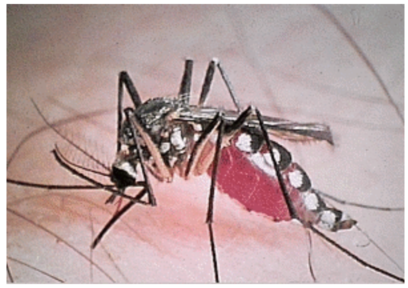
MOSQUITO SURVEILLANCE 2024



GEORGIA DEPARTMENT OF PUBLIC HEALTH, ENVIRONMENTAL HEALTH

Mosquito Surveillance 2024

Limited mosquito surveillance programs occur in many Georgia counties (http://www.gamosquito.org/resources/GA_Mosquito_Control_Programs2017.pdf), but most counties with mosquito control programs conduct control activities without appropriate mosquito surveillance. Data obtained from mosquito surveillance activities are important to guide vector control operations by identifying vector species, providing an estimate of vector species abundance, and by indicating geographic areas where humans and animals are at greatest risk of exposure to WNV or other arboviruses.

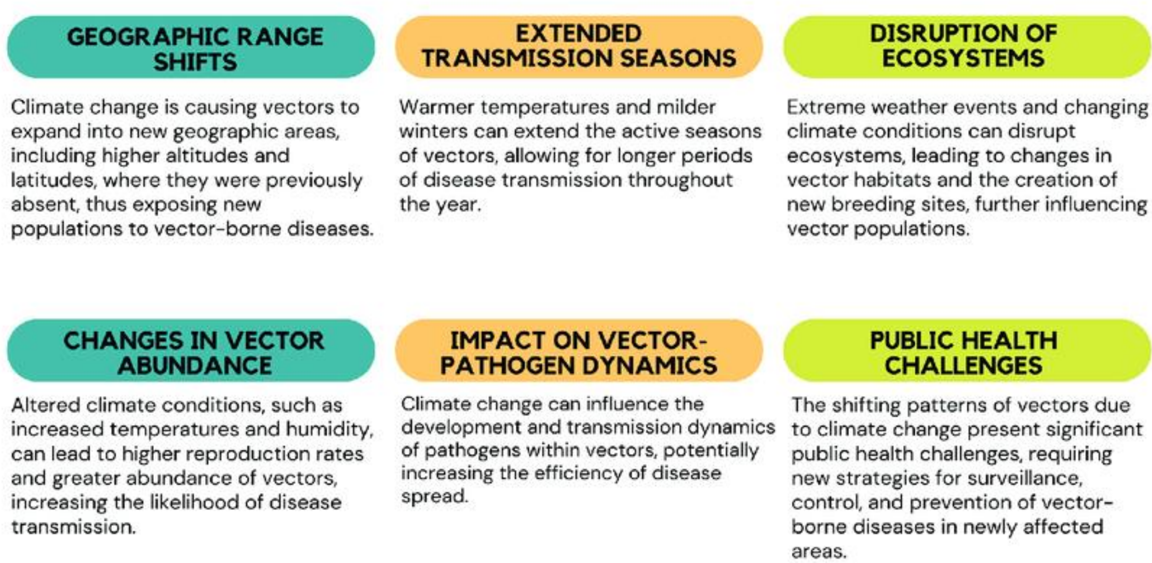
Mosquito-borne diseases threaten more than 40% of the world's population and are an increasingly serious global health challenge. A report released by the World Health Organization (WHO) showed that malaria caused 247 million cases and 619,000 deaths in 2021, and there still is no significant progress in current malaria control.

The global incidence and number of reported epidemic areas of dengue have also grown dramatically. Moreover, Zika, a newly emerged mosquito-borne disease associated with neurological complications, caused several large outbreaks involving 89 countries and territories in 2015 and 2016. During 2006–2013, an average of 28 people per year in the United States tested positive for recent chikungunya virus infection. All were travelers visiting or returning to the United States from affected areas in Asia, Africa, or the Indian Ocean. In late 2013, the first local transmission of chikungunya virus in the Americas was identified in Caribbean countries and territories.

Oropouche virus disease was the second most common arboviral disease in South America (after dengue) before the emergence of chikungunya and Zika viruses in 2013 and 2015. Prior to late 2023, Oropouche virus disease was reported in Brazil, Bolivia, Colombia, Ecuador, Haiti, Panama, Peru, Trinidad and Tobago, French Guiana and Venezuela; most cases were reported near the Amazon rainforest area. However, since December 2023, there has been an increase in the number of cases reported, including in areas where transmission had not been previously documented. In 2024, locally transmitted Oropouche virus disease was reported in seven countries in Latin America and the Caribbean: Brazil, Bolivia, Colombia, Cuba, Guyana, Peru and the Dominican Republic. Additionally, Oropouche virus disease cases were reported among travelers returning from countries with local transmission to the United States, Canada, Spain, Italy and Germany. Oropouche virus is primarily transmitted by biting midges, but several mosquito species have also been implicated.

The changing climate is dramatically altering the landscape of mosquito-borne diseases. Warmer temperatures, changes in rainfall, and human activity are enabling their spread to new places often unprepared to deal with them.

The risk of vector-borne diseases can be reduced through protective measures and community mobilization. Although our surveillance team has continued to be diminished by funding cuts, our goals for the 2025 mosquito surveillance season included doing some level of mosquito surveillance in as many counties in Georgia as possible, assisting mosquito control programs with surveillance where possible, and providing local outreach for mosquito complaints. We also plan to continue to do pesticide resistance testing in several areas of Georgia. The accomplishment of these goals allows the Georgia Department of Public Health to be better prepared for dealing with endemic mosquito-borne disease issues, and for dealing with the next mosquito-borne disease to emerge. The data we collect provide information on changing risks for arboviral disease transmission that Public Health can use to provide educational messages and mosquito control can use to support control decisions. We accomplish these goals with the assistance of our colleagues and collaborators.



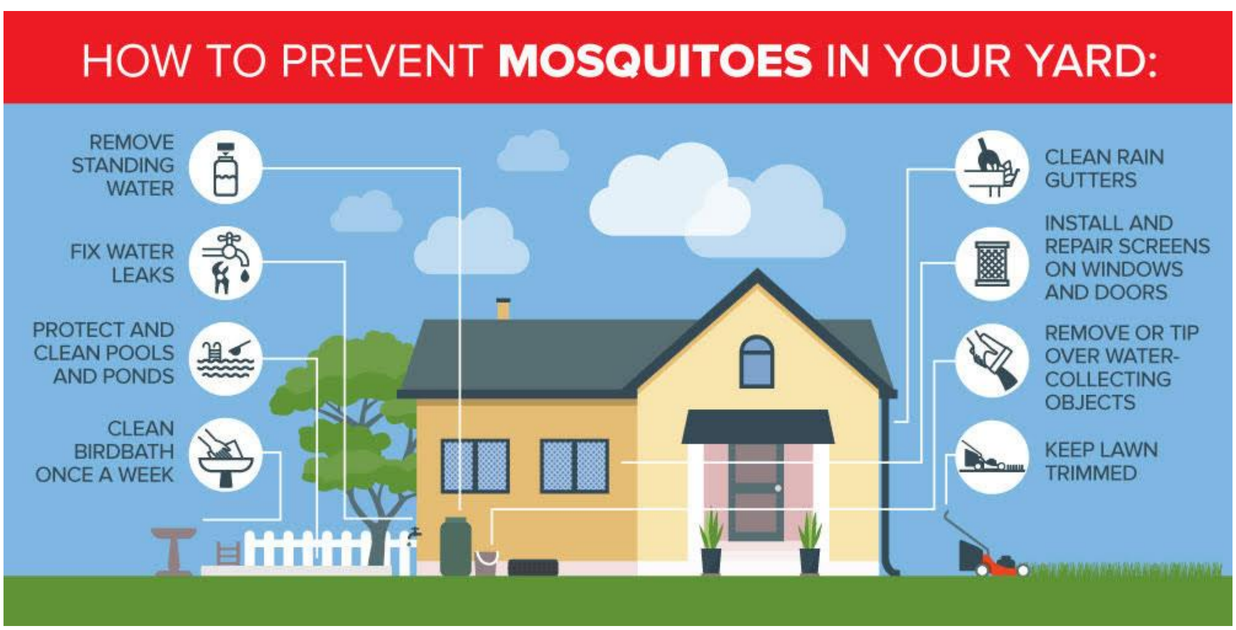
Integrated Mosquito Management

MOSQUITO SURVEILLANCE 2024

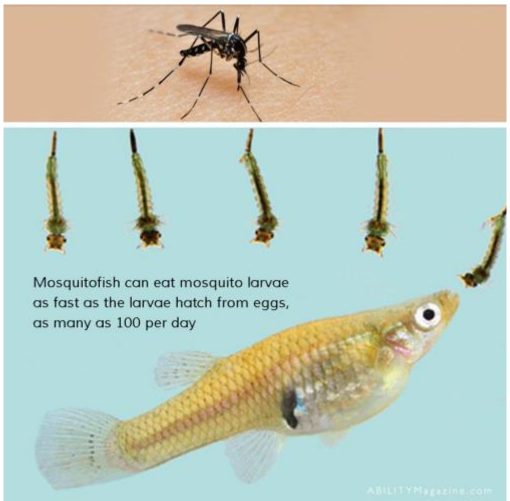
Controlling mosquitoes reduces the nuisance factor and protects public health. The best way to control mosquitoes is by utilizing a wide variety of control methods known as Integrated Mosquito Management (IMM). The first part of IMM is trapping and surveillance, which is used to quantify the number, species, and location of mosquitoes.

What does mosquito control do to protect the public's health? In Georgia, there are approximately 60 different mosquito species. Each species of mosquito has a different flight range, host preference, larval habitat, and potential for carrying and transmitting infectious disease. Any mosquito that bites or annoys people can be considered a health problem, but in Georgia the definition includes mosquitoes that carry infectious diseases like WNV, LaCrosse Encephalitis (LAC), and Eastern Equine Encephalitis (EEE), as well as those can transmit new and emerging viruses like CHIK and ZIKV.

What are the techniques of an Integrated Mosquito Management (IMM) program that serve to eliminate the mosquito? If your county has mosquito control, it is usually located in the Public Works Department, but it may be in Public Health/Environmental Health, or it could be a stand-alone agency. The first response to a mosquito complaint is to send an inspector to find the source of the mosquitoes. Source reduction, also known as physical control, is an important part of IMM. This involves finding and eliminating potential mosquito breeding areas and is typically the most effective and economical of the various techniques used to control mosquitoes. Mosquitoes need water for their eggs to hatch and for the larvae to survive until adulthood. In areas around a home these sources may be anything that can retain water, including birdbaths, unscreened swimming pools, and old tires. Breeding areas also include hollow stemmed plants like bromeliads. The inspector should educate the



homeowner about keeping these items clean and dry, or rinsing them periodically with fresh water.



If the source is a new pond or other permanent-water area that cannot or should not be drained, the inspector may elect to stock it with small, non-descript mosquito-eating fish called *Gambusia*. Using the mosquito's natural predator to reduce populations is a method of biological control.

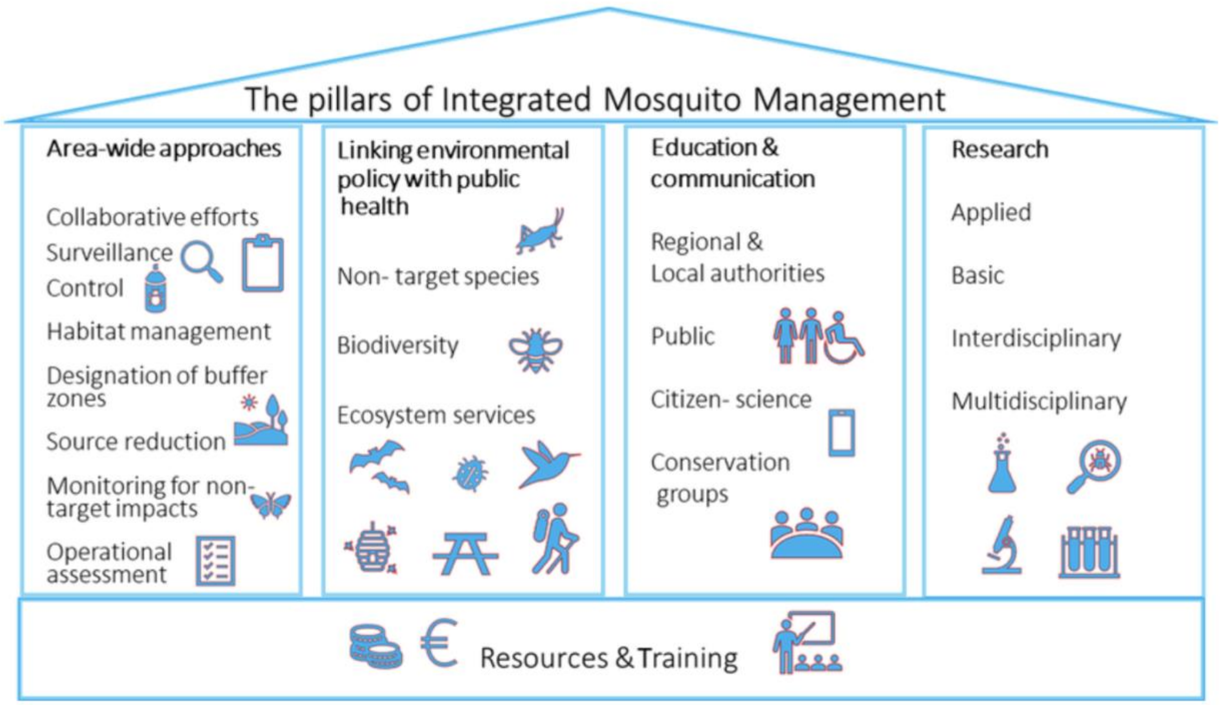
Another technique is called larviciding. Larviciding, as the name implies, kills mosquito larvae and pupae using a variety of products, both chemical and biological. This prevents the metamorphosis of the larvae into the flying, biting pests that we know and hate.

Larvicide treatments can be applied by ground or air to standing water depending on the size of the area. Different types of larvicides include chemical pesticides that are absorbed or ingested by the larvae, surface control agents that suffocate the pupae, insect growth regulators, and microbial larvicides. Larvicides commonly used in Georgia include microbial larvicides and insect growth regulators (IGRs). The microbial larvicide consists of two species of the Bacillus bacterium (Bti and *B sphaericus*), that are toxic when ingested by mosquito and black fly larvae. Methoprene, an IGR, prevents mosquito larvae from molting to the adult stage.

Once adult mosquitoes are on the wing, the only way to control them is to use an adulticide. Using truck-mounted sprayers or aircraft, a condensed plume of ultralow volume (ULV) insecticide is released into the air, which spreads out with the prevailing wind. When the pesticide droplets contact flying mosquitoes, it kills them. Mosquito control may also use a barrier spray to provide the homeowner some temporary relief. This is also one method of controlling day biting mosquitoes. A barrier spray is a coating of pesticide droplets sprayed onto foliage surrounding an area that has been inundated by mosquitoes. This will kill mosquitoes landing in the foliage, and it repels them. It adheres to the underside of the foliage, depriving them of their resting places. Another technique, thermal fogging, can be used to control day biting mosquitoes or to control mosquitoes in areas where vegetation is so dense that ULV does not penetrate. The amount of chemical used is designed to be target specific, in that it kills mosquitoes without harming anything else. Since most mosquitoes do not fly during the daytime, adulticiding is done at dusk and beyond, and the hours just before dawn, when mosquito activity is at its peak. Additionally, spraying pesticides by ULV machines during the heat of the day is wasteful as the pesticide droplets rise and never interact with the mosquitoes, and so is wasted.

It is impossible, and potentially ecologically damaging, to completely eradicate the mosquito, so the focus should be on controlling mosquito populations to reduce the nuisance factor and protect public health by using all aspects of Integrated Mosquito Management. It is important to remind homeowners that they can also play a role in mosquito control, especially where organized mosquito control is not present. Surveillance can be used to determine if the mosquito is *Aedes albopictus*, the Asian tiger mosquito, or some other species. By standing out in the yard during the day and waiting to see if a small black and silver mosquito comes to bite your legs, it is possible to determine if this species is present. This is the most common nuisance species in Georgia and, unless there have been heavy rains recently or the area is along the coast, the mosquito most likely to come and bite during the day. Why is knowing the species important? This species is a container breeder and does not fly very far from where it lays its eggs. Source reduction is the best means of control. This includes picking up anything that holds water, emptying it, and disposing of it correctly; refilling bird baths and animal water bowls at least once a week; raking big leaves, such as magnolia leaves, that can hold water; and cleaning gutters, will help reduce the populations of this species and other container breeding species. Additionally, pools need to be maintained properly as “green” pools breed large numbers of mosquitoes, including the WNV vector. Homeowners can also buy larvicide, both Bti (mosquito dunks) and methoprene (mosquito torpedoes). This can be applied to standing water to control mosquitoes by killing larvae. As with any pesticide, it is important to follow the label instructions explicitly, to protect the environment and non-targets, and to reduce or eliminate pesticide resistance issues.

Finally, it is important to wear repellent outside when mosquitoes are biting. Information about the various types of recommended repellents can be found at https://dph.georgia.gov/environmental-health/insects-and-diseases.

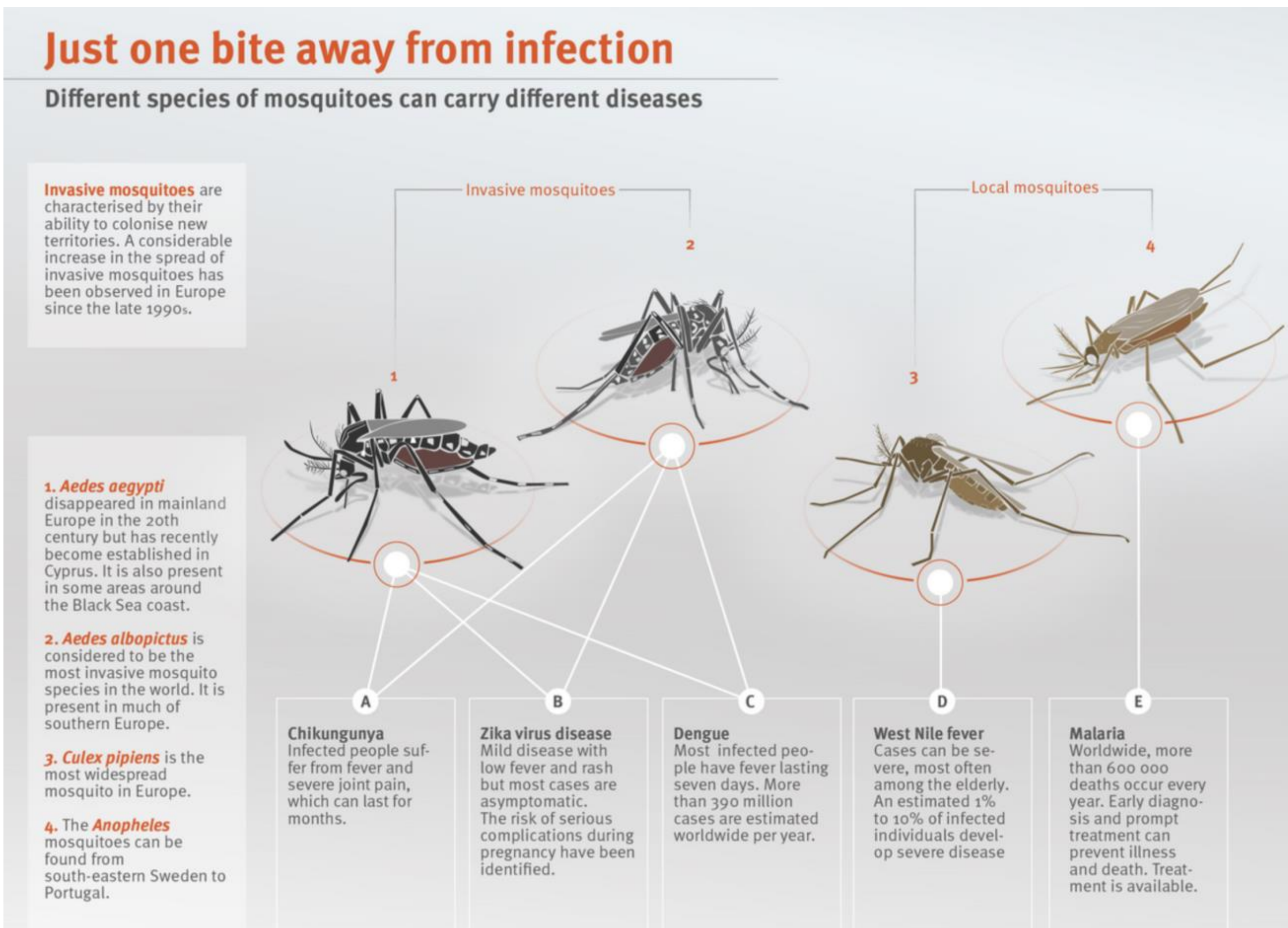


Pillars for an Integrated Vector Management strategy

The 4 overlapping aims of mosquito control are to:

- Keep mosquito populations at acceptable densities
- Prevent mosquito bites
- Minimize mosquito-vertebrate contact
- Reduce the longevity of female mosquitoes

This last aim is of vital importance when dealing with container breeding mosquitoes. Oviposition site choice in container breeders tends to be cryptic, making it difficult to find and larvicide sufficient breeding sites to reduce mosquito populations. Additionally, the container breeding species tend to emerge asynchronously, with small numbers emerging daily, making the use of adulticides to reduce populations difficult. However, adulticiding will kill off the older mosquitoes, which are the most likely to have picked up virus while blood feeding, so this technique is most likely to reduce the risk of arboviral disease transmission. Several studies reported in the European Centre for Disease Prevention and Control (ECDC) Technical Report, show that vector control practices and strategies against West Nile virus indicated that aerial ULV adulticiding reduced the number of human cases within the treatment sites compared to the untreated sites, and that the odds of infection after spraying were six times higher in the untreated areas compared to the treated ones. Also, with larviciding of catch basins only, a > 90% reduction in larvae/pupae was recorded. However, no significant reduction was observed in adult *Culex* spp populations collected resting in catch basins indicating that larval control alone did not lead to meaningful reductions in adult mosquito populations and WNV prevalence. Finally, while larvicide applications reduced pupal abundance and the prevalence of host-seeking adults, there was no detectable impact on entomological risk metrics for WNV. This was likely because mosquitoes in the treatment areas were significantly younger than those in the control area; younger mosquitoes are less likely to have blood fed, so less likely to have picked up virus.



Overview

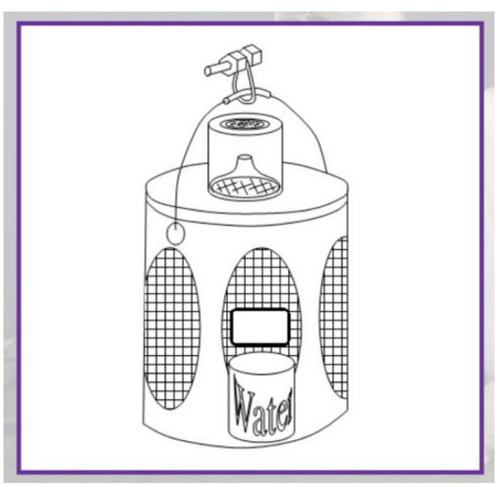
Currently, surveillance is done by the 2 entomologists at the State level, interns, and the District-level programs in 1-1, 2-0, 3-1, 3-2 (VDCI), 3-5, 6-0, 8-1 (VSU & District EH), 9-1 (Chatham County MC & VDCI), and 10-0. We worked with Columbus, GA Environmental Health in Muscogee County and Fayette County Environmental Health to collect data in those two counties. If I missed anyone who assisted, my apologies. We could not do this without all of your help.

The maps used in this document were all created in March 2025. They depict the month(s) in which surveillance was done in each county and the presence or absence of the important vector species *Aedes aegypti*, *Ae albopictus*, *Coquillettidia perturbans*, *Culiseta melanura*, *Culex coronator*, *Cx nigripalpus*, *Cx quinquefasciatus*, *Cx restuans*, *Cx salinarius*, *Ochlerotatus japonicus,* and *Oc triseriatus*. All species trapped are listed in a table for each District by county.

Surveillance

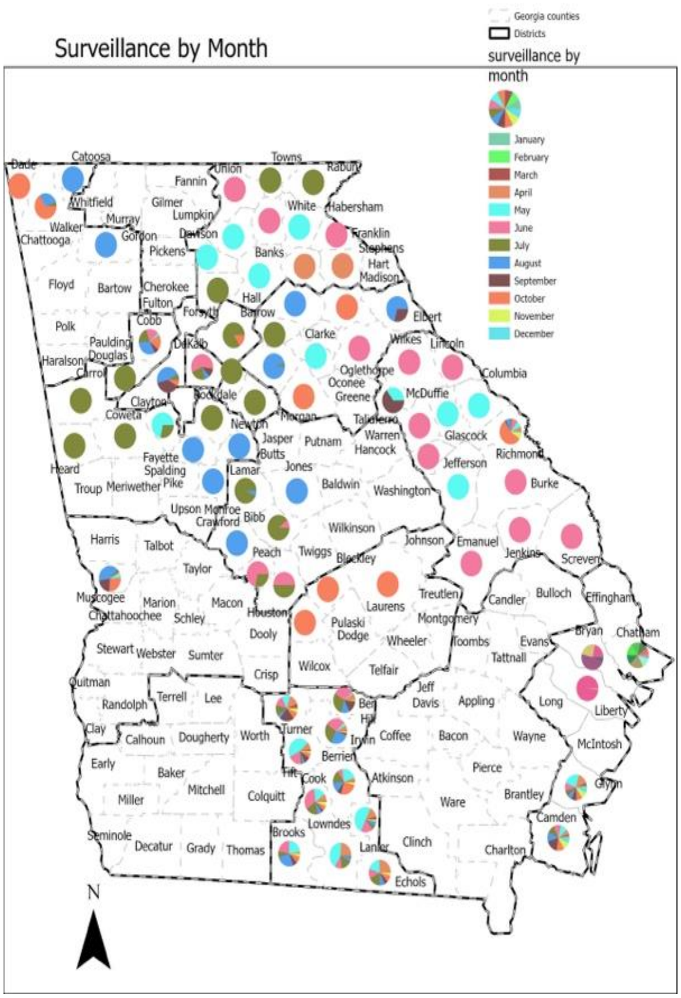
Adult mosquito monitoring is a necessary component of surveillance activities and is directed toward identifying where adults are most numerous. This information drives response to service requests and helps determine whether interventions (source reduction, larviciding, and/or adulticiding) are effective.

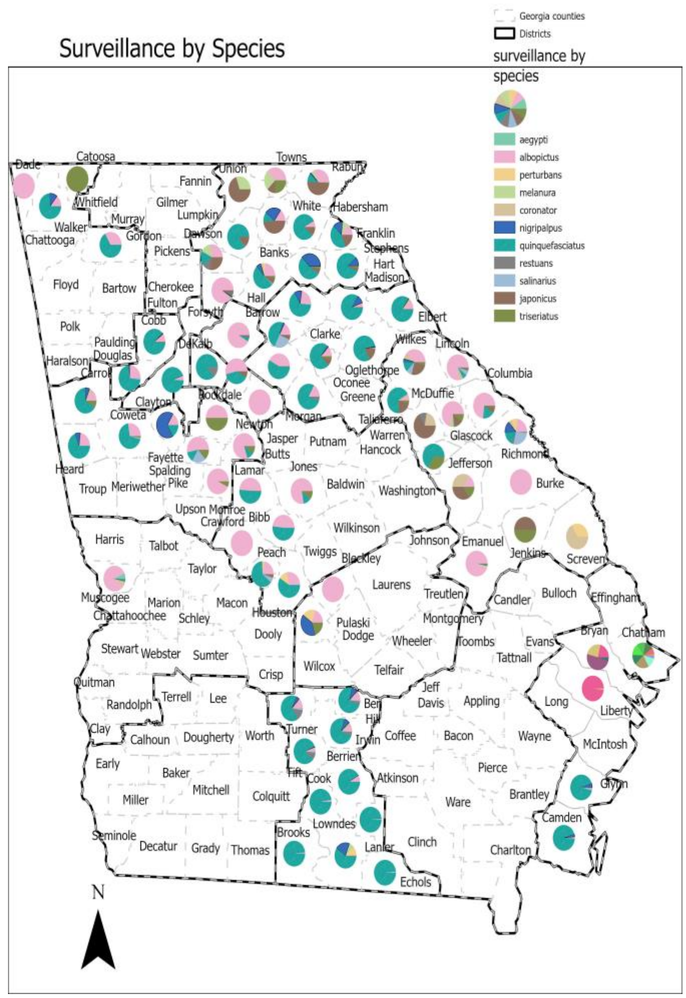
There are a variety of different mosquito traps, but generally three different types of traps are used. One type, a gravid trap, selectively attracts container- breeding mosquitoes that have had a blood meal and are looking for a place to lay eggs, so is useful to determine if WNV+ mosquitoes are in the area. The other type, a light trap, attracts mosquitoes looking for a blood meal, so is useful for general surveillance. The third type of trap, the BG-Sentinel trap, has been used in areas where exotic arbovirus cases have been detected. This trap is specific for the Zika (ZIKV), Chikungunya (CHIK), and Dengue (DEN) vectors, *Ae aegypti* and *Ae albopictus,* although it will also attract *Cx quinquefasciatus*, our primary WNV vector. With all three traps, as the mosquito gets close, it gets suctioned into the trap by a small fan. Mosquitoes caught in these traps are counted and identified. They may also be pooled according to date, species, and location and sent to a lab for testing.



EXIT TRAP

Other traps used were DynaTraps, Exit traps, and New Jersey Light Traps (NJLT). DynaTraps are insect traps designed to control flying pests like mosquitoes and other insects using a 3-way technology featuring UV light attraction, a CO_2 trail, and a fan to capture and trap insects. Exit traps are used on sentinel chicken cages to catch mosquitoes that have taken a blood meal from the chickens. New Jersey Light Traps (NJLT) are stationary traps that are strategically placed and left in the mosquito control district during surveillance season. They capture mosquitoes and other insects by attracting them with light and then sucking them into a jar with a fan. They are typically collected once a week. Since these mosquitoes are dead when picked up, they cannot be used for virus detection.





Surveillance and mosquito identification were done by the two GDPH entomologists, by District or County Environmental Health Specialists (EHS), by local mosquito control, and by a variety of other collaborators.

GRAVID TRAP

This trap selectively attracts container-breeding mosquitoes that lay eggs in stagnant, organically rich water. These mosquitoes will have had at least one blood meal, so may possibly have picked up an infected blood meal if there are arbovirus-positive enzootic hosts in the area.

LIGHT TRAP

Light traps attract mosquitoes looking for a blood meal. The attractants used are light and CO_2, in the form of dry ice or as compressed gas in canisters. These traps are useful for providing information about the mosquito species found in the area under surveillance. Because they attract mosquitoes looking for a blood meal that may have just emerged and never had a blood meal previously, the likelihood of finding virus in these mosquitoes is much reduced.

BG SENTINEL TRAP

What makes the BG-S trap different? It:

- Mimics convection currents created by a human body
- Employs attractive visual cues
- Releases artificial skin emanations through a large surface area
- Can be used without CO_2 to specifically capture selected mosquito species

Used in combination with the BG-Lure, a dispenser which releases a combination of non-toxic substances that are also found on human skin (ammonia, lactic acid, and caproic acid), the BG-Sentinel trap is especially attractive for the yellow fever (or ZIKV) mosquito, *Aedes aegypti*, the Asian tiger mosquito, *Aedes albopictus*, the southern house mosquito, *Culex quinquefasciatus*, and selected other species.

With the addition of carbon dioxide, the BG-Sentinel trap is an excellent surveillance tool for mosquitoes in general.

MOSQUITO BREEDING HABITAT TYPES

There are two general categories within which mosquito breeding habitats exist: natural mosquito breeding habitats and man-made mosquito breeding habitats. Female mosquitoes lay their eggs either on water or on soils that are periodically flooded. These breeding areas can be found in habitats that exist naturally, such as within a pond or flood plain; or in habitats that have been created by humans, such as bird baths, water-filled tires, or catch basins. Mosquitoes can breed in a wide variety of locations, and the discussion below provides a description of the general types of habitats where mosquitoes are known to breed.

NATURAL MOSQUITO BREEDING HABITATS

Temporary Woodland Pools:

Shallow, temporary pools are common in woodland areas during the spring and wet summers in low lying areas or in small depressions where a variety of mosquito species will breed, most commonly *Ochlerotatus canadensis* and *Aedes vexans*. These mosquitoes lay their eggs along the edges of the pool, and when rainwater or melting snow fills these pools, the larvae hatch.

Freshwater Ponds:

The larvae of Anopheles are found primarily in small ponds among the emergent vegetation. Ponds clogged with vegetation can breed large numbers of mosquitoes by providing large amounts of organic matter for feeding and by providing shelter from fish and other aquatic predators.

Streams and Floodplains:

Streams with running water rarely produce mosquitoes. However, mosquitoes need to be near water to lay their eggs. *Aedes* and *Culex* species are two genera that can sometimes be found in isolated pockets adjacent to streams or within floodplain areas that undergo only periodic flooding.

Tree Holes and Other Natural Containers:

Tree holes and other natural containers, such as pitcher plants or water trapped in or on plant leaves, can also serve as breeding habitats for mosquitoes, such as *Ochlerotatus triseriatus*. Frequent rainfalls maintain standing water within these types of microhabitats and can breed mosquitoes throughout the summer.

Freshwater Marshes and Swamps:

Mosquitoes, such as *Coquillettidia perturbans*, breed in freshwater marshes and swamps consisting of emergent vegetation. These types of habitats can occur in both woodland and open field habitats. Larvae attach themselves to the stems and roots of the vegetation to obtain oxygen, and do not need to swim up and down in the water column to feed or breathe. Due to this adaptation, larvae can avoid exposure to predatory fish.

MAN-MADE MOSQUITO BREEDING HABITATS

Stormwater/Wastewater Detention:

A catch basin typically includes a curb inlet where storm water enters the basin to capture sediment, debris, and associated pollutants. These catch basins provide breeding habitat for urban mosquito species, such as *Culex quinquefasciatus*. Moisture and organic debris captured within the catch basin provide habitat for growing larvae. Detention/retention basins that perform similar functions for other types of wastewaters, such as waste treatment settlement ponds, provide a similar type of breeding habitat to that of the storm water catch basin.

Roadside Ditches:

Roadside ditches are the suitable habitat for many species of Culex mosquitoes. The larvae of *Culex quinquefasciatus* and *Culex restuans*, for example, can survive in waters with high organic content. Culex mosquitoes will lay their eggs directly on the water's surface; therefore, ditches that hold water for extended periods of time can breed large numbers of mosquitoes.

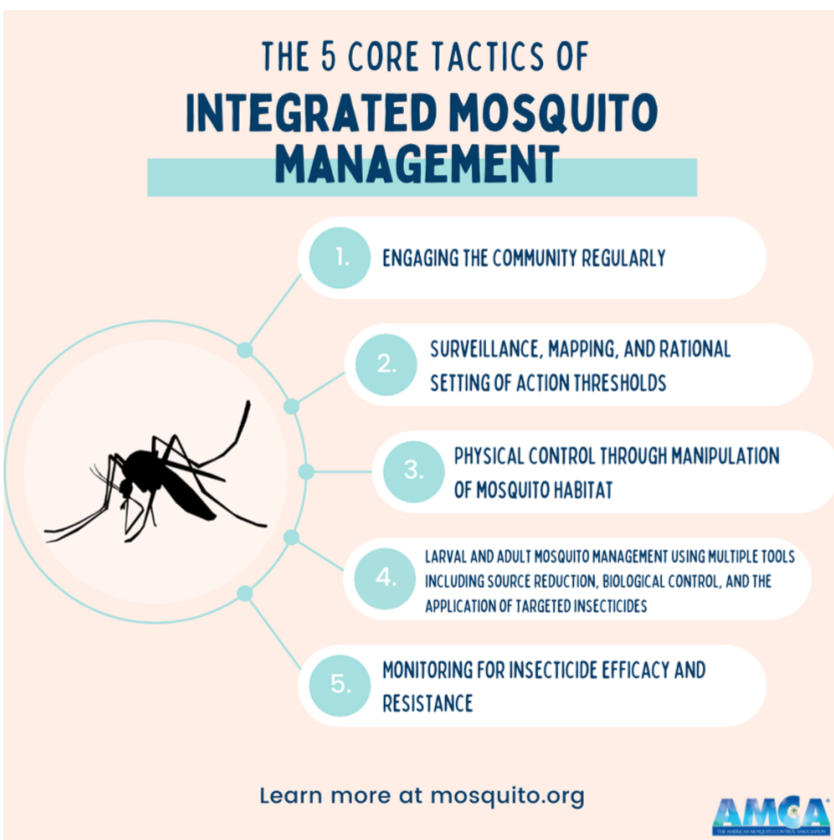
Artificial Containers:

Artificial containers such as tires, bottles, buckets, and birdbaths can provide an excellent mosquito-breeding habitat free from predation. Saucers placed under flowerpots to hold water provide a habitat for mosquito larva, as well as causing root rot in the plant. Many tree-hole mosquitoes have learned to adapt to using these man-made mosquito nurseries. *Aedes albopictus*, our most common pest species, also breeds readily in these artificial containers. An abundance of organic debris, which also collect in these containers, allows for the proliferation of mosquitoes.

Control – A Message for the Public

The mosquitoes of most importance to public health in Georgia are *Culex quinquefasciatus*, the Southern house mosquito, and *Aedes albopictus*, the Asian tiger mosquito. Both species lay eggs in such artificial containers as birdbaths, gutters, tires, flowerpots, and any other container that holds water for at least a week. The Southern house mosquito prefers organically polluted water for laying its eggs, and bites at dusk. It feeds primarily on birds, but will bite mammals, and is our primary vector for WNV. The Asian tiger mosquito, a daytime biter, prefers cleaner water for laying its eggs. It feeds primarily on mammals. *Aedes albopictus* is a potential vector for WNV in Georgia and can be a vector for DEN, ZIKV, and CHIK.

The best way to control these species is to dump out or treat standing water, treat catch basins with larvicide, and to cut back heavy vegetation where the mosquito will rest when not out biting. These mosquitoes will shelter in abandoned houses or sheds. Thermal fogging or barrier spray around these structures can help to reduce resting and overwintering mosquitoes. Two larvicides are available to the public for treating standing water, Mosquito Torpedoes (Methoprene) and Mosquito Dunks (Bti). Both are available online, from home goods or hardware stores, and occasionally from large chain pet stores. Hand-held foggers can also be used to reduce biting populations of mosquitoes, but this solution is temporary and needs to be followed up with good source reduction (removing breeding sites) and larviciding.



Mosquitoes and Trap Types, 2024

Species	BGS	CDC	DynaTrap	Exit	Gravid	NJLT	TOTAL
Ae. aegypti	165				1		166
Ae. albopictus	1788	2255			975	13	5031
Ae. cinereus		7					7
Ae. vexans	5	9053	28		683	712	10481
An. crucians		606	33		28	1309	1976
An. punctipennis		94			26		120
An. quadrimaculatus		159			11	1	171
Cq. perturbans		1859	1		19	42	1921
Cs. inornata		16	3			4	23
Cs. melanura	1	961	1	23	61	3	1050
Cx. coronator		1251			177		1428
Cx. erraticus	4	4811		3	251		5069
Cx. nigripalpus		10523	250	232	5851	714	17570
Cx. quinquefasciatus	42	2650	40		147315	354	150401
Cx. restuans	4	47			2731		2782
Cx. salinarius		2290	463	3	206	267	3229
Cx. territans					14		14
Ma. tittilans		19				18	37
Oc. atlanticus		2072		72	3	102	2249
Oc. canadensis		107			2	3	112
Oc. fulvus pallens		8					8
Oc. infirmatus		299			5		304
Oc. japonicus		38			200		238
Oc. mitchellae		1			3		4
Oc. sollicitans		11	4			89	104
Oc. sticticus		17			3		20
Oc. taeniorhynchus		128	7			543	678
Oc. thibaulti		1					1
Oc. tormentor					2		2
Oc. triseriatus		64			61		125
Oc. trivittatus		17			8		25
Or. signifera	1	1			10		12

Species	BGS	CDC	DynaTrap	Exit	Gravid	NJLT	TOTAL
Ps. ciliata		57			6	12	75
Ps. columbiae		314	6		26	977	1323
Ps. cyanescens		57			6		63
Ps. ferox		1863			76	5	1944
Ps. horrida		1			1		2
Ps. howardii		24			3		27
Tx. rutilus					1		1
Ur. lowii					1		1
Ur. sapphirina		35				4	39
TOTAL	2010	41716	836	333	158766	5172	208833


Ps. ciliata is known for its large size and tenacious bite

NOTE: Is it *Aedes*, or is it *Ochlerotatus*?

Ochlerotatus had been originally established as a genus in 1891. It became an aedine subgenus in the 1930s. In 2000, John Reinert and his colleagues elevated the subgenus *Ochlerotatus* back to a genus based upon microscopic differences in the male genitalia between it and other subgenera of *Aedes*. However, in 2005 the *Journal of Medical Entomology* and the Entomological Society of America decided to put *Ochlerotatus* back to subgenera level (https://academic.oup.com/jme/article/42/4/511/910895?login=true). After a contentious worldwide debate regarding the effect the taxonomic changes would have on names established over decades of work in scientific, government, and lay communities, many scientists (including those at the CDC), and others affected by the change, espoused the continued use of the previously established names. So, for the time being, everything is *Aedes* again.

HOWEVER, since the GDPH mosquito surveillance database was established after *Ochlerotatus* was elevated to genus status, we appreciate you continuing to use *Ochlerotatus* to make data access easier.

Aedes

- *Ae. aegypti*
- *Ae. albopictus*
- *Ae. cinerius*
- *Ae. vexans*

Ochlerotatus

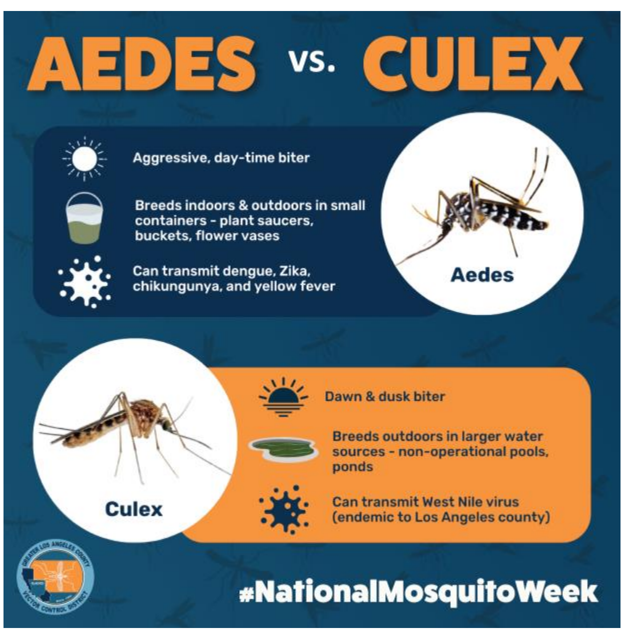
- *Oc. atlanticus/tormentor*
- *Oc. atropalpus*
- *Oc. canadensis*
- *Oc. dupreei*
- *Oc. fulvus pallens*
- *Oc. hendersoni*
- *Oc. infirmatus*
- *Oc. japonicus*
- *Oc. mathesoni*
- *Oc. mitchellae*
- *Oc. sollicitans*
- *Oc. sticticus*
- *Oc. taeniorhynchus*
- *Oc. thibaulti*
- *Oc. triseriatus*
- *Oc. trivittatus*

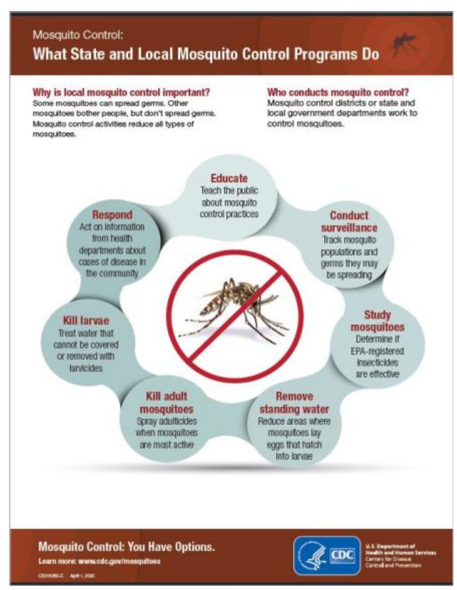
Data by District

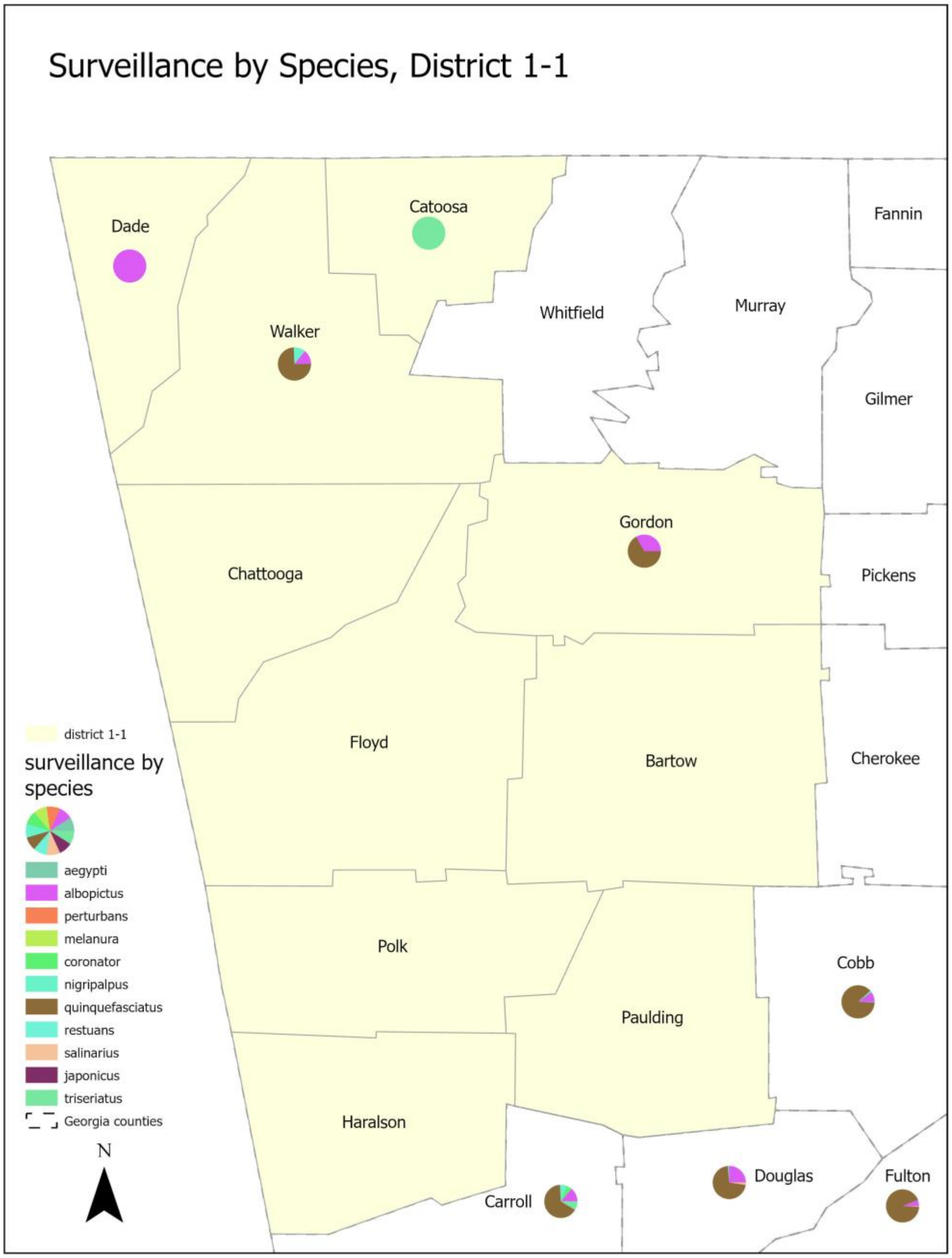
District 1-1

Surveillance in District 1-1 was done by local EHS. Surveillance was done from the mid-June through the beginning of October over 6 nights.

District 1-1		trap type
County	**Species**	**CDC**
Catoosa	*Ae. vexans*	2
	Oc. triseriatus	2
Dade	*Ae. albopictus*	2
	Ae. vexans	2
Gordon	*Ae. albopictus*	3
	Cx. quinquefasciatus	6
Walker	*Ae. albopictus*	5
	Culex spp. (male)	1
	Cx. erraticus	1
	Cx. nigripalpus	4
	Cx. quinquefasciatus	26
	Ps. ferox	4







District 1-2

No surveillance was done in District 1-2 in 2024.

District 2-0

Surveillance in District 2-0 was done by local EHS. Surveillance was done from late April through late July over 9 nights.

District 2-0		trap type	
County	***Species***	**CDC**	**gravid**
Banks	*An. punctipennis*		1
	Cx. nigripalpus		45
	Cx. quinquefasciatus		63
	Cx. restuans		1
	Oc. japonicus		7
	Oc. triseriatus		4
Dawson	*Ae. albopictus*	9	
	Cs. melanura		5
	Cx. quinquefasciatus		6
	Cx. restuans		4
	Cx. territans		1
	Oc. japonicus		9
	Ps. howardii	2	1
Forsyth	*Ae. albopictus*	179	76
	An. punctipennis	3	
	Cs. melanura	3	
	Cx. nigripalpus		3
	Cx. quinquefasciatus		4
	Oc. japonicus		19
	Ps. cyanescens	3	
Franklin	*Cx. nigripalpus*		8
	Cx. quinquefasciatus		57
	Oc. japonicus		3
	Oc. triseriatus		2
Habersham	*Ae. albopictus*	1	1
	Ae. vexans	7	
	An. punctipennis	2	
	Cx. quinquefasciatus		21
	Oc. japonicus	1	2
Hall	*Ae. albopictus*	4	16

District 2-0		trap type	
County	***Species***	**CDC**	**gravid**
Lumpkin	*Cx. quinquefasciatus*		33
	Cx. restuans		1
	Oc. japonicus		5
Rabun	*Ae. albopictus*	15	3
	An. punctipennis	2	1
	Cs. melanura	3	
	Cx. nigripalpus	1	
	Cx. quinquefasciatus		6
	Oc. japonicus		28
	Oc. triseriatus		1
Stephens	*Ae. albopictus*	3	
	Ae. vexans	5	
	An. crucians	7	
	An. punctipennis	3	1
	Cs. melanura		2
	Cx. nigripalpus		3
	Cx. quinquefasciatus		9
	Oc. japonicus	2	2
Towns	*Ae. albopictus*		3
	An. punctipennis	1	
	Cs. melanura	1	1
	Oc. infirmatus	2	
	Oc. japonicus		1
	Oc. triseriatus		2
Union	*An. punctipennis*	1	1
	Cs. melanura		3
	Oc. japonicus		7
	Ps. cyanescens	1	
White	*Ae. albopictus*	1	4
	An. punctipennis	3	1

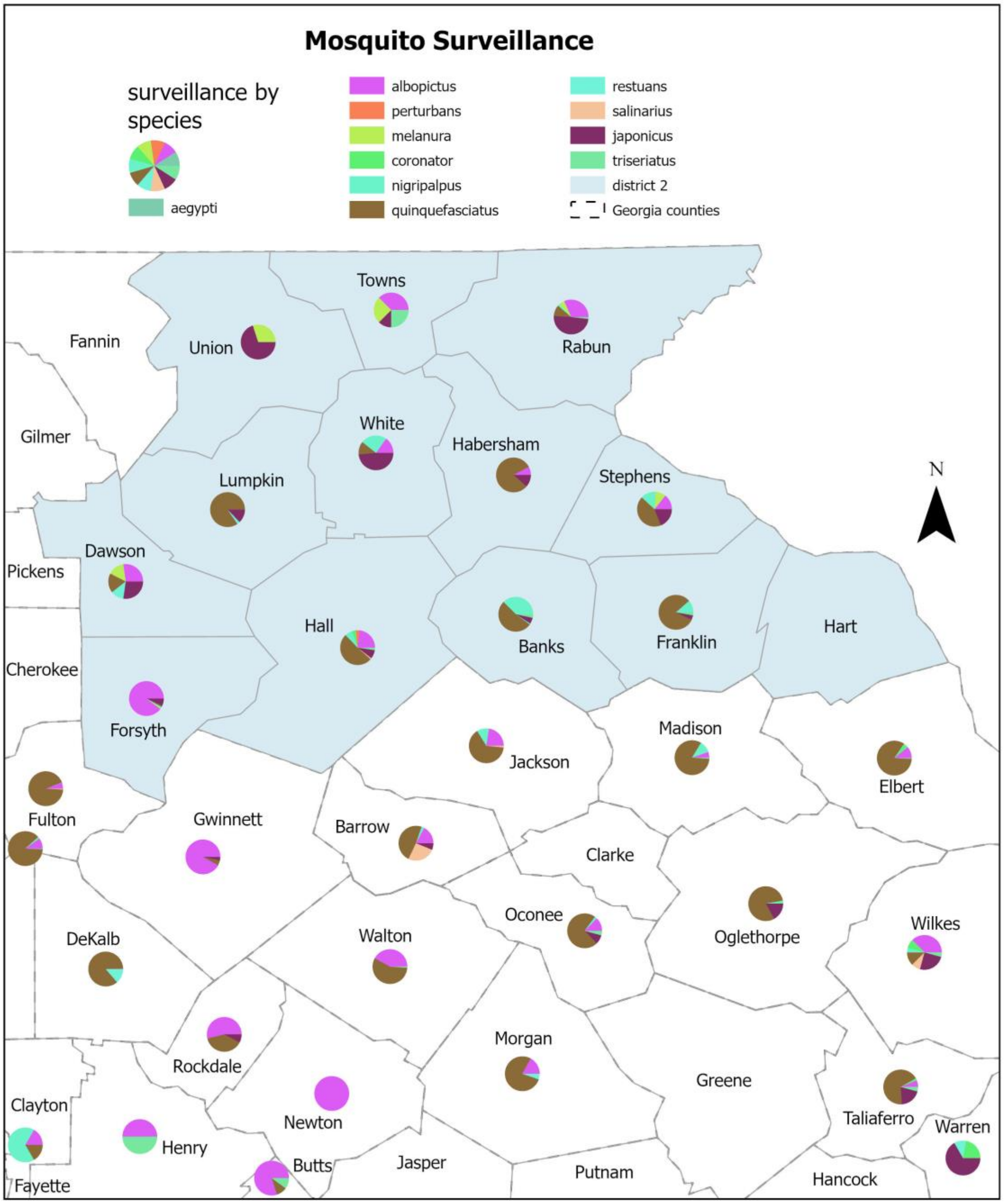
Hall	*An. crucians*	9	4
	Cq. perturbans	3	
	Cx. coronator	2	1
	Cx. nigripalpus		6
	Cx. quinquefasciatus		44
	Cx. salinarius	1	
	Oc. japonicus		7
	Oc. triseriatus	2	

White	*Cx. nigripalpus*	1	7
	Cx. quinquefasciatus		4
	Oc. japonicus		16
	Oc. tormentor		2
	Ps. columbiae		2
	Ps. howardii	1	

GRAVID TRAP

MOSQUITO SURVEILLANCE 2024

Surveillance by Species, District 2-0

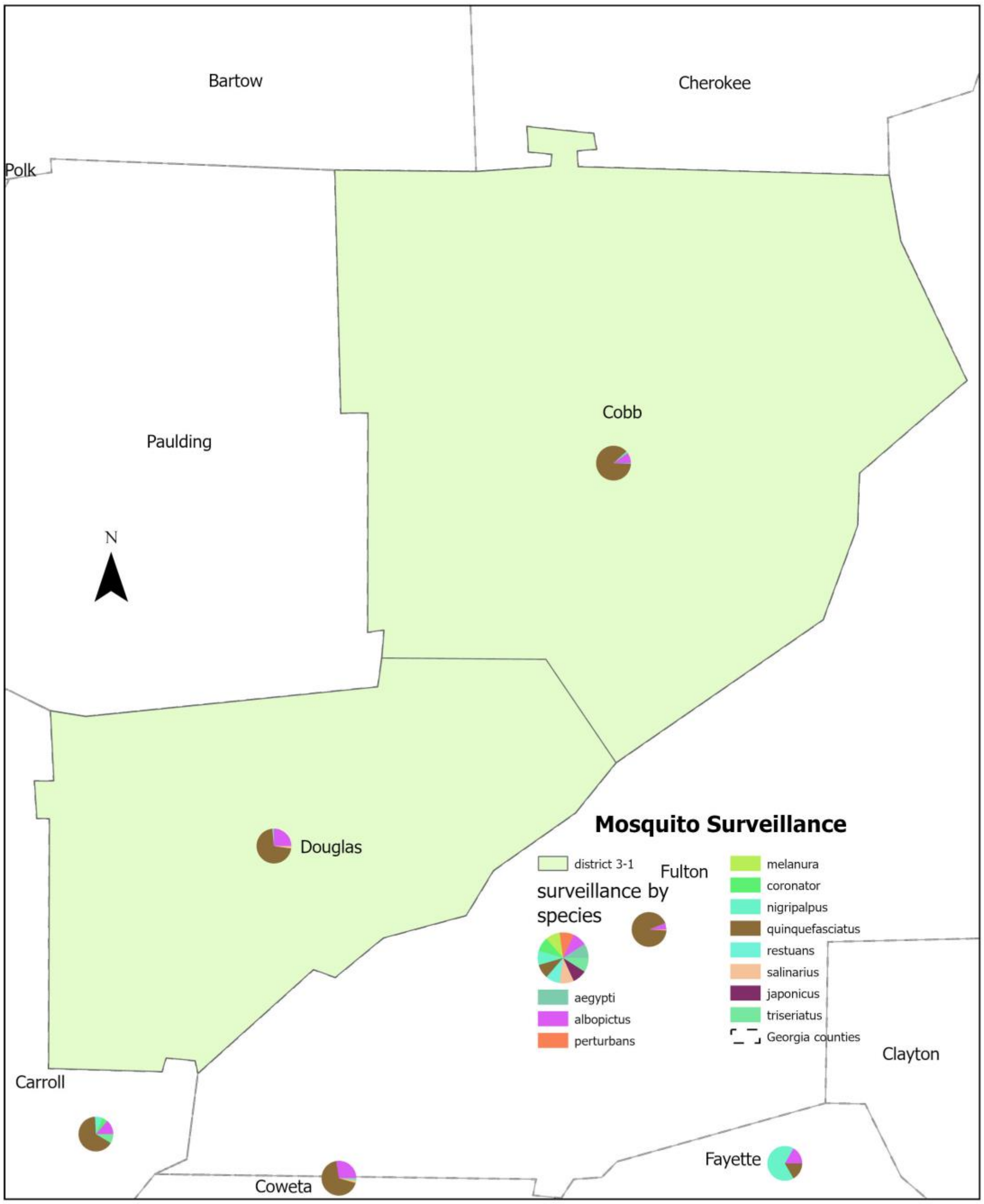


District 3-1

District 3-1		trap type	
County	**Species**	**CDC**	**gravid**
Cobb	*Ae. albopictus*	161	30
	Ae. albopictus (male)	19	1
	Ae. cinereus	1	
	Ae. vexans	16	9
	An. crucians	1	
	An. punctipennis	18	1
	An. quadrimaculatus	17	
	Culex spp. (male)	82	17
	Cx. coronator	3	12
	Cx. erraticus	4	4
	Cx. nigripalpus		21
	Cx. quinquefasciatus	284	1408
	Cx. restuans		1
	Oc. japonicus	13	
	Oc. triseriatus	10	3
	Oc. trivittatus		1
	Ps. ferox	34	
	Ps. howardii	10	
Douglas	*Ae. albopictus*	16	6
	Ae. vexans	2	3
	An. punctipennis	3	9
	An. punctipennis (male)	1	
	Cx. nigripalpus		1
	Cx. quinquefasciatus	13	49
	Cx. salinarius	2	

Surveillance in District 3-1 was done by the EHS mosquito technician and the DPH entomologists. Surveillance was done from early April-early October over 14 nights.

Surveillance by Species, District 3-1

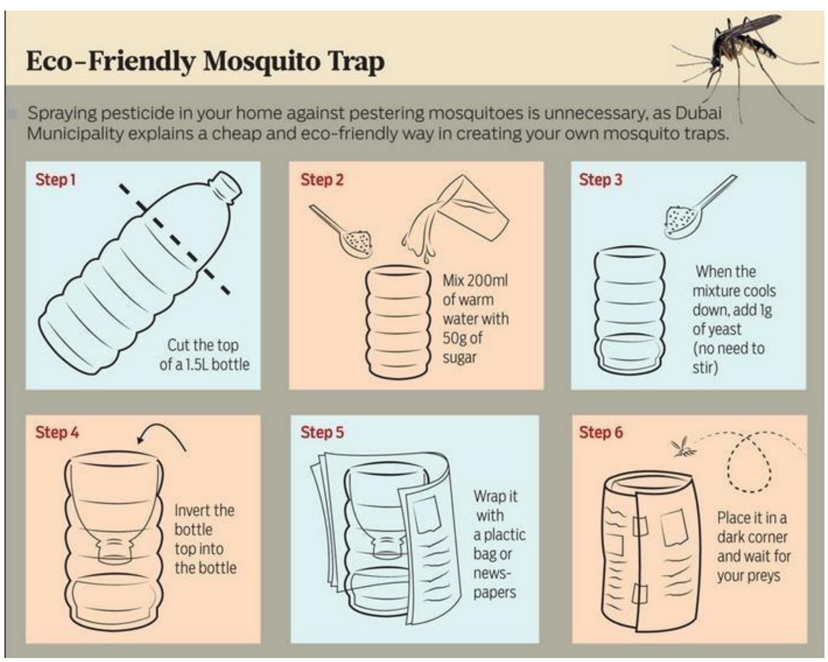


District 3-2

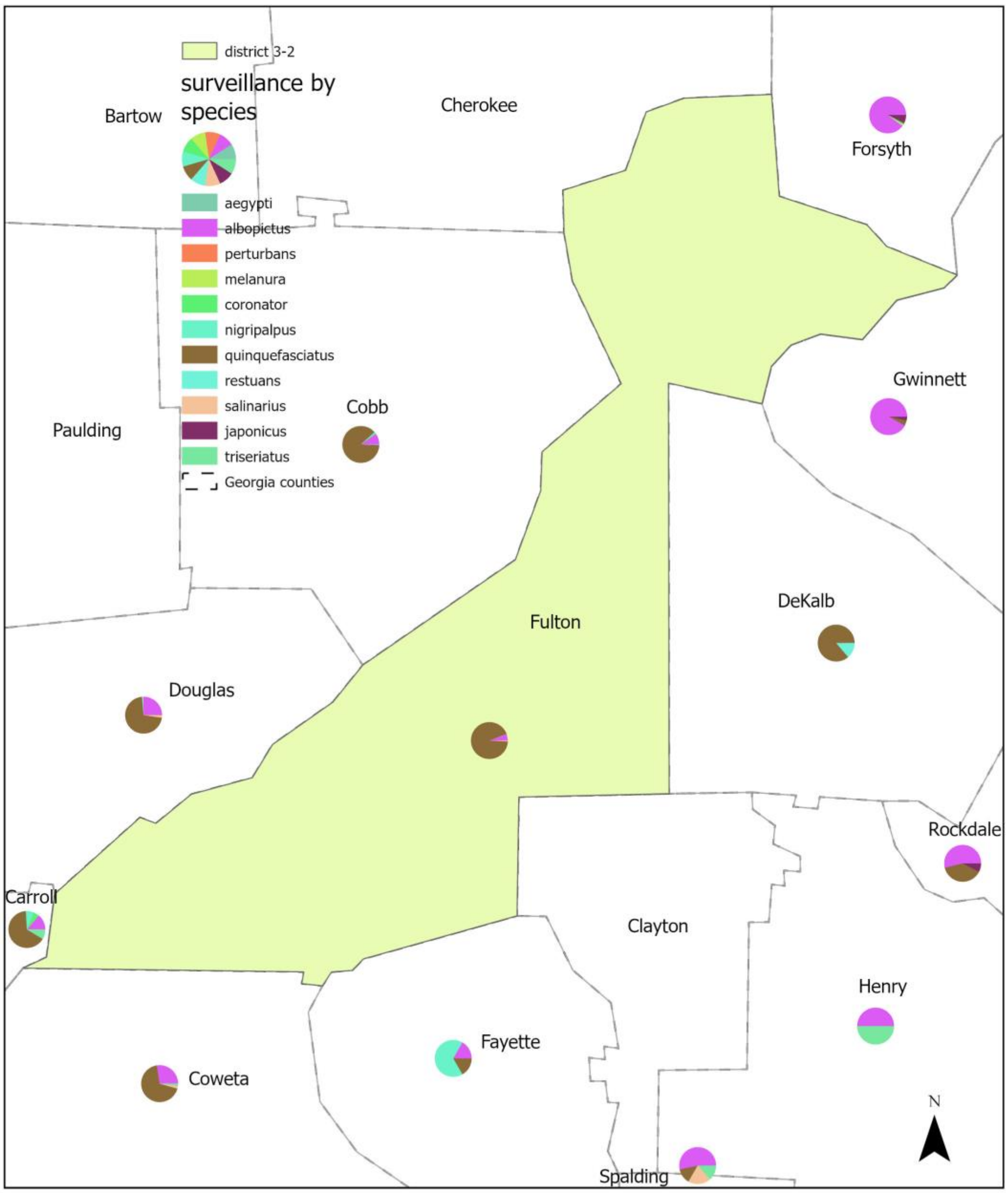
Surveillance in District 3-2 was done by Vector Disease Control International (VDCI), an integrated mosquito surveillance company that contracted with the District to do mosquito surveillance and control. Surveillance was done from late July-late October over 16 nights.

District 3-2		trap type	
County	**Species**	**CDC**	**Gravid**
Fulton	*Ae. albopictus*	276	154
	Ae. vexans	12	20
	Aedes/Ochlerotatus spp.		39
	An. punctipennis	2	1
	An. quadrimaculatus	8	
	Cx. erraticus		3
	Cx. nigripalpus	10	
	Cx. quinquefasciatus	1597	5407
	Cx. restuans		1
	Cx. salinarius	51	13
	Ps. ferox	1	

DIY Mosquito Catcher:



Surveillance by Species, District 3-2



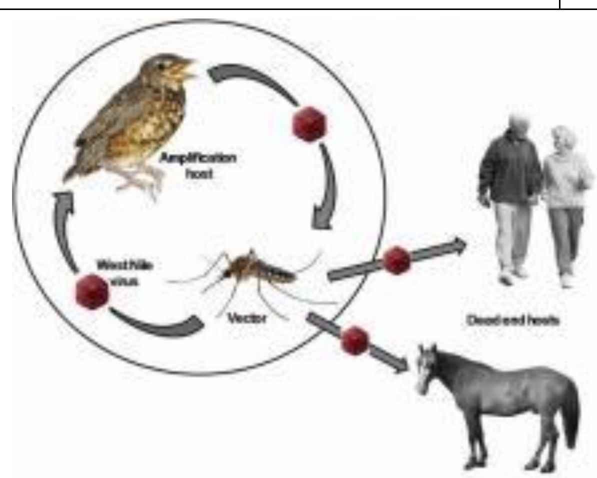
District 3-3

No surveillance was done in District 3-3 in 2024.

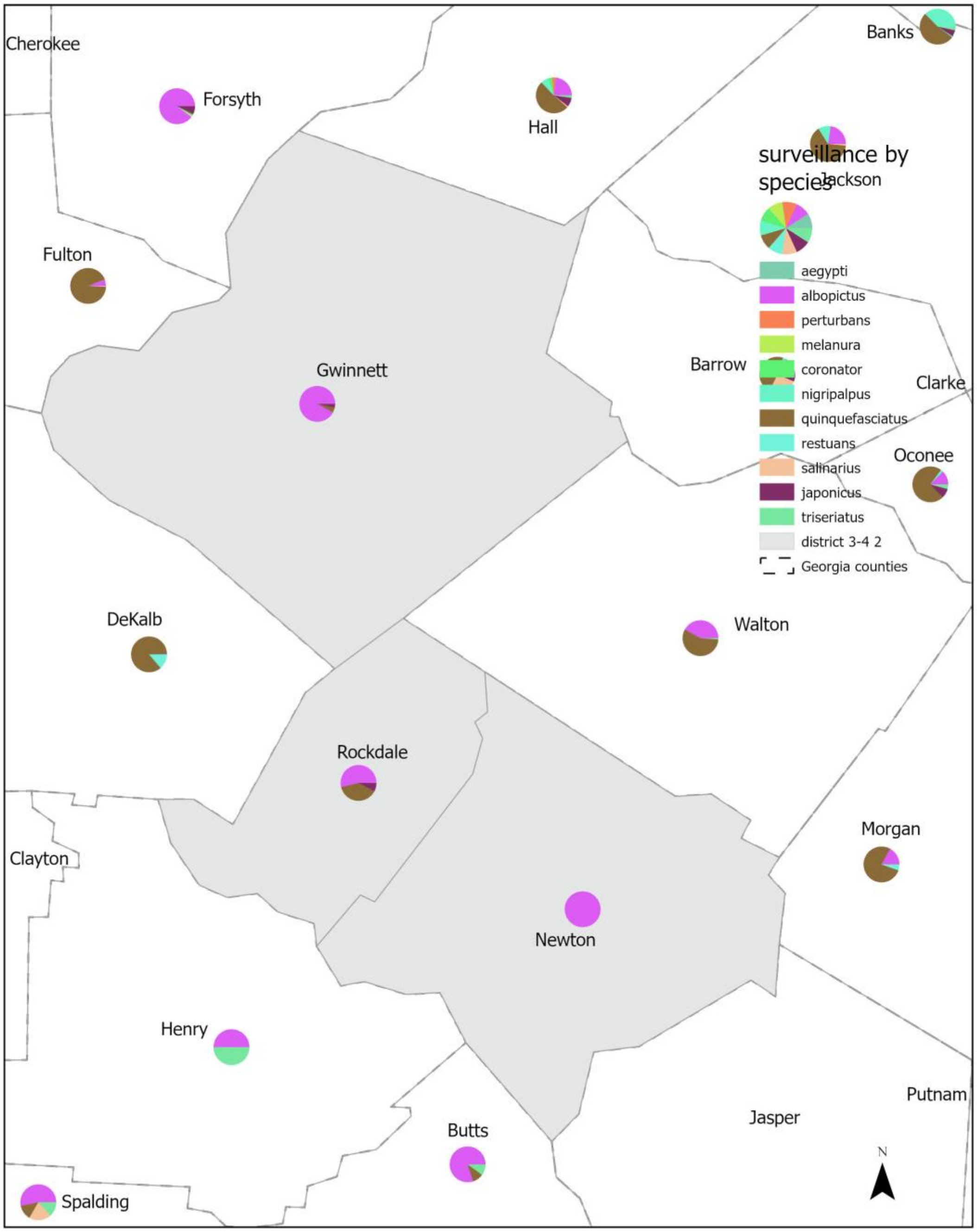
District 3-4

Surveillance in District 3-4 was done by the DPH entomologists. Surveillance was done in July and October over 3 nights.

District 3-4		trap type	
County	**Species**	**CDC**	**gravid**
Gwinnett	*Ae. albopictus*	39	18
	Ae. vexans	5	
	An. punctipennis	1	
	An. quadrimaculatus	2	
	Cx. quinquefasciatus		3
	Oc. japonicus	1	1
	Ps. ferox	1	
Newton	*Ae. albopictus*	1	1
	An. punctipennis	1	
Rockdale	*Ae. albopictus*	2	5
	Ae. vexans	1	
	Cx. erraticus	4	5
	Cx. quinquefasciatus	3	2
	Oc. japonicus		1
	unknown	1	



Surveillance by Species, District 3-4

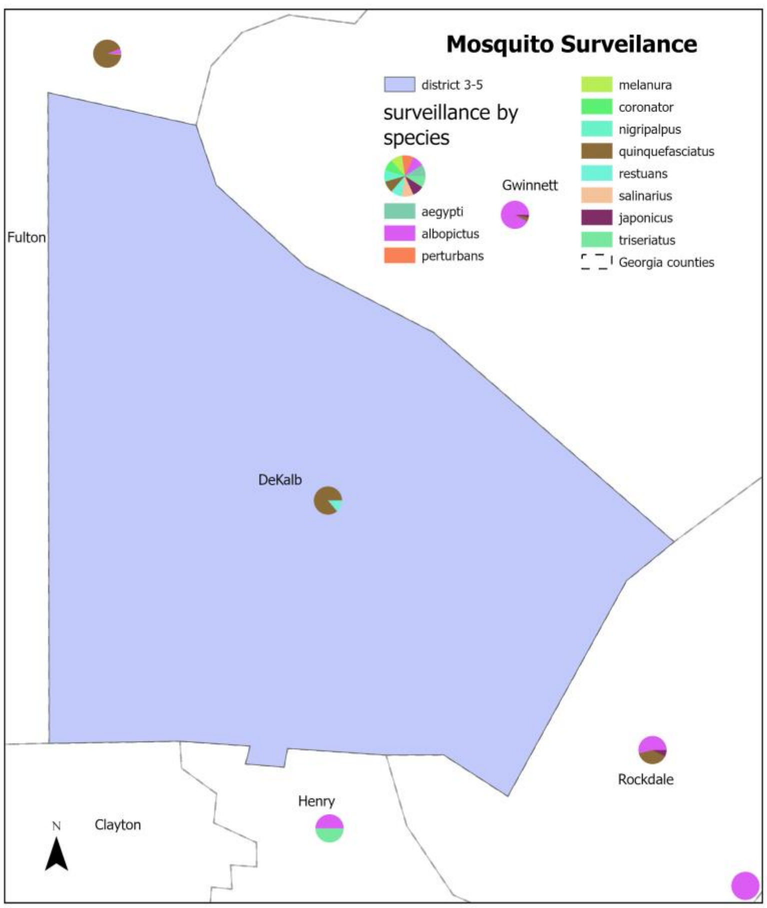


District 3-5

Surveillance in District 3-5 was done by interns in the County Environmental Health program. Surveillance was done from mid-June through end of October over 32 nights. Data from tested mosquitoes were shared with the DPH.

District 3-5		trap type	
County	**Species**	**CDC**	**Gravid**
DeKalb	*Ae. albopictus*	23	
	An. punctipennis	1	
	Cx. erraticus	1	
	Cx. quinquefasciatus	1	10445
	Cx. restuans		1666
	Oc. triseriatus	1	

Surveillance by Species, District 3-5

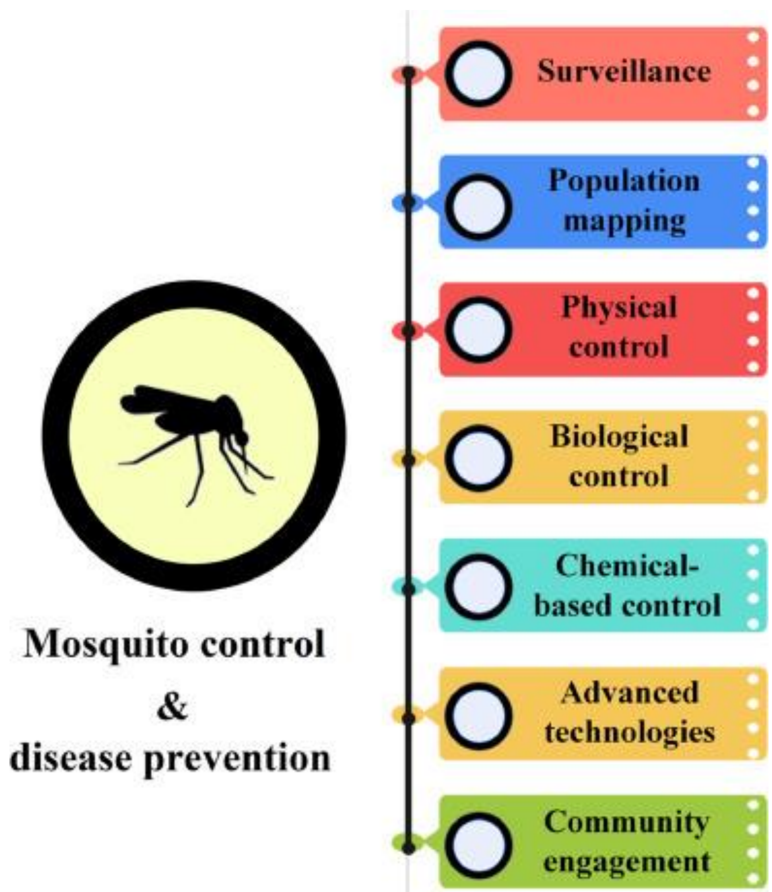


District 4-0

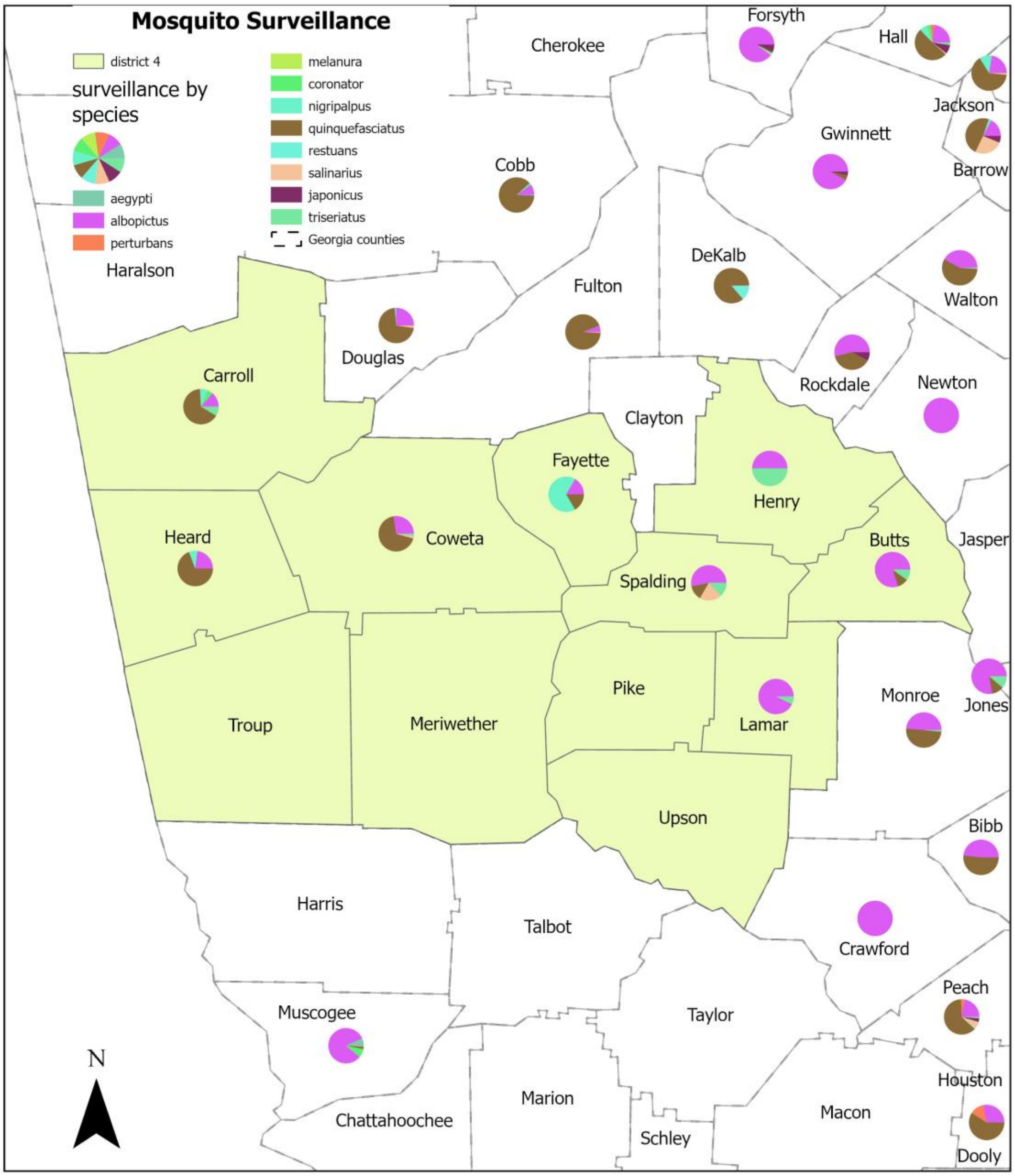
Surveillance in District 4-0 was done by the DPH entomologists. Surveillance was done from mid-May to early August over 4 nights.

District 4-0		trap type	
County	**Species**	**CDC**	**Gravid**
Butts	*Ae. albopictus*	7	1
	Cx. erraticus	1	
	Cx. quinquefasciatus	1	
	Oc. triseriatus	1	
Carroll	*Ae. albopictus*		8
	Ae. vexans		2
	Cx. coronator	3	
	Cx. nigripalpus		4
	Cx. quinquefasciatus	16	22
	Oc. triseriatus	2	3
Coweta	*Ae. albopictus*	17	8
	An. quadrimaculatus	3	
	Cx. erraticus	3	
	Cx. quinquefasciatus	22	40
	Cx. salinarius		2
	Oc. triseriatus	2	
	Ps. ferox	3	
Fayette	*Ae. albopictus*	1	
	Cx. erraticus	1	
	Cx. nigripalpus		4
	Cx. quinquefasciatus	1	
Heard	*Ae. albopictus*	2	4
	Ae. vexans	2	
	An. punctipennis	1	
	Cx. nigripalpus		2
	Cx. quinquefasciatus		18
	Ps. howardii	1	
Henry	*Ae. albopictus*	1	

Henry	*An. crucians*	1	
	An. punctipennis	1	
	Oc. triseriatus		1
Lamar	*Ae. albopictus*	3	10
	An. punctipennis	1	
	An. quadrimaculatus	1	
	Cx. erraticus	2	
	Oc. triseriatus		1
Spalding	*Ae. albopictus*	2	6
	Cx. quinquefasciatus		2
	Cx. salinarius	3	
	Oc. triseriatus		2



Surveillance by Species, District 4-0

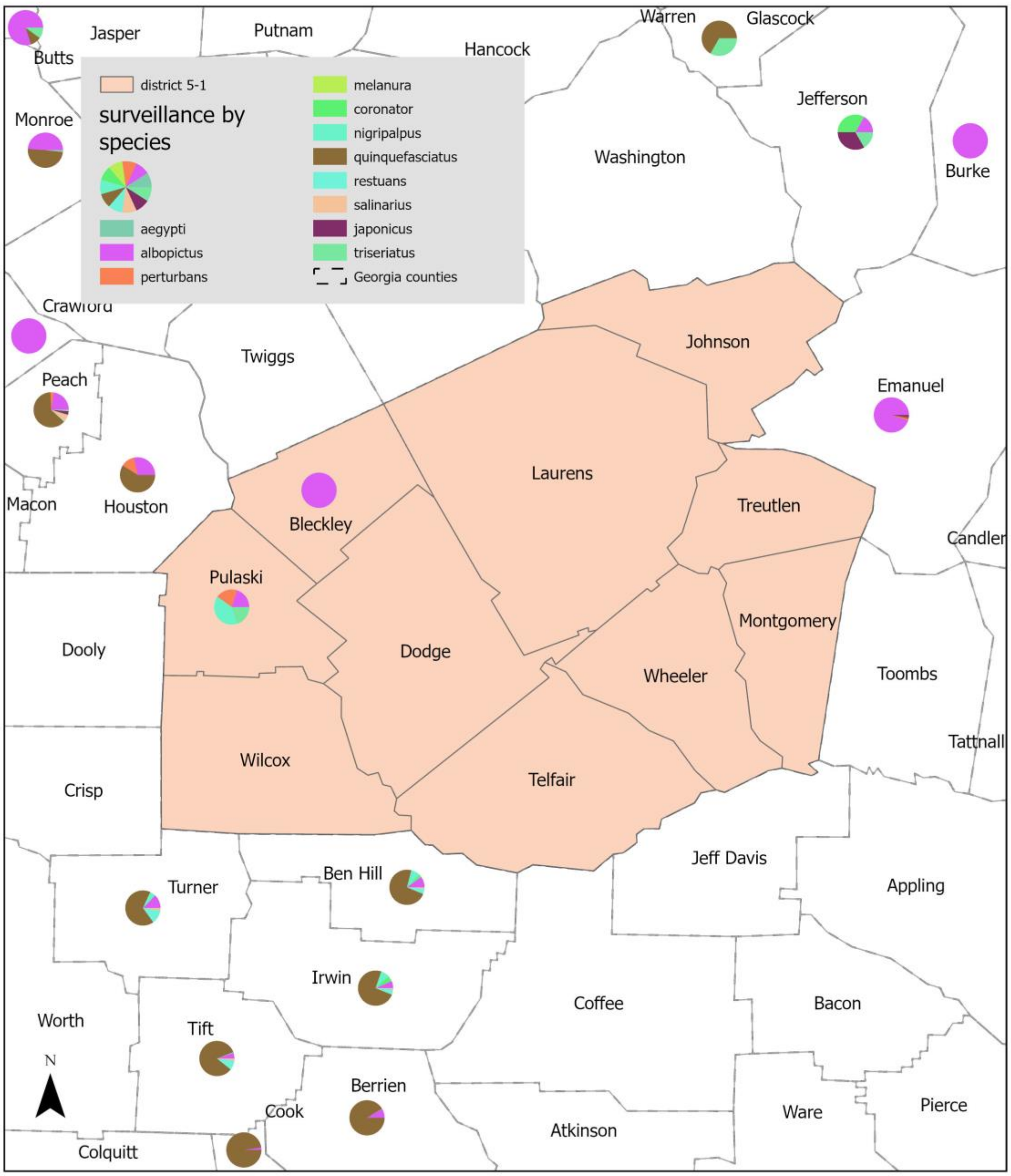


District 5-1

Surveillance in District 5-1 was done by the DPH entomologists on October 8.

District 5-1		trap type	
County	**Species**	**CDC**	**Gravid**
Bleckley	*Ae. albopictus*		7
	Ae. vexans	4	
	An. quadrimaculatus	1	
	Oc. atlanticus		3
	Ps. ciliata	4	
	Ps. ferox	7	
	Ps. howardii	3	
Laurens	*Ae. vexans*	1000	
	An. crucians	1	
	Oc. atlanticus	3	
	Ps. ferox	1000	
Pulaski	*Ae. albopictus*	1	
	Ae. vexans	650	1
	An. punctipennis	2	
	An. quadrimaculatus	2	
	Cq. perturbans	1	
	Cx. nigripalpus	2	
	Oc. triseriatus	1	
	Ps. ciliata	1	
	Ps. columbiae	4	
	Ps. ferox	58	
	Ps. howardii	5	

Surveillance by Species, District 5-1



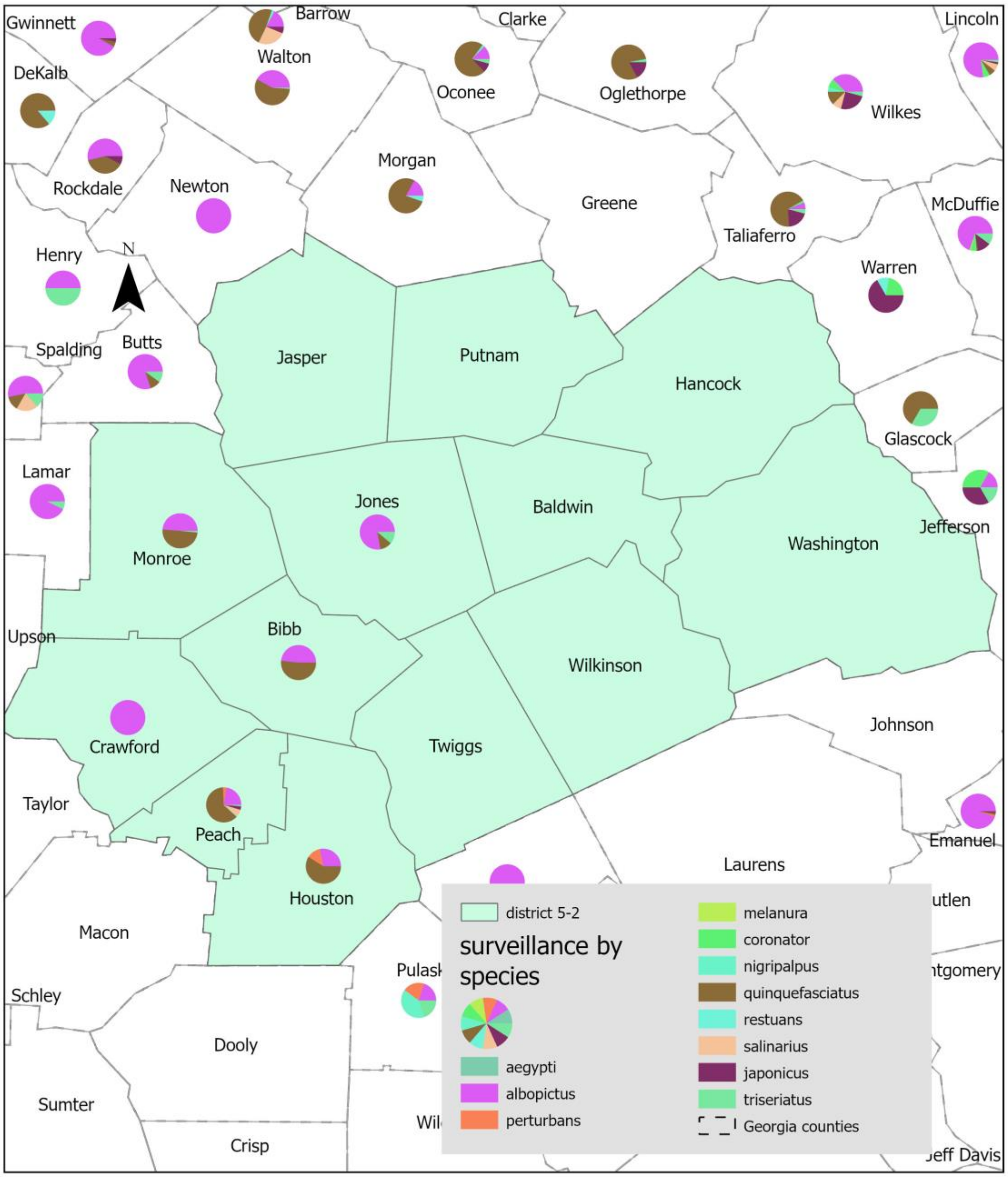
District 5-2

Surveillance in District 5-2 was done by the DPH entomologists from early June to late August over 7 nights.

District 5-2		trap type			District 5-2		traps	
County	**Species**	**CDC**	**Gravid**		**County**	**Species**	**CDC**	**Gravid**
Bibb	*Ae. albopictus*	41			**Monroe**	*Ae. albopictus*	57	3
	An. crucians	1				*Ae. vexans*	1	
	An. punctipennis	1				*An. quadrimaculatus*	1	
	Cx. quinquefasciatus	11	33			*Cx. quinquefasciatus*	4	57
Crawford	*Ae. albopictus*		6			*Oc. triseriatus*		2
	Ae. vexans	2				*Ps. columbiae*	1	
	An. crucians	2			**Peach**	*Ae. albopictus*	28	6
	Cx. erraticus		1			*Ae. vexans*	44	
Houston	*Ae. albopictus*	8	3			*An. crucians*	9	
	Ae. vexans	6				*An. quadrimaculatus*	8	
	Cq. perturbans	5				*Cq. perturbans*	5	
	Cx. erraticus	5				*Culex spp.*		1
	Cx. quinquefasciatus	4	19			*Cx. erraticus*	1	
Jones	*Ae. albopictus*		7			*Cx. quinquefasciatus*		95
	Cx. quinquefasciatus		1			*Cx. restuans*		1
	Oc. triseriatus		1			*Cx. salinarius*	10	

Crane Fly

Surveillance by Species, District 5-2



District 6-0

Surveillance in District 6-0 was done by the Richmond County Mosquito Control program. Surveillance was done from mid-March to end of December over 40 nights.

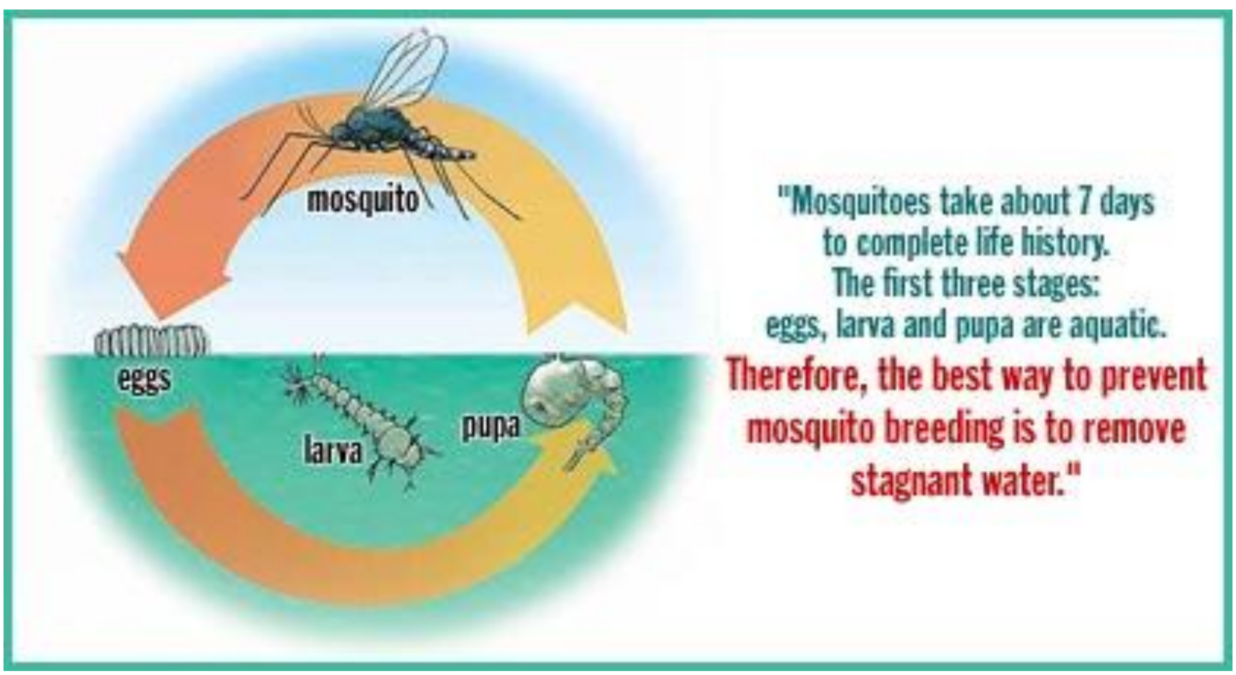
District 6-0		trap type	
County	***Species***	**CDC**	**gravid**
Burke	*Ae. albopictus*		1
	Ps. ferox	1	
Columbia	*Ae. albopictus*	22	
	Ae. vexans		1
	Aedes/Ochlerotatus spp. (male)		1
	Culex spp.	7	18
	Culex spp. (male)	1	1
	Cx. quinquefasciatus		5
	Oc. japonicus		2
	Oc. triseriatus		1
	Ps. ciliata	1	1
	Ps. cyanescens		1
	Ps. ferox		2
Emanuel	*Ae. albopictus*	55	1
	Ae. albopictus (male)	3	
	Ae. vexans	1	
	An. quadrimaculatus	1	1
	Cq. perturbans	1	
	Culex spp. (male)		1
	Cx. erraticus		1
	Cx. quinquefasciatus		1
	Oc. canadensis	12	
	Oc. japonicus		1
	Ps. ciliata	4	
	Ps. cyanescens	12	
	Ps. ferox	20	
	Ps. horrida	1	
	Psorophora spp.	2	
	unknown	3	

Glascock	*Aedes/Ochlerotatus spp.*		1
	Culex spp.		1
	Culex spp. (male)		2
	Cx. quinquefasciatus		2
	Oc. triseriatus		1
Jefferson	*Ae. albopictus*		1
	Aedes/Ochlerotatus spp.		1
	An. punctipennis	1	
	Cx. coronator	1	1
	Oc. japonicus		2
	Oc. triseriatus		1
	Or. signifera		1
Jenkins	*Ae. vexans*	1	
	An. crucians	1	
	Oc. japonicus		1
	Oc. triseriatus		1
Lincoln	*Ae. albopictus*	37	
	Ae. albopictus (male)	1	
	Cx. coronator		3
	Cx. quinquefasciatus	1	2
	Cx. salinarius		3
	Oc. japonicus		1
	Oc. triseriatus		1
	Ps. ciliata		1
McDuffie	*Ae. albopictus*	60	2
	Ae. vexans	9	
	Aedes/Ochlerotatus spp.	8	1
	Anopheles spp. (male)	1	
	Cs. melanura	1	
	Cx. coronator	4	1
	Cx. quinquefasciatus		1
	Oc. japonicus	9	2
	Oc. triseriatus	5	4
	Ps. ciliata	1	

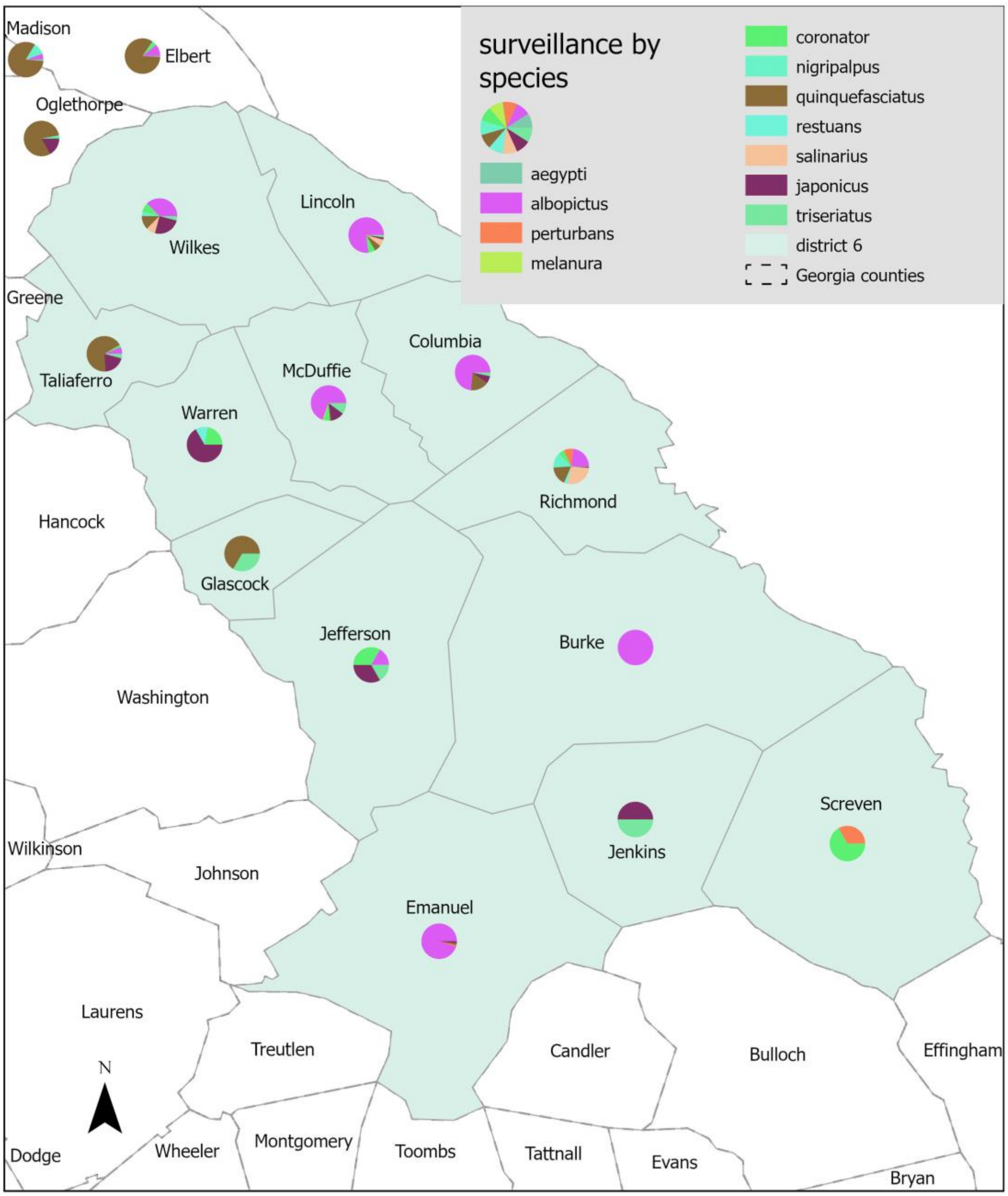
McDuffie	*Ps. columbiae*		1
	Ps. horrida		1
	Psorophora spp.	1	
	unknown		1
Richmond	*Ae. albopictus*	816	101
	Ae. albopictus (male)	43	34
	Ae. cinereus	6	
	Ae. cinereus (male)	1	
	Ae. vexans	6449	584
	Ae. vexans (male)	197	61
	Aedes/Ochlerotatus spp.	29	2
	Aedes/Ochlerotatus spp. (male)	2	
	An. crucians	266	15
	An. crucians (male)	2	
	An. punctipennis	10	2
	An. quadrimaculatus	94	3
	An. quadrimaculatus (male)	1	
	Anopheles spp.	4	4
	Anopheles spp. (male)	16	6
	Cq. perturbans	359	2
	Cq. perturbans (male)	8	
	Cs. melanura	5	
	Culex spp.	645	186
	Culex spp. (male)	85	104
	Cx. coronator	172	27
	Cx. erraticus	205	81
	Cx. erraticus (male)		1
	Cx. nigripalpus	490	79
	Cx. quinquefasciatus	72	630
	Cx. restuans	42	79
	Cx. salinarius	1009	87
	Cx. salinarius (male)	2	
	Oc. atlanticus	4	
	Oc. canadensis	81	2

Richmond	*Oc. infirmatus*	4	
	Oc. japonicus	7	30
	Oc. mitchellae	1	
	Oc. sollicitans	11	
	Oc. sticticus	16	3
	Oc. triseriatus	7	10
	Oc. trivittatus	8	2
	Or. signifera	1	4
	Ps. ciliata	41	3
	Ps. ciliata (male)	5	
	Ps. columbiae	17	
	Ps. cyanescens	29	2
	Ps. ferox	602	63
	Ps. ferox (male)	6	2
	Ps. howardii	2	
	Psorophora spp.	17	2
	Psorophora spp. (male)	11	1
	unknown	62	6
	Ur. sapphirina	34	
	Ur. sapphirina (male)	13	
Screven	*An. punctipennis*	5	
	Cq. perturbans	1	
	Cq. perturbans (male)	1	
	Culex spp. (male)	1	
	Cx. coronator	2	
	Cx. erraticus	1	
Taliaferro	*Ae. albopictus*		6
	An. punctipennis		1
	Culex spp.		15
	Culex spp. (male)		2
	Cx. coronator		2
	Cx. quinquefasciatus	1	64
	Oc. japonicus		19
	Oc. japonicus (male)		1

Taliaferro	*Oc. triseriatus*	1	3
	Ps. ferox		1
	unknown		1
Warren	*Cx. coronator*		2
	Cx. restuans		1
	Oc. japonicus	1	5
	Ur. sapphirina	1	
Wilkes	*Ae. albopictus*	5	4
	Cx. coronator		2
	Cx. nigripalpus		1
	Cx. quinquefasciatus		3
	Cx. salinarius		2
	Oc. japonicus		6
	Oc. triseriatus		1
	Ps. cyanescens		3



Surveillance by Species, District 6-0



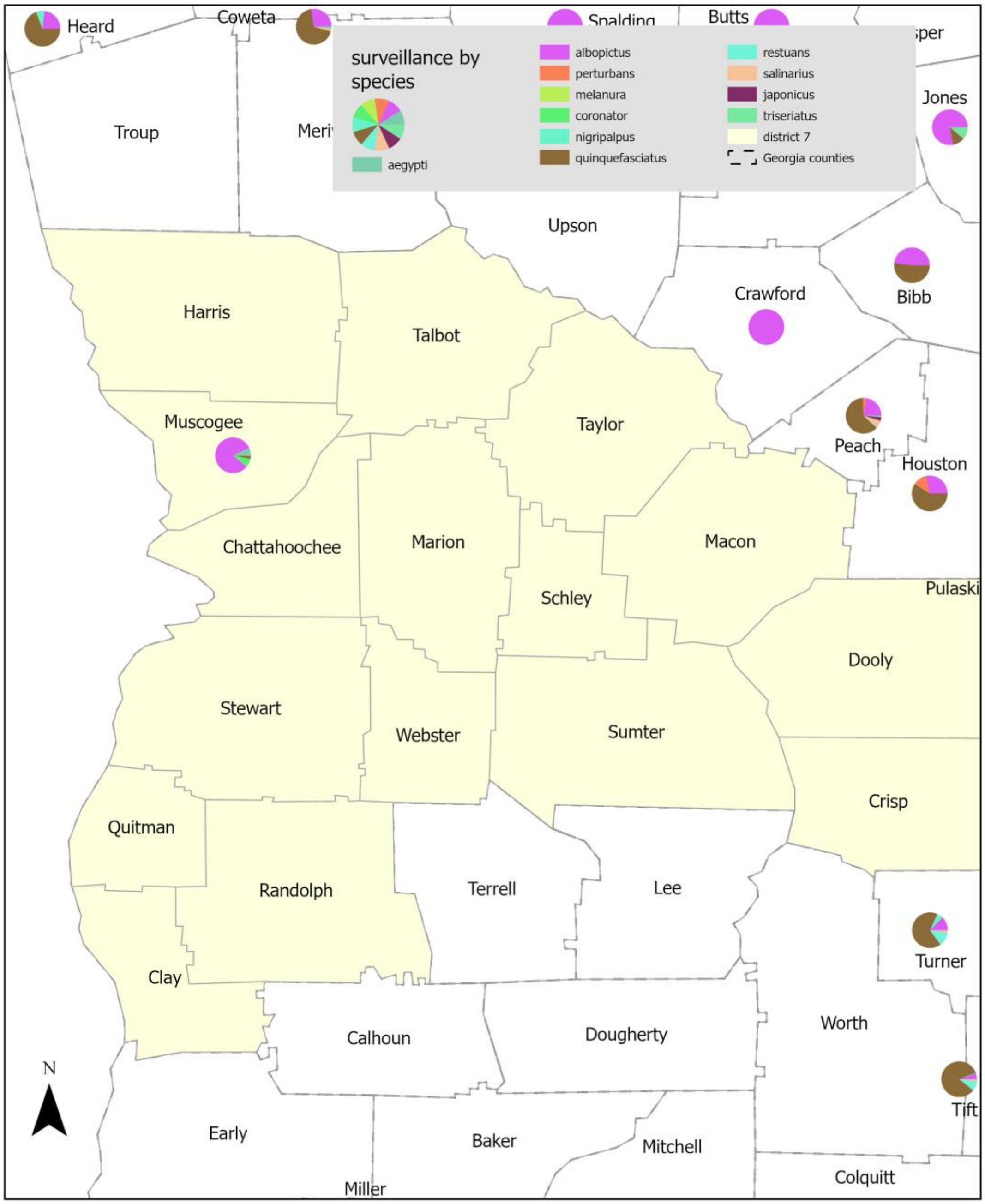
District 7-0

Surveillance in District 7-0 was done by the DPH entomologists and our PHEFA Fellow. Surveillance was done from mid-March to early November over 20 nights.

District 7-0		trap type	
County	***Species***	**BGS**	**CDC**
Muscogee	*Ae. aegypti*	165	
	Ae. albopictus	1788	193
	Ae. vexans	5	125
	An. punctipennis		13
	Cx. coronator		188
	Cx. erraticus	4	5
	Cx. nigripalpus		2
	Cx. quinquefasciatus	23	38
	Cx. restuans	4	
	Cx. salinarius		10
	Oc. canadensis		2
	Oc. japonicus		1
	Oc. sticticus		1
	Oc. thibaulti		1
	Oc. triseriatus		1
	Or. signifera	1	
	Ps. ciliata		5
	Ps. columbiae		1
	Ps. ferox		4

IN2CARE TRAP

Surveillance by Species, District 7-0



District 8-1

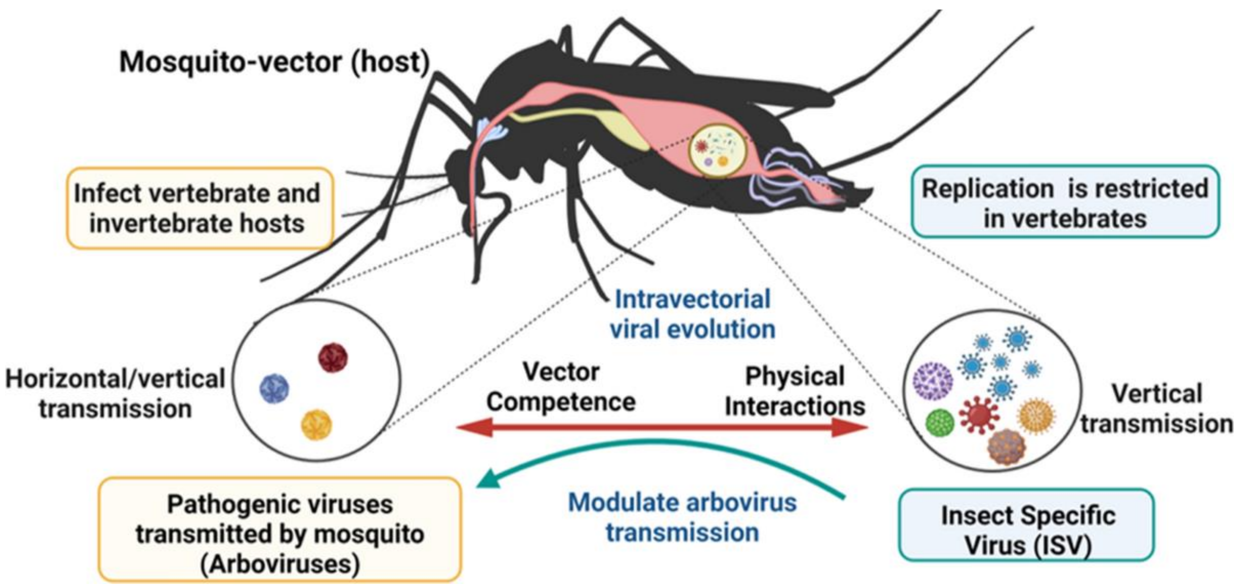
Surveillance in District 8-1 was done by the local EHS and students from Valdosta State University. Surveillance was done from early March to mid-November over 134 nights.

District 8-1		trap type	
County	***Species***	**CDC**	**Gravid**
Ben Hill	*Ae. albopictus*		75
	Aedes/Ochlerotatus spp.		5
	An. punctipennis		3
	An. quadrimaculatus		1
	Anopheles spp.		1
	Culex spp.		251
	Cx. coronator		18
	Cx. erraticus		2
	Cx. nigripalpus		64
	Cx. quinquefasciatus		543
	Cx. restuans		36
	Cx. salinarius		11
	Cx. territans		11
	Or. signifera		1
	Ps. ferox		3
	unknown		15
Berrien	*Ae. albopictus*		35
	An. crucians		1
	An. punctipennis		2
	Cx. nigripalpus		1
	Cx. quinquefasciatus		381
	Ps. ciliata		1
	Ps. columbiae		7
	Ps. ferox		1
Brooks	*Ae. albopictus*		34
	Aedes/Ochlerotatus spp.		2
	Culex spp.		3
	Cx. quinquefasciatus		2310

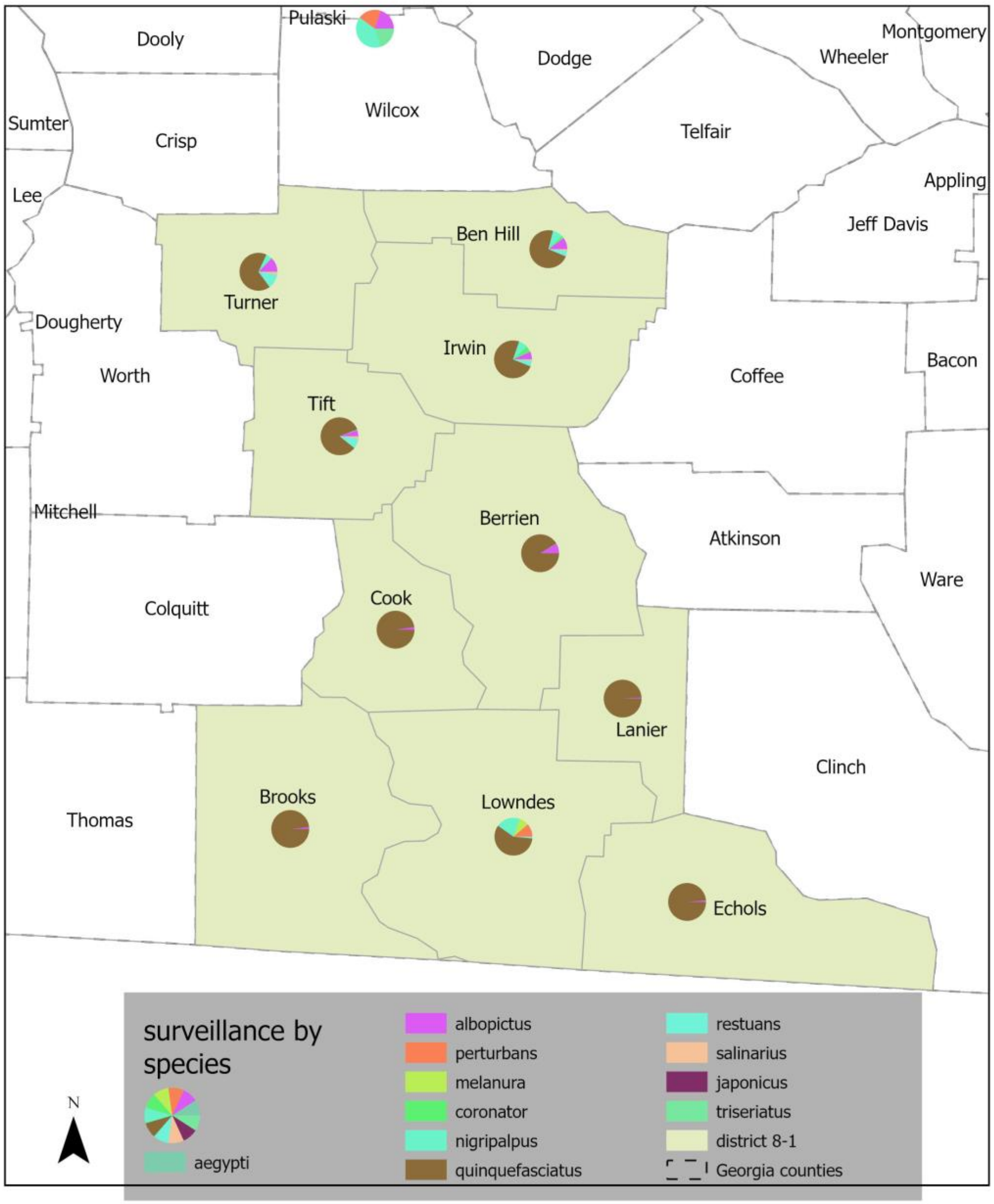
Brooks	*Ps. columbiae*		1
	Toxorhynchites spp.		1
	Tx. rutilus		1
Cook	*Ae. albopictus*		8
	Ae. vexans		4
	Aedes/Ochlerotatus spp.		1
	An. quadrimaculatus		1
	Cx. quinquefasciatus		352
	Ps. columbiae		6
Echols	*Ae. aegypti*		1
	Ae. albopictus		18
	Cx. quinquefasciatus		1404
	Ps. columbiae		1
Irwin	*Ae. albopictus*		48
	Ae. vexans		1
	Aedes/Ochlerotatus spp.		3
	An. crucians		2
	An. punctipennis		1
	An. quadrimaculatus		1
	Culex spp.		247
	Cx. coronator		38
	Cx. erraticus		10
	Cx. nigripalpus		58
	Cx. quinquefasciatus		541
	Cx. restuans		36
	Cx. salinarius		8
	Cx. territans		2
	Oc. mitchellae		3
	Ps. columbiae		5
	unknown		5
Lanier	*Ae. albopictus*		13
	Aedes/Ochlerotatus spp.		4
	An. crucians		2
	Cx. quinquefasciatus		1400

Lanier	*Ps. columbiae*		1
Lowndes	*Ae. albopictus*		3
	An. quadrimaculatus	1	
	Cq. perturbans	1009	17
	Cs. melanura	698	44
	Cx. nigripalpus	1465	441
	Cx. quinquefasciatus	157	5163
	Cx. restuans		140
	Cx. salinarius		1
	Oc. triseriatus	1	
Tift	*Ae. albopictus*		79
	Ae. vexans		1
	Aedes/Ochlerotatus spp.		7
	An. quadrimaculatus		1
	Culex spp.		645
	Cx. coronator		1
	Cx. erraticus		9
	Cx. nigripalpus		8
	Cx. quinquefasciatus		1263
	Cx. restuans		132
	Cx. salinarius		29
	Oc. triseriatus		1
	Or. signifera		3
	Ps. howardii		2
	unknown		13
Turner	*Ae. albopictus*		105
	Ae. vexans		23
	Aedes/Ochlerotatus spp.		9
	An. crucians		1
	An. punctipennis		1
	Culex spp.		248
	Cx. coronator		4
	Cx. erraticus		26
	Cx. nigripalpus		41

Turner	*Cx. quinquefasciatus*		554
	Cx. restuans		104
	Cx. salinarius		19
	Oc. infirmatus		1
	Oc. triseriatus		1
	Or. signifera		1
	Ps. columbiae		1
	Ps. ferox		4
	unknown		3
	Ur. lowii		1



Surveillance by Species, District 8-1



District 8-2

No surveillance was done in District 8-2 in 2024.

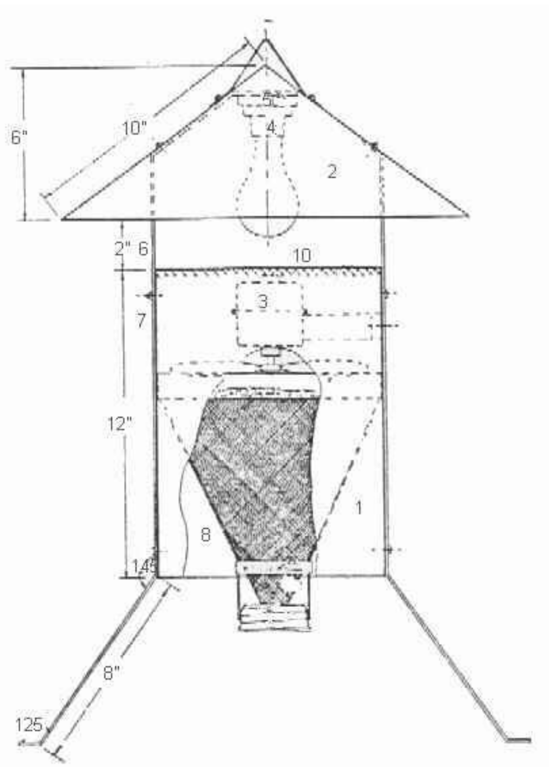
District 9-1

Surveillance in District 9-1 was done by Hinesville Public Works (Liberty County), Mosquito Control Services (Glynn & Camden counties), and Chatham County Mosquito Control programs. Surveillance was done from January-December over 212 nights.

District 9-1		trap type					
County	***Species***	**BGS**	**CDC**	**DynaTrap**	**Exit**	**Gravid**	**NJLT**
Bryan	*Ae. vexans*		6				
	An. punctipennis		4				
	Cx. nigripalpus		2			2	
	Cx. quinquefasciatus					46	
	Ma. titillans		1				
Camden	*Ae. albopictus*		10				2
	Ae. vexans		14				263
	An. crucians		117				846
	An. quadrimaculatus		4				
	Cq. perturbans		113				31
	Cs. inornata		15				
	Cs. melanura		1				
	Culex spp.						1
	Culiseta spp.		41				25
	Cx. erraticus		31				
	Cx. nigripalpus		203				226
	Cx. quinquefasciatus		39			11206	102
	Cx. restuans					32	
	Cx. salinarius		13			2	122
	Ma. titillans		12				15
	Oc. atlanticus		274				95
	Oc. canadensis		4				3
	Oc. infirmatus		54				

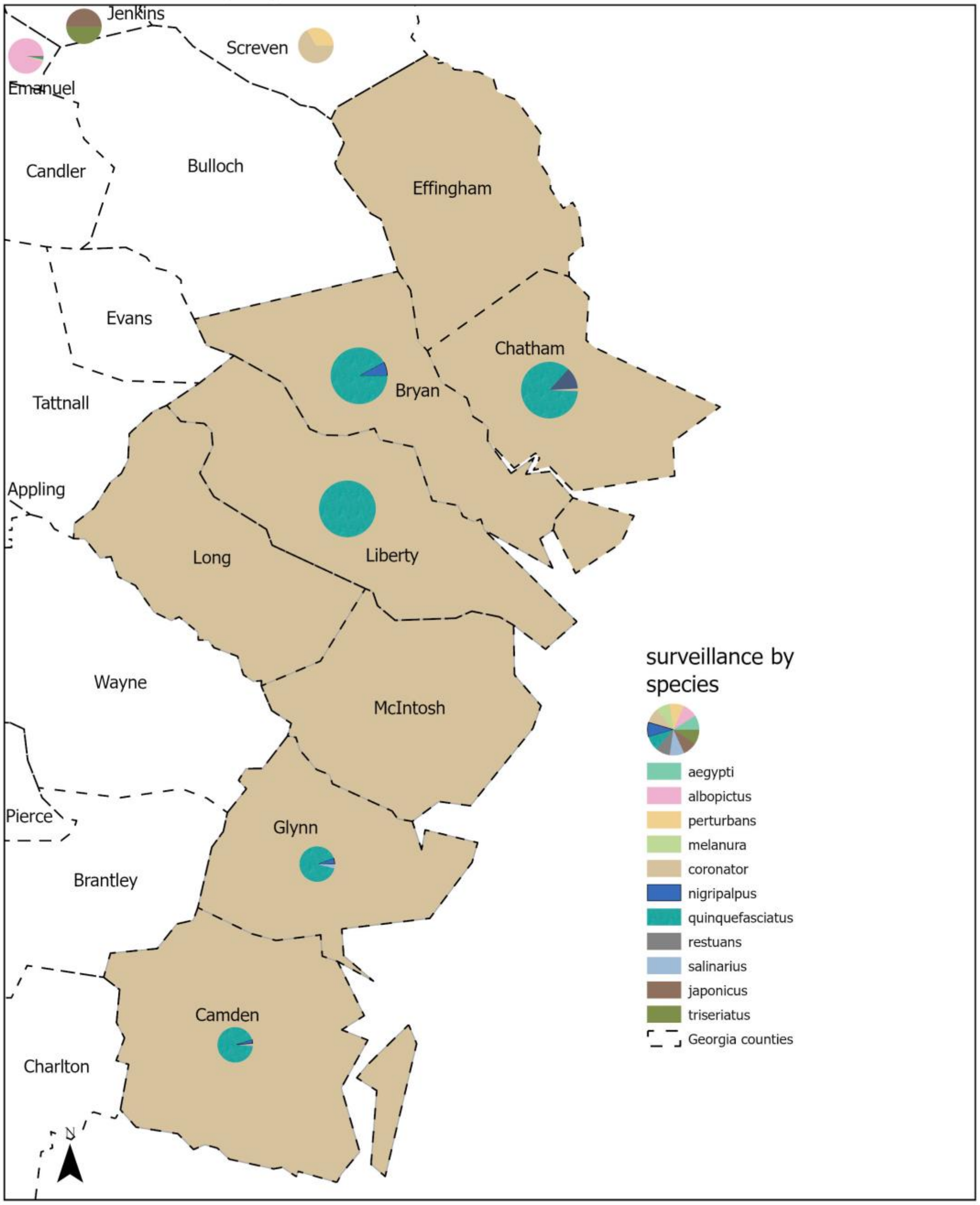
Camden	*Oc. sollicitans*						1
	Oc. taeniorhynchus		11				7
	Ps. ciliata						8
	Ps. columbiae		239				671
	Ps. ferox		4				5
	unknown		34				
	Ur. sapphirina						1
Chatham	*Ae. albopictus*		2				
	Ae. vexans		632				
	An. crucians		178				
	Anopheles spp.		5				
	Cq. perturbans		344				
	Cs. melanura	1	248		23	4	
	Culex spp.		59			5511	
	Cx. coronator		251				
	Cx. erraticus		4466		3	68	
	Cx. nigripalpus		7498		232	4968	
	Cx. quinquefasciatus	19	33			86979	
	Cx. restuans					496	
	Cx. salinarius		520		3		
	Oc. atlanticus		1748		72		
	Oc. fulvus pallens		1				
	Oc. infirmatus		121				
	Oc. triseriatus		22			10	
Glynn	*Ae. albopictus*		22			1	11
	Ae. vexans		37	28		3	449
	An. crucians		13	33		3	463
	An. quadrimaculatus		1				1
	Anopheles spp.		2				
	Cq. perturbans		5	1			11
	Cs. inornata		1	3			4
	Cs. melanura			1		2	3
	Culiseta spp.		1				
	Cx. erraticus		67				

Glynn	*Cx. nigripalpus*		115	250		60	488
	Cx. quinquefasciatus		106	40		15732	252
	Cx. salinarius		94	463		7	145
	Ma. titillans		6				3
	Oc. atlanticus		43				7
	Oc. infirmatus		72			4	
	Oc. sollicitans			4			88
	Oc. taeniorhynchus		117	7			536
	Ps. ciliata						4
	Ps. columbiae		2	6		1	306
	Ps. ferox		13			2	
	Ur. sapphirina						3
Liberty	*An. punctipennis*		6				
	Cx. erraticus					8	
	Cx. quinquefasciatus					308	



NEW JERSEY LIGHT TRAP (NJLT)

Surveillance by Species, District 9-1



District 9-2

No surveillance was done in District 9-2 in 2024.

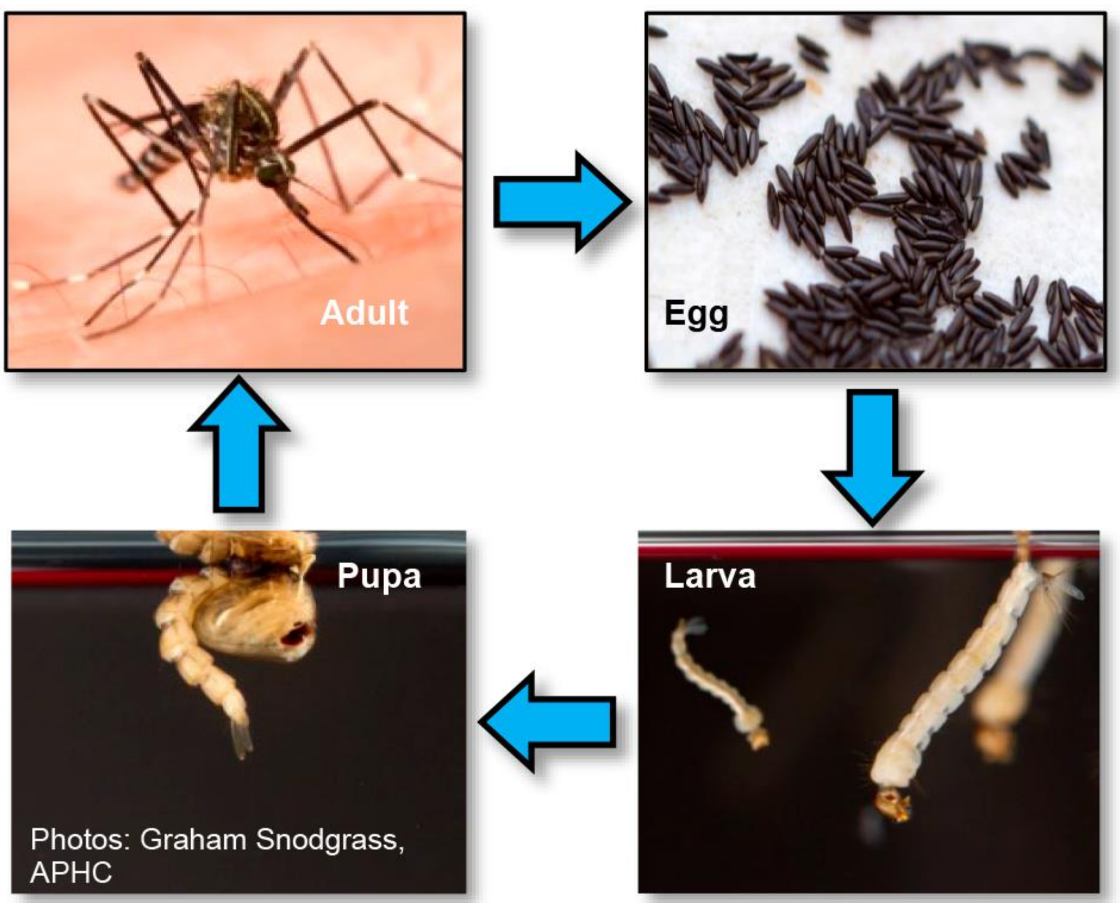
District 10-0

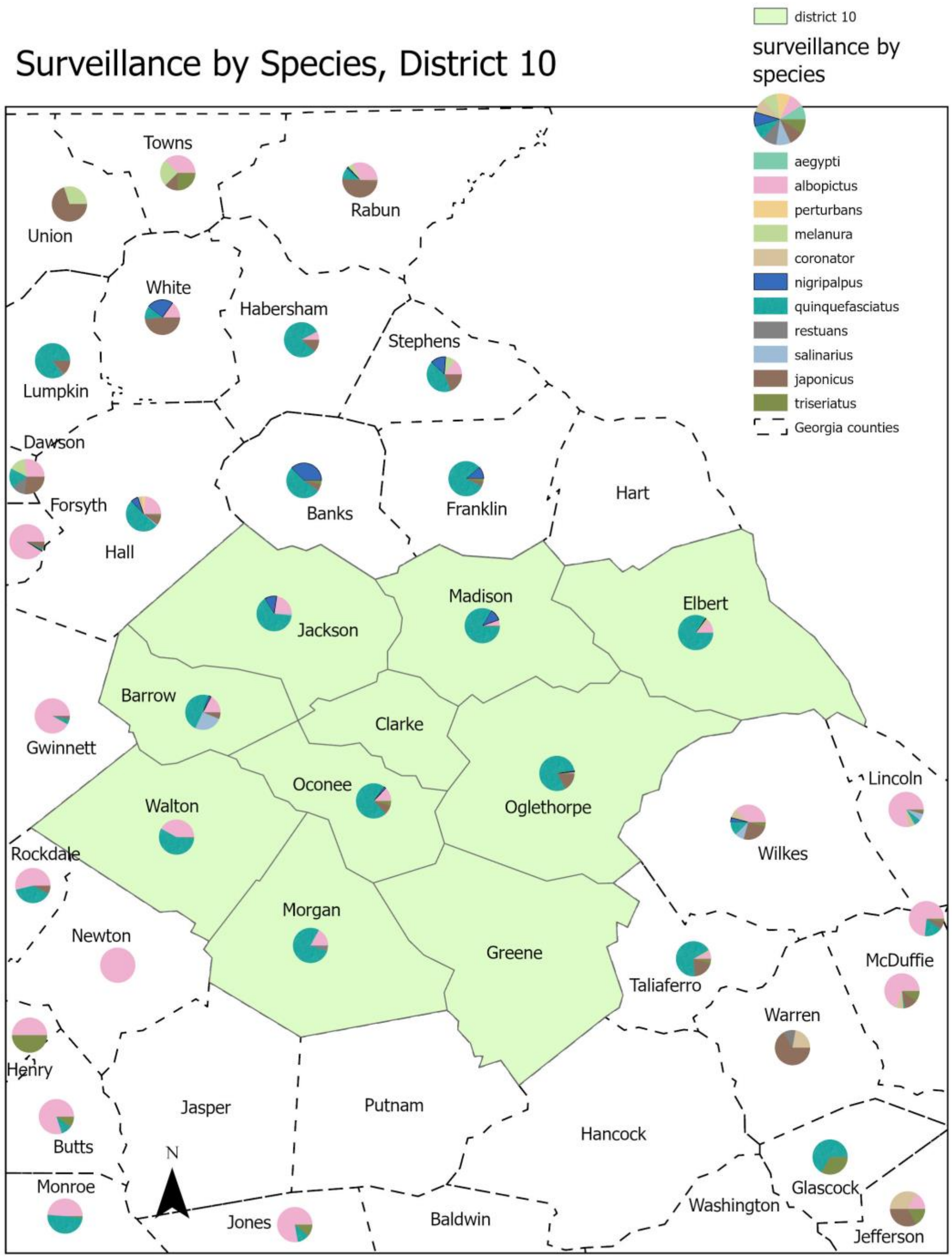
Surveillance in District 10-0 was done by the local EHS and a volunteer entomologist from UGA. Surveillance was done from early April to early October over 15 nights.

District 10-0		trap type	
County	***Species***	**CDC**	**gravid**
Barrow	*Ae. albopictus*	10	4
	Ae. vexans	3	6
	An. quadrimaculatus	1	
	Cx. nigripalpus		2
	Cx. quinquefasciatus	1	38
	Cx. salinarius		21
	Oc. japonicus		5
	Oc. trivittatus	1	
Elbert	*Ae. albopictus*	29	19
	Ae. albopictus (male)	2	
	Ae. vexans	2	3
	An. punctipennis	3	
	An. quadrimaculatus		1
	Culex spp. (male)	4	87
	Cx. coronator	3	14
	Cx. erraticus	4	3
	Cx. nigripalpus	3	
	Cx. quinquefasciatus	122	247
	Oc. fulvus pallens	7	
	Oc. triseriatus	3	
	Ps. cyanescens	12	
	Ps. ferox	104	
Jackson	*Ae. albopictus*	5	9
	Ae. vexans	3	13
	An. quadrimaculatus	1	

Jackson	*Culex spp. (male)*		3
	Cx. erraