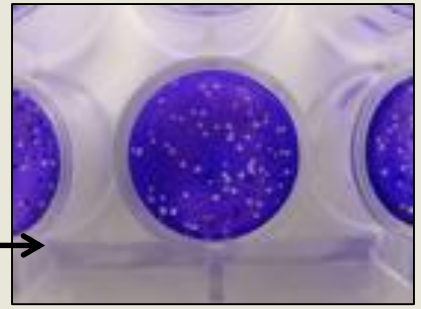


Weekly Data Collection

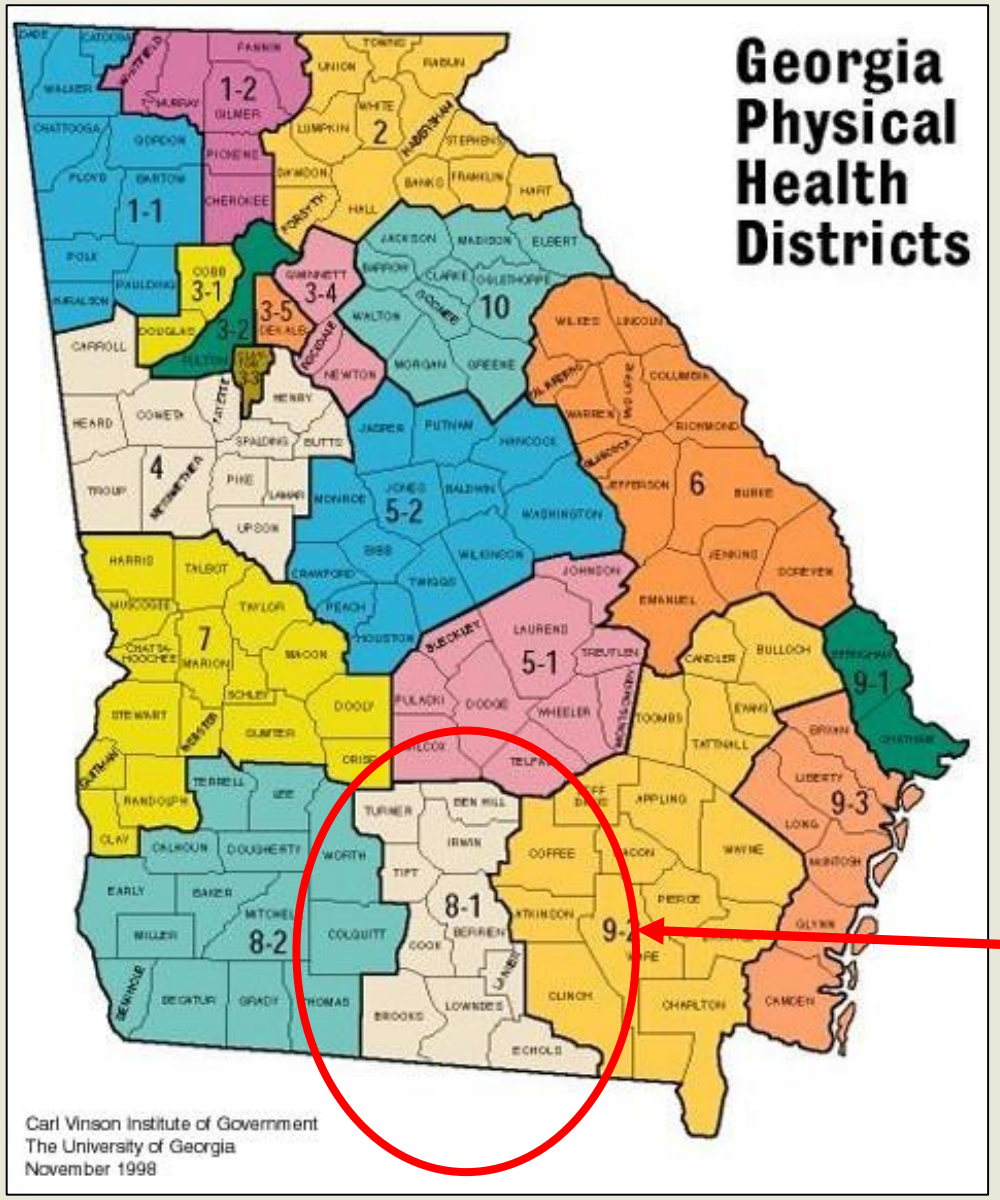
- 12 – 14 locations
- Two trap types
- Identification
- Virus isolation (SCWDS)
  - Plaque assay
  - Virus-specific RT-PCR







Surveillance Expanded



9 counties

Mosquito Fauna of Lowndes County*

Ae. vexans	*An. crucians s.l.*	*Cs. inornata*	*Ur. sapphirina*
Ae. atlanticus	*An. punctipennis*	*Cs. melanura*	*Ur. lowii*
Ae. canadensis	*An. quadrimaculatus*	*Ma. titillans*	*Tx. rutilus*
Ae. fulvus pallens	*Cq. perturbans*	*Or. signifera*	
Ae. infirmatus	*Cx. coronator*	*Ps. ciliata*	
Ae. mitchellae	*Cx. nigripalpus*	*Ps. columbiae*	
Ae. sollicitans	*Cx. quinquefasciatus*	*Ps. ferox*	
Ae. sticticus	*Cx. restuans*	*Ps. howardii*	
Ae. taeniorhynchus	*Cx. salinarius*	*Ps. cyanescens*	
Ae. thibaulti	*Cx. erraticus*		
Ae. triseriatus	*Cx. territans*		
Ae. albopictus			

* Includes all species collected 2001-2019

Virus Epidemiology

<u>Arboviruses found in Lowndes Co.</u>

EEEv

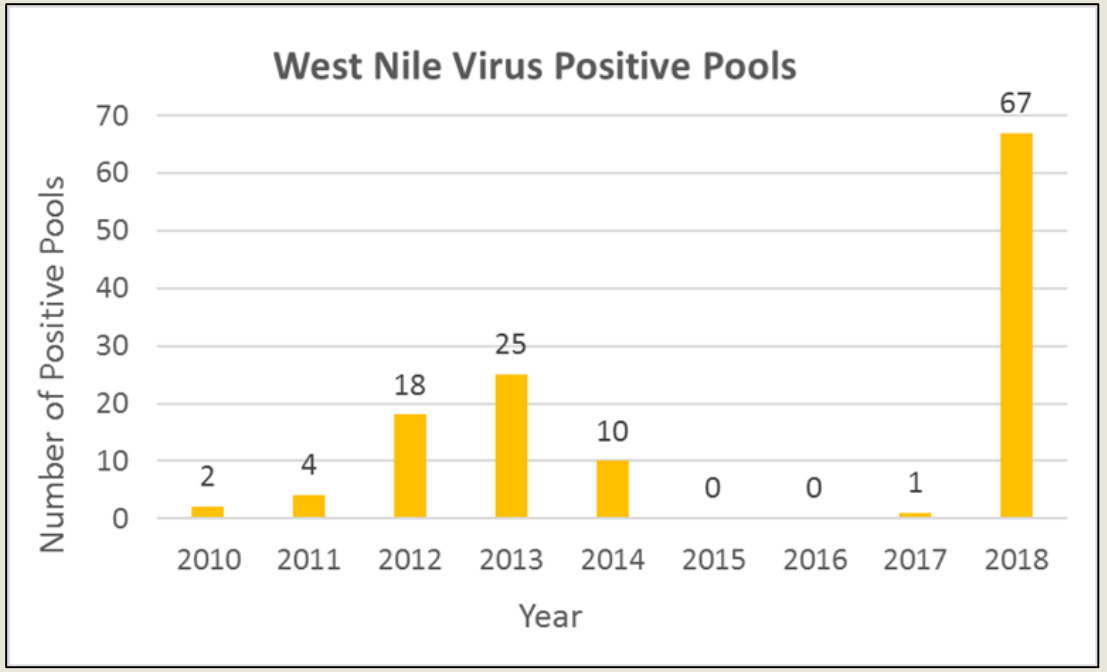
West Nile virus

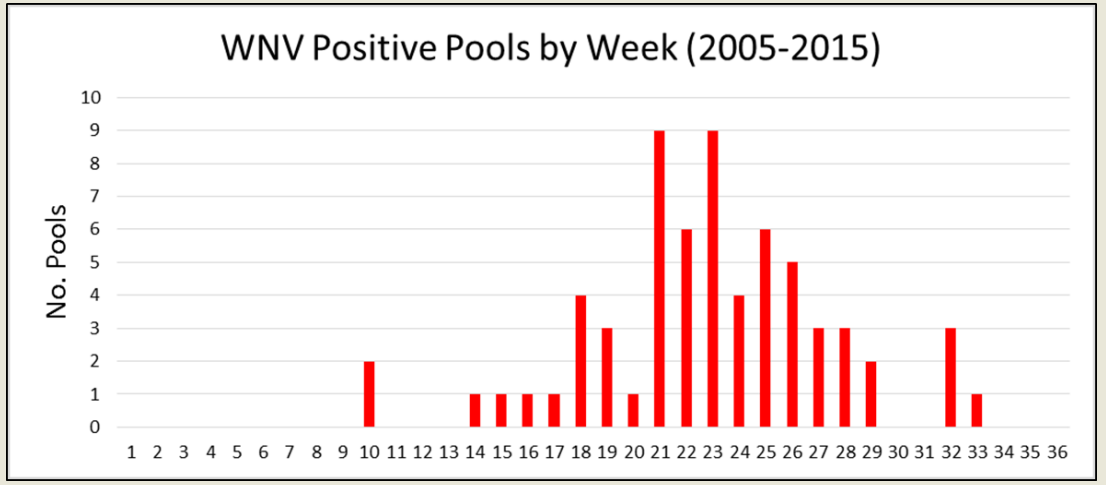
Flanders virus*

Highlands J

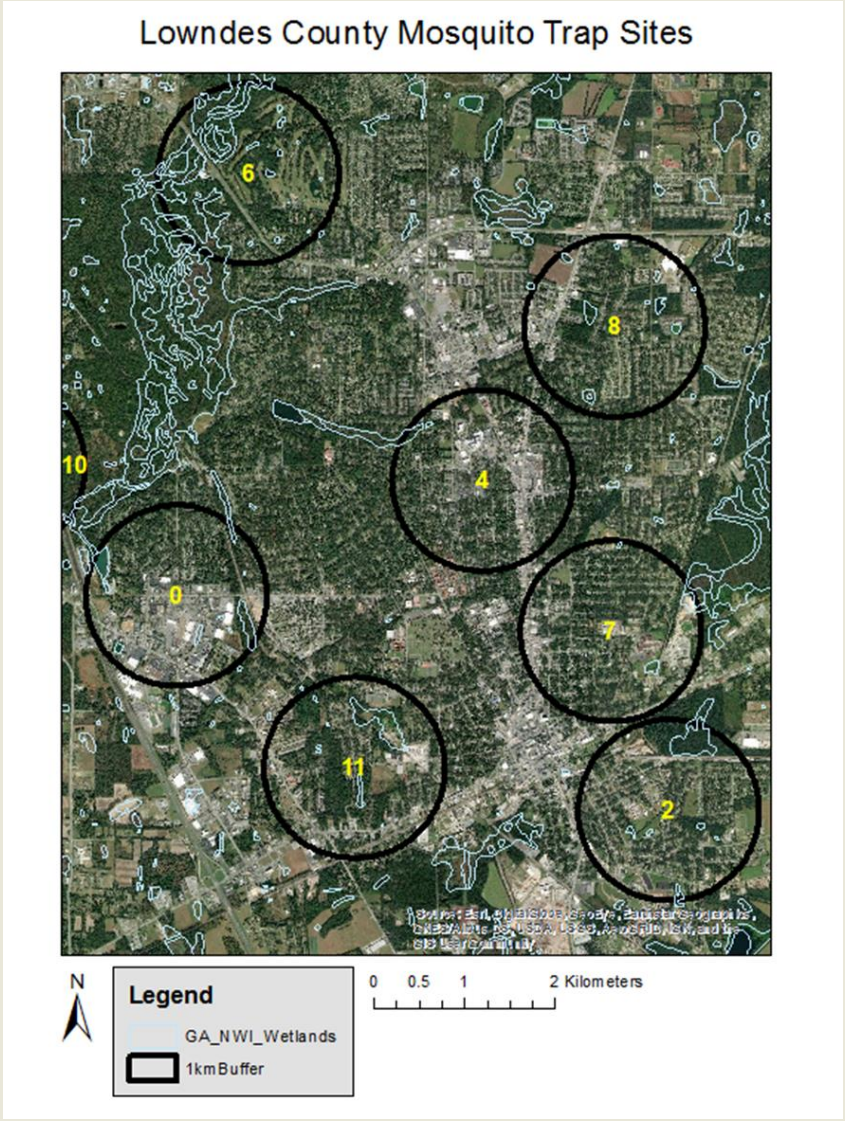
La Crosse virus

Keystone virus



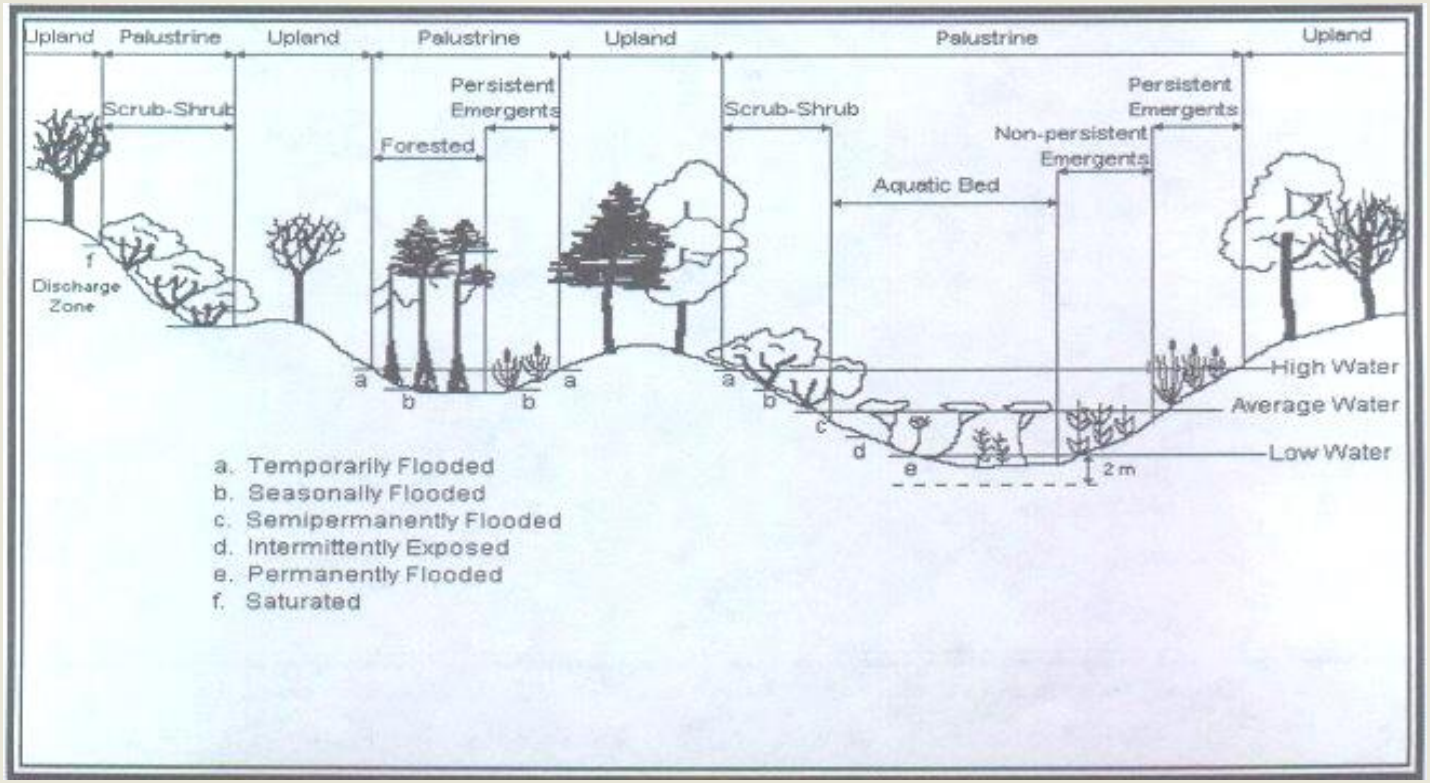


MIR varies among trap sites

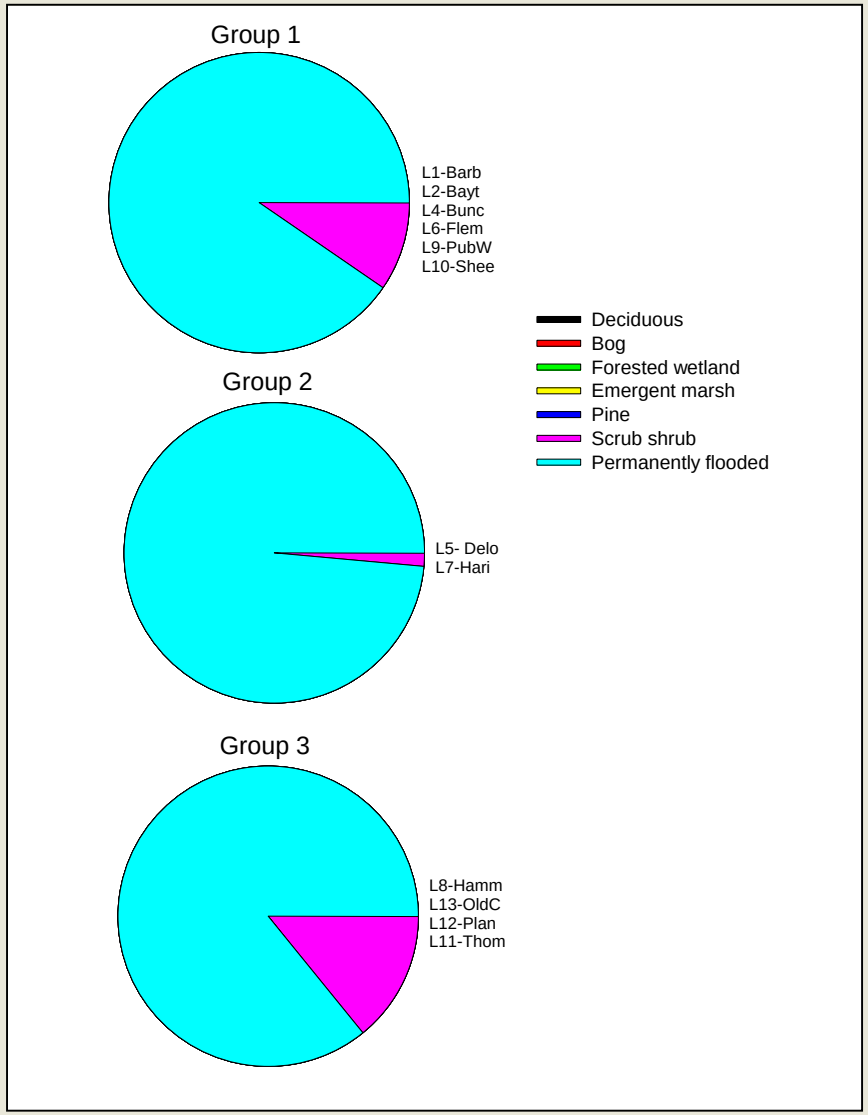


Characterization of Sites

- % Canopy
- % Wetlands
- National Wetlands Inventory Classes

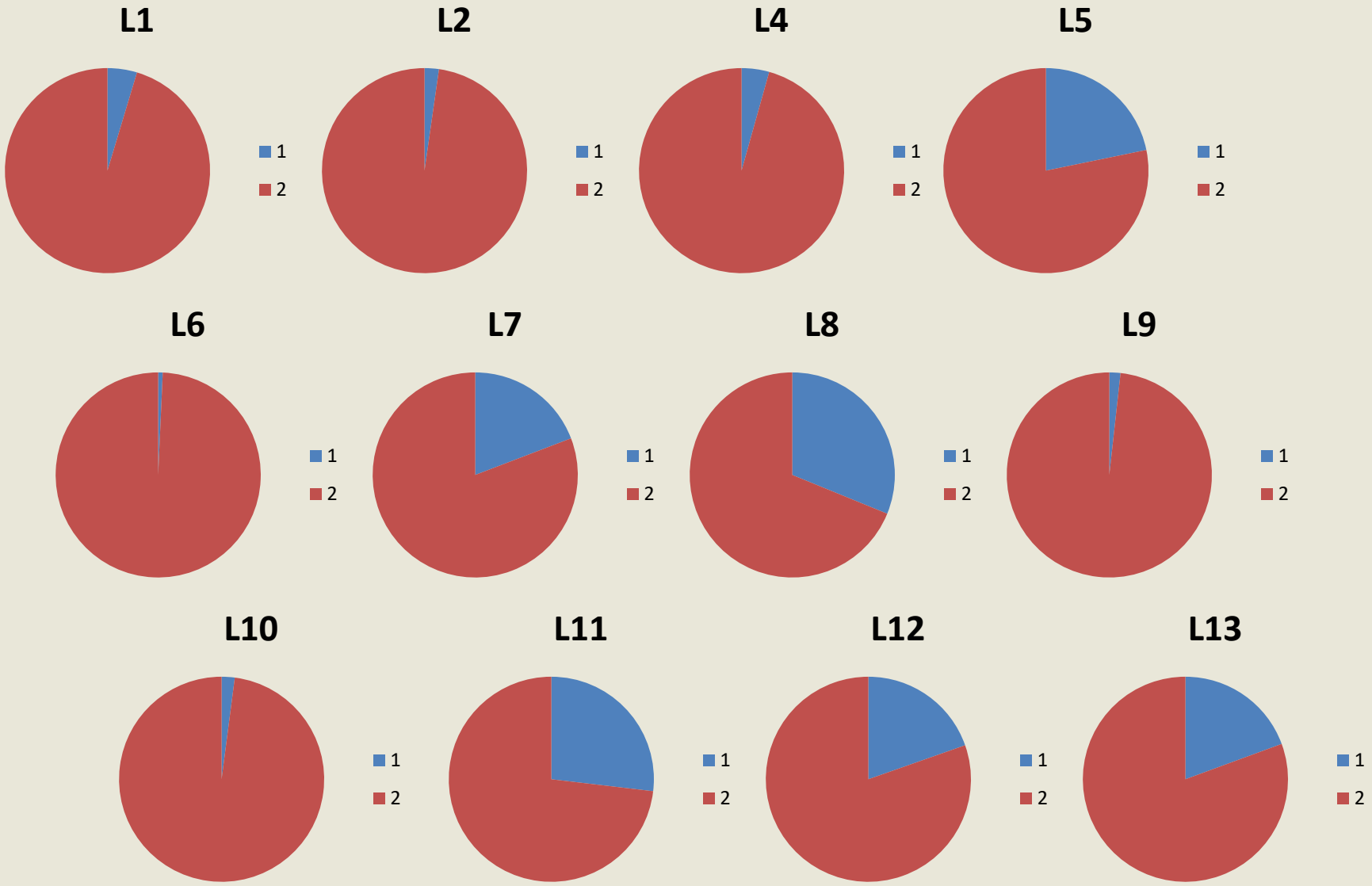


Habitat Features & Indicator Species

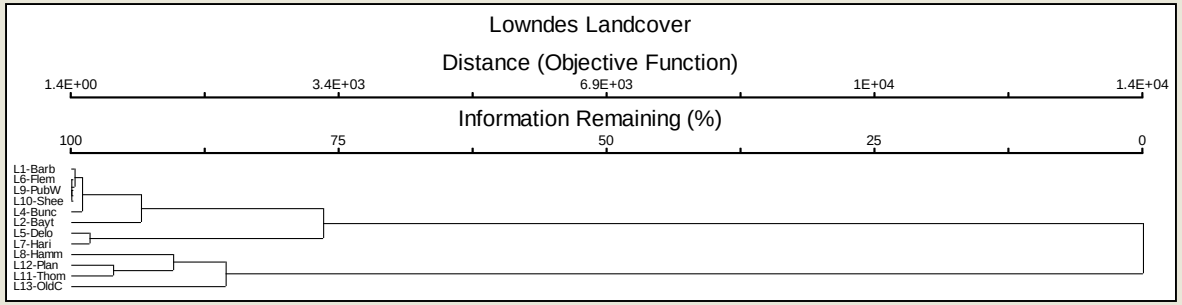


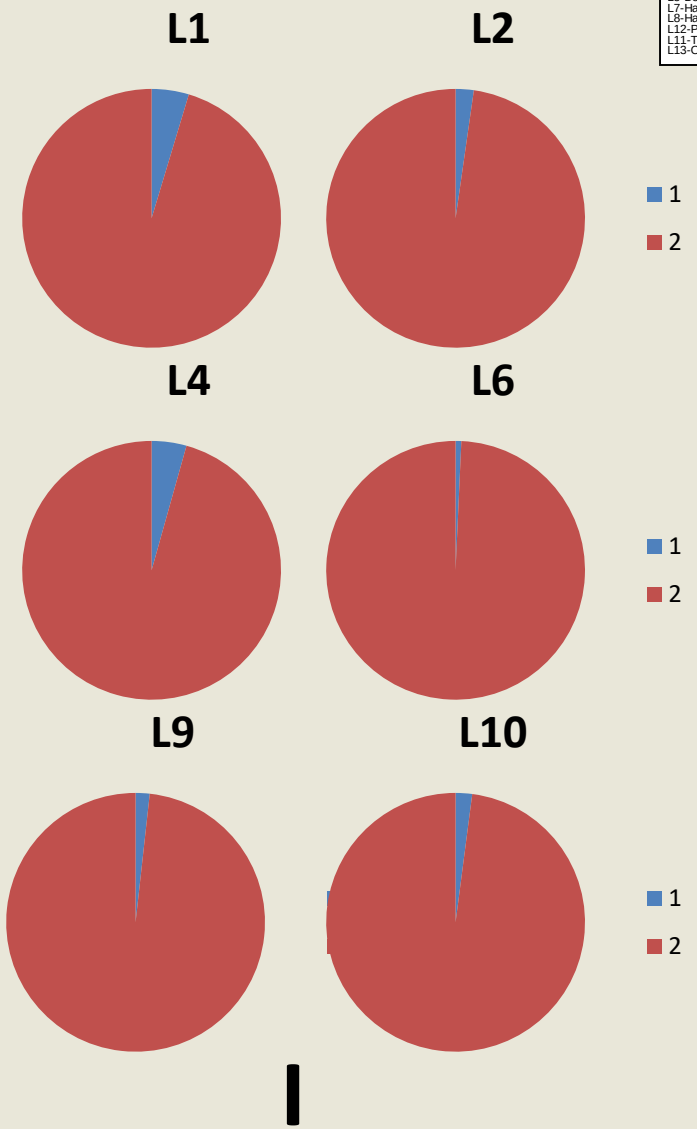
- *Culex quinquefasciatus* & unidentified *Culex*
- *Aedes atlanticus*, *Ae. canadensis, Ae. infirmatus*, & *Culex erraticus*
- *Culex coronator*
- Repeated arbovirus isolations from sites in *all* 3 habitat groups

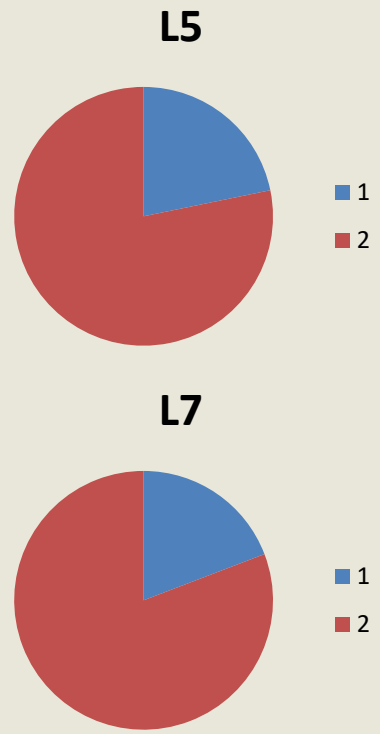
% Wetlands by Trap Location

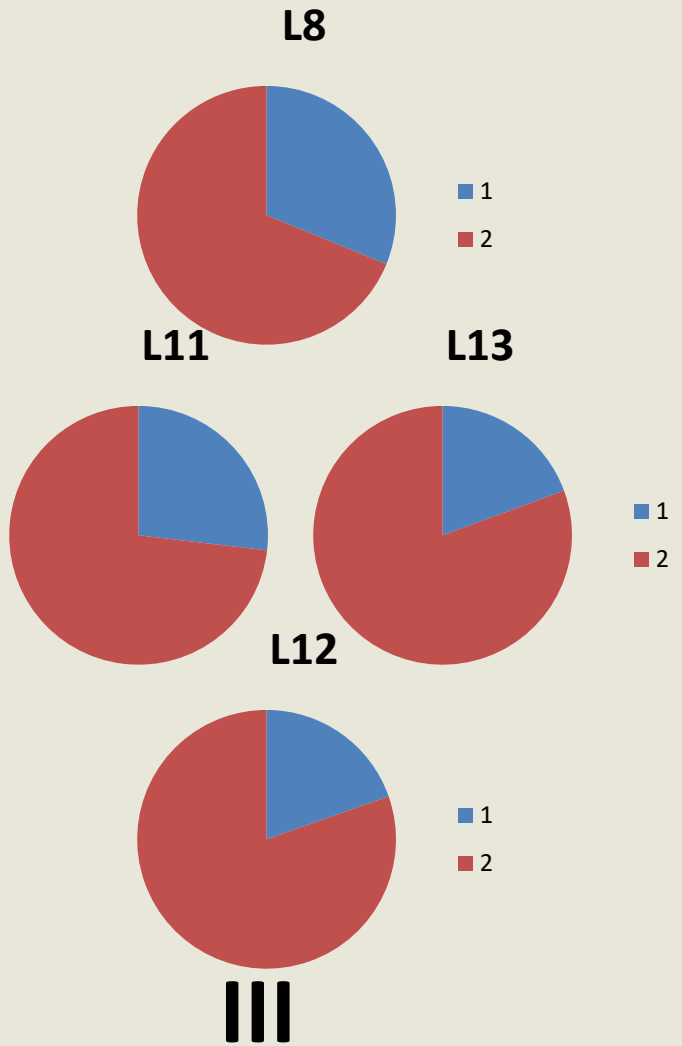


Site Groupings









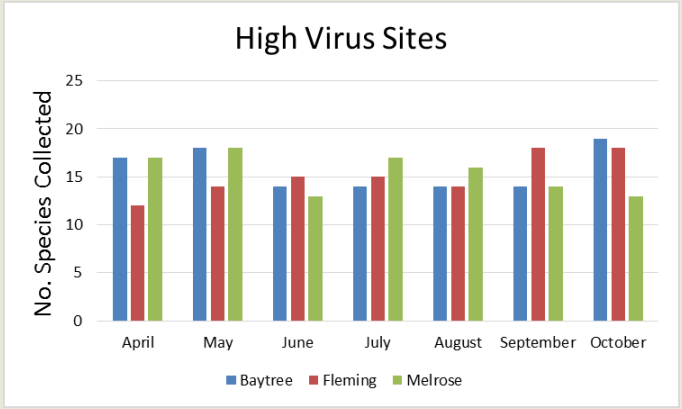
Species Richness 2013

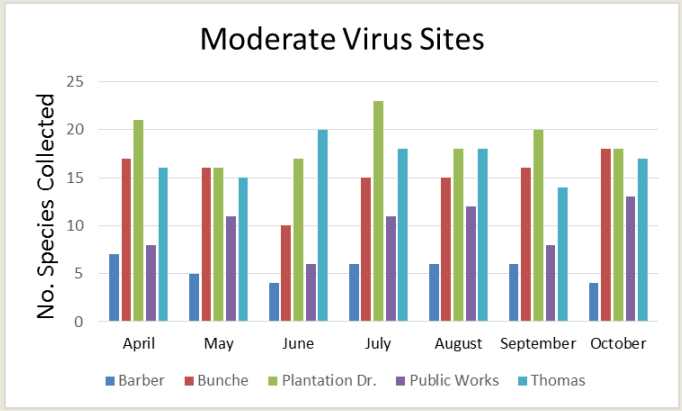
<u>Classification of Sites</u>

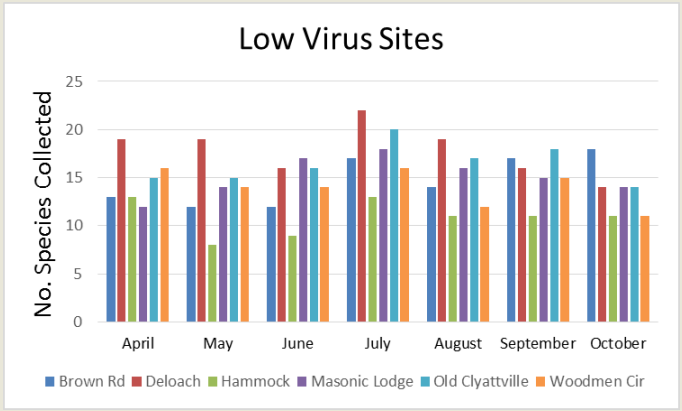
Low Virus: 0 WNV^+ Pools in 10 yr

Moderate Virus: 2-7 WNV^+ Pools Total; WNV^+ in 1-2 yr

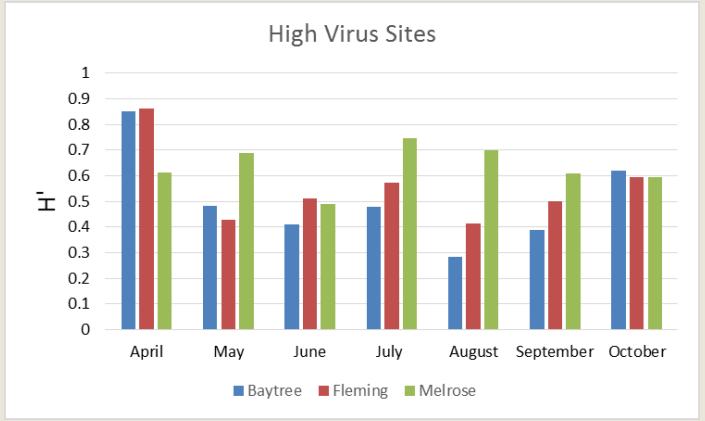
High Virus: 10-18 WNV^+ Pools Total; WNV^+ in 3-6 yr

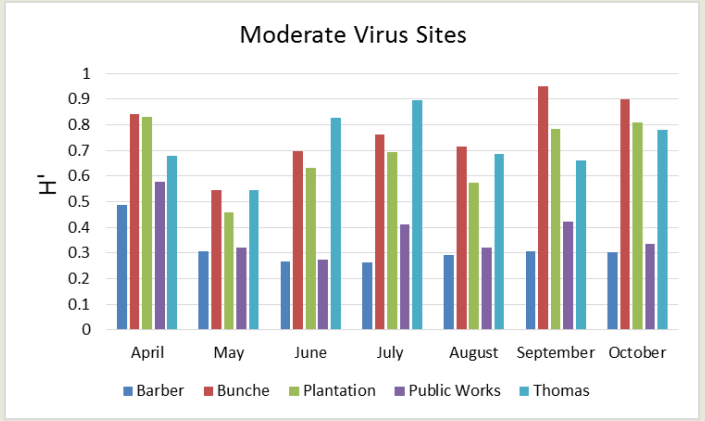


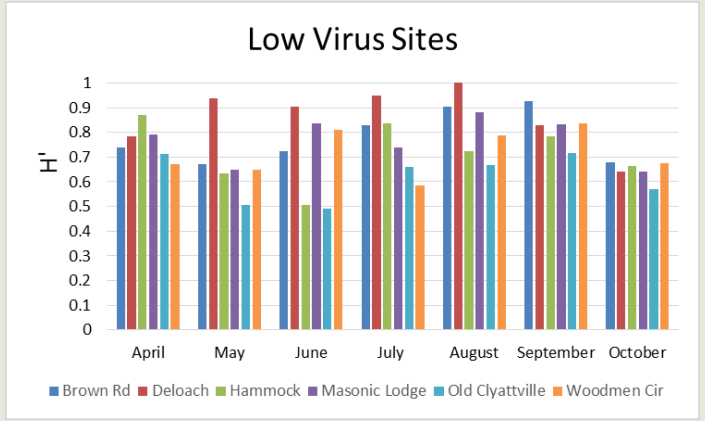




Diversity 2013

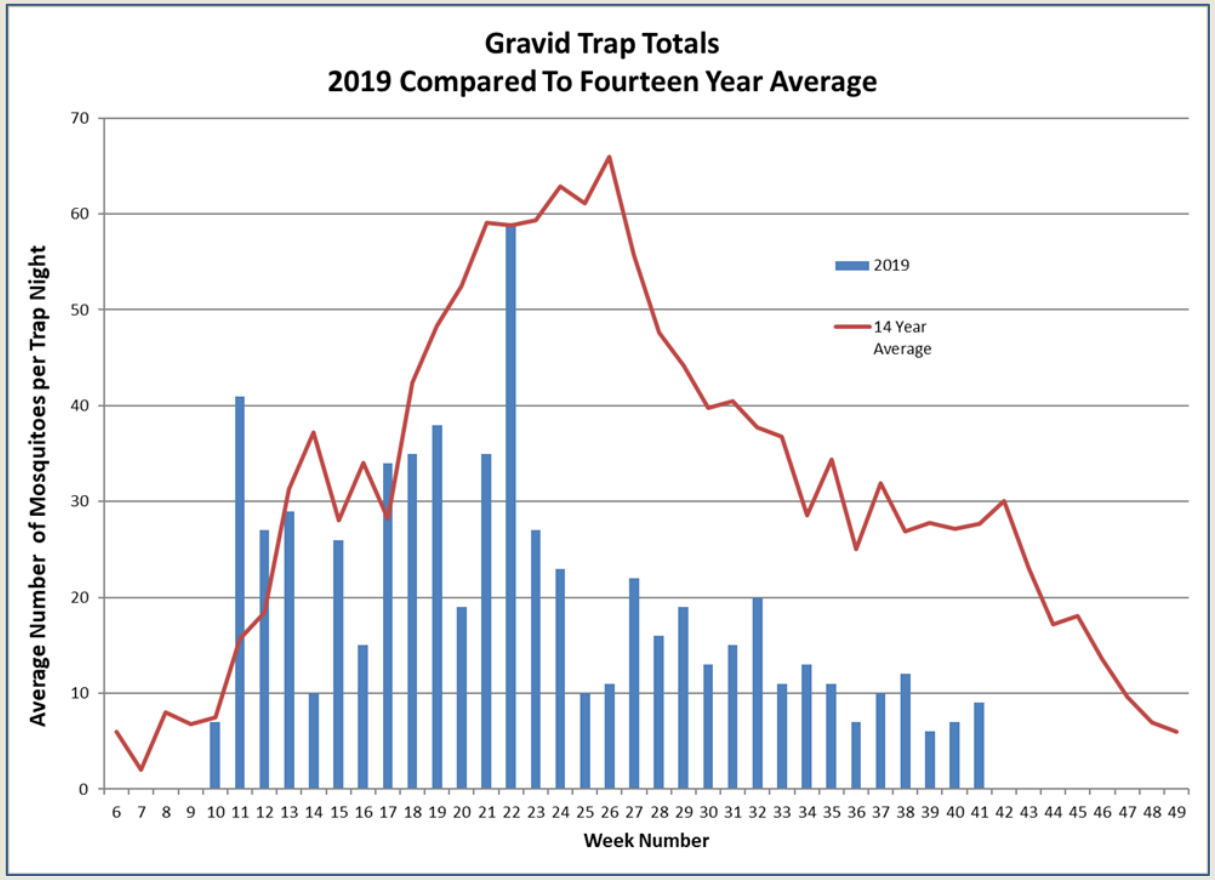


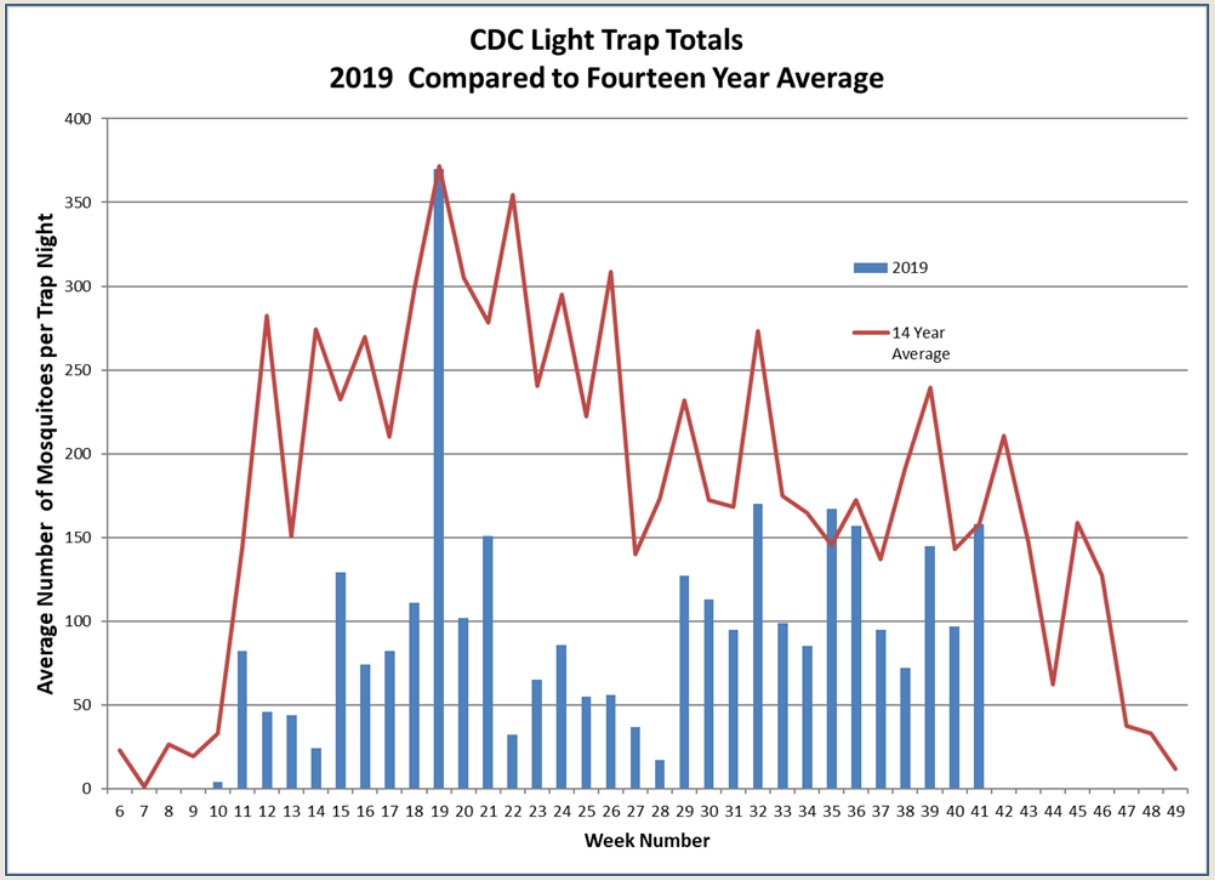




$$H' = - \sum p_i \log (p_i)$$

2019


Gravid Trap Totals
2019 Compared To Fourteen Year Average
Average Number of Mosquitoes per Trap Night
Week Number
2019
14 Year Average


CDC Light Trap Totals
2019 Compared to Fourteen Year Average
Average Number of Mosquitoes per Trap Night
Week Number
2019
14 Year Average

Other Work in Progress

- WNV exposure serosurvey

- Human behavior

- Avian population assessments

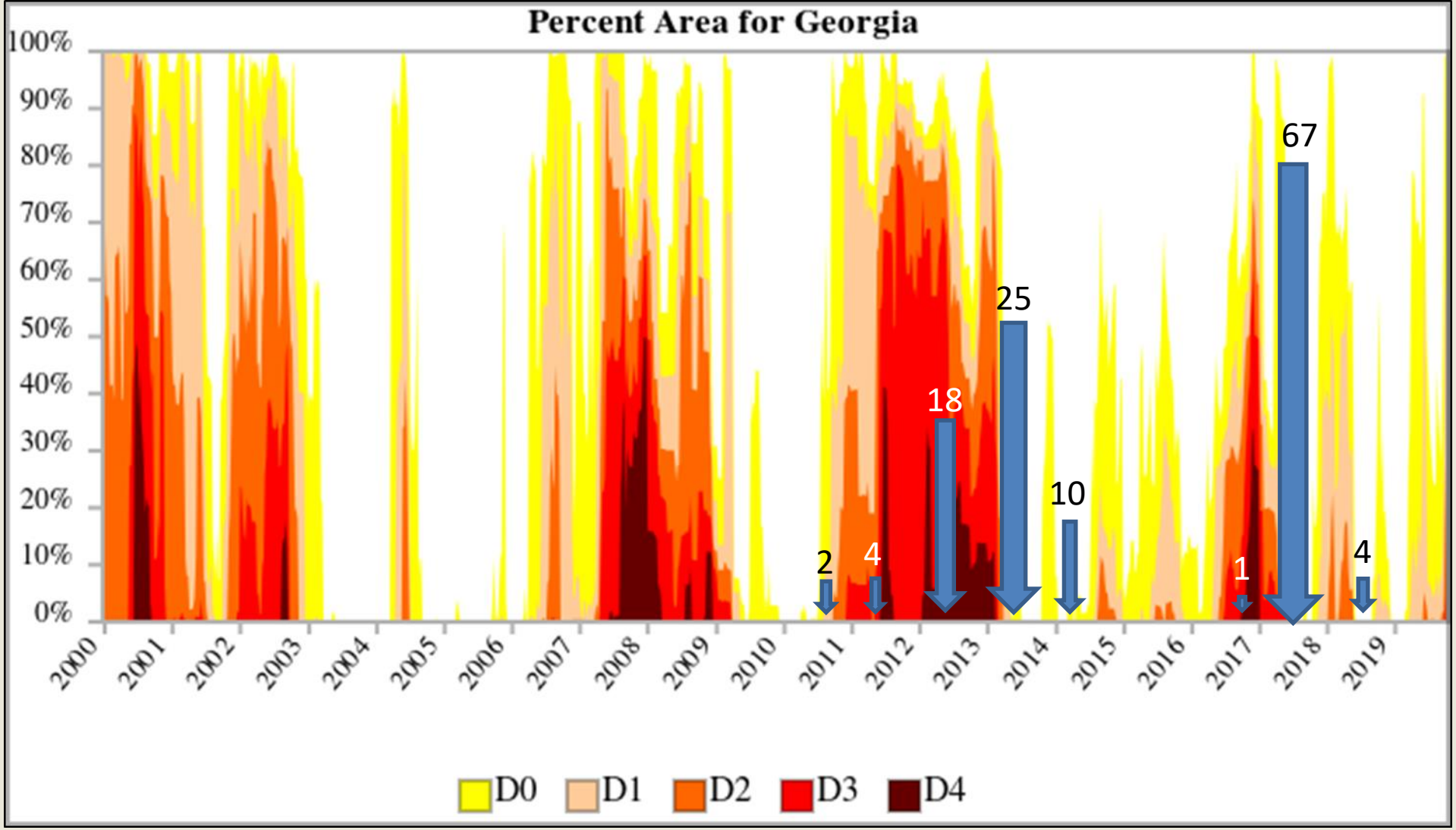
Acknowledgements

Katie Merritt Butts
Christopher Adam Slaton

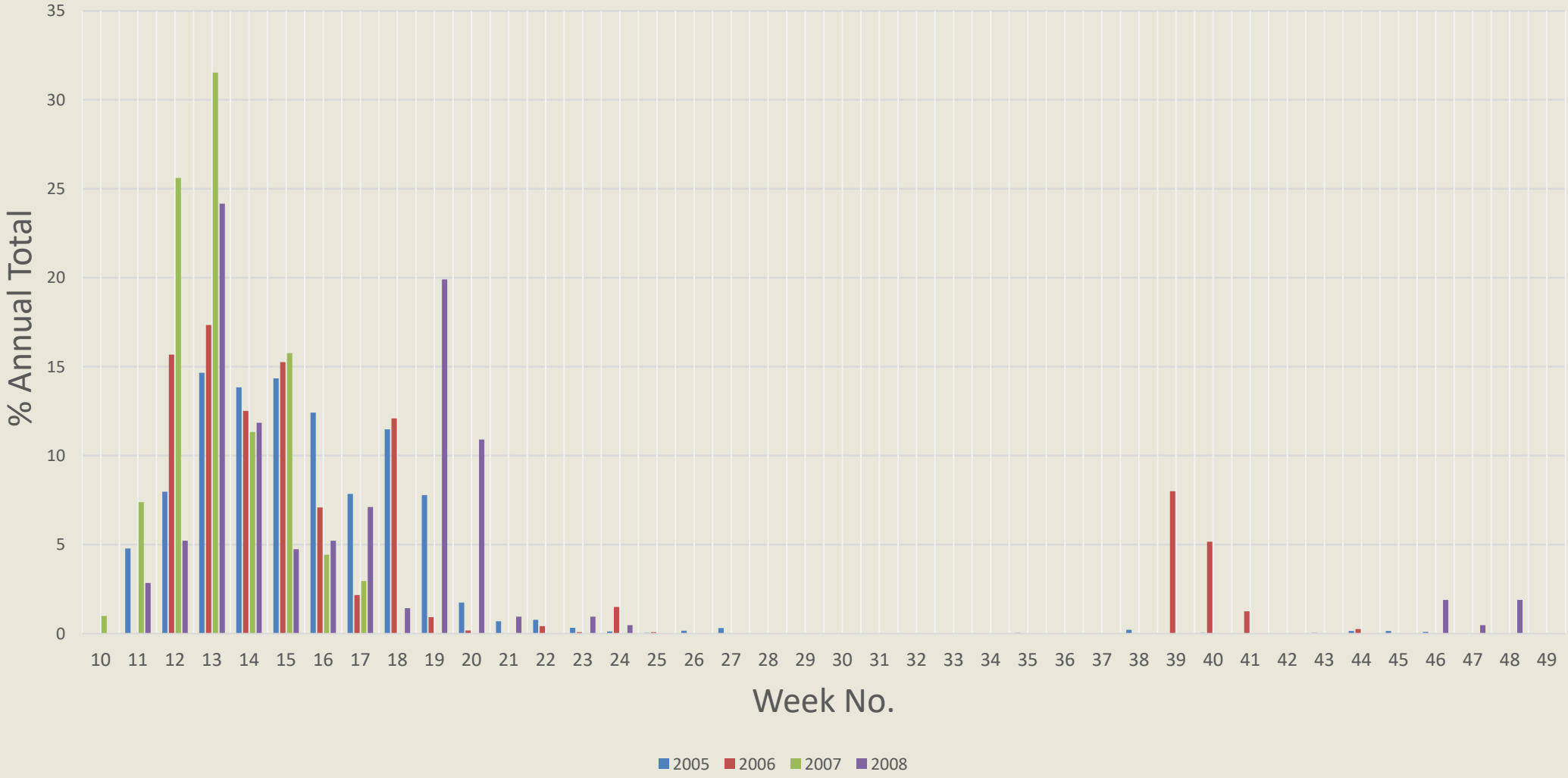
City of Valdosta
Lowndes County Commission

Dr. Danny Mead (SCWDS)

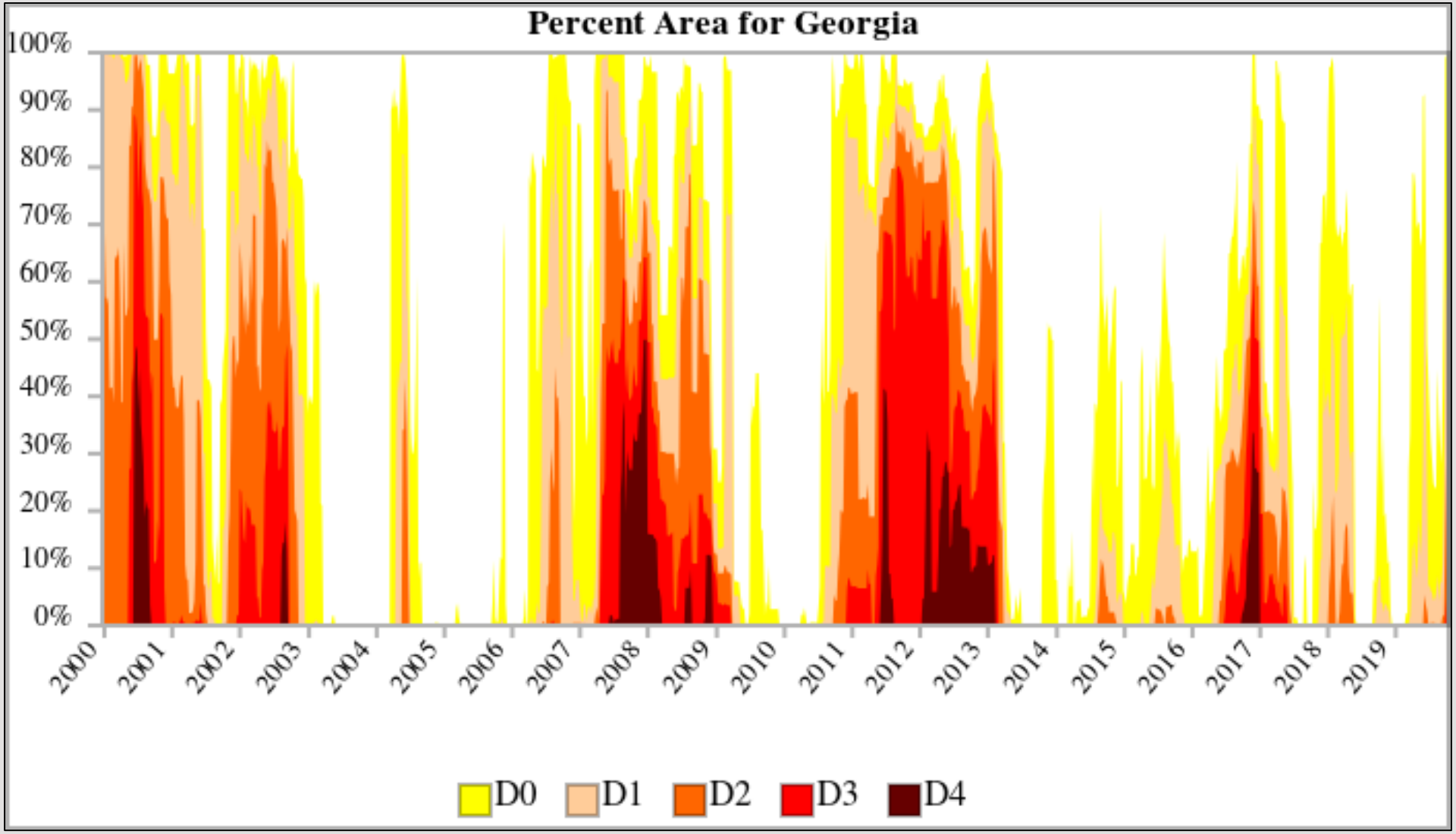
VSU Mosquito Lab Students


Percent Area for Georgia
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2
4
18
25
10
1
67
4
D0
D1
D2
D3
D4

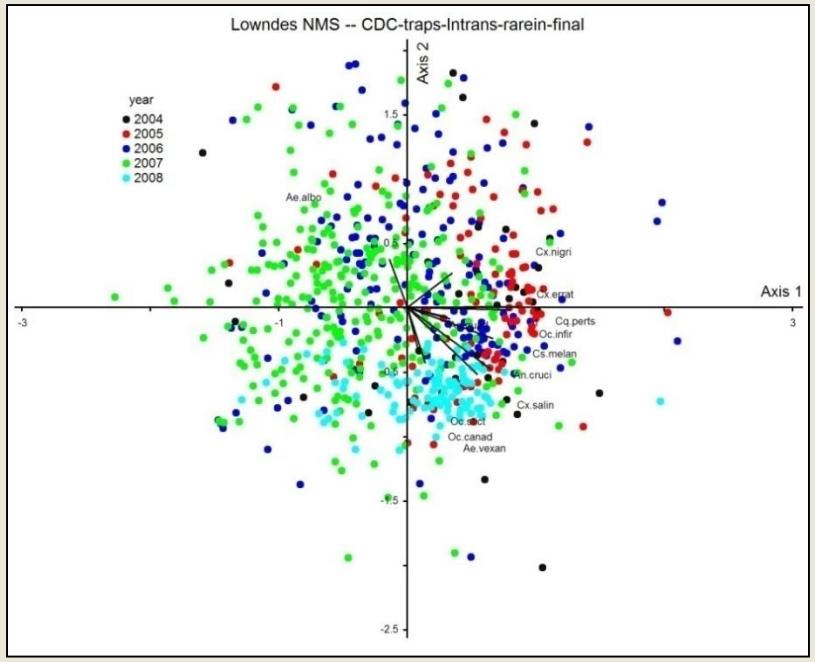
Phenology of *Culex restuans*

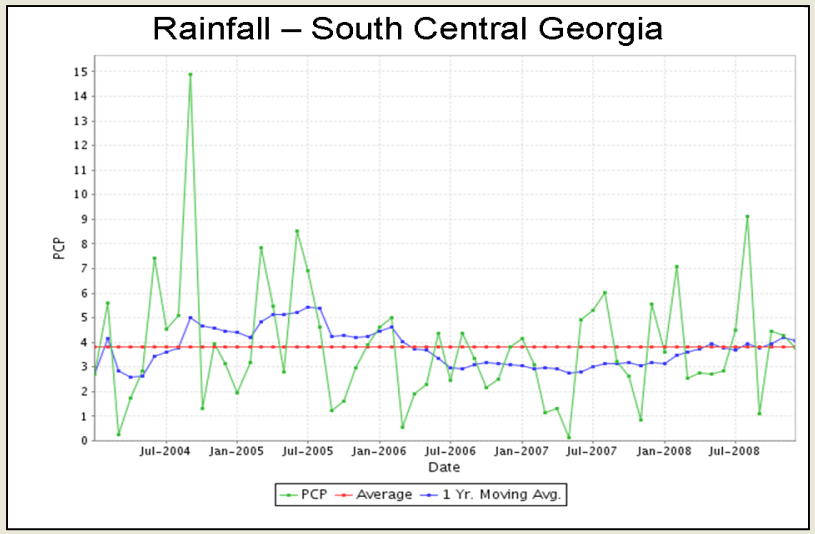


Drought in Georgia from 2000 – 2019

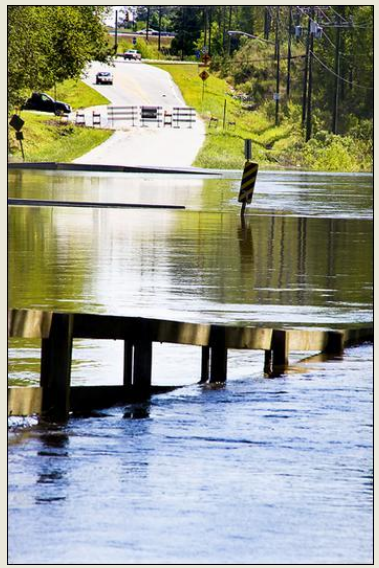


Trends from Light Trap Data





- Temporal variation associated with different species associations
- Possible relationship with virus epizootics?



Next Steps

- Complete ordination analysis of gravid trap data (2004-2019)
- Refine and extend habitat analysis
- Compare to other locations
  - Comparative studies
  - Predictive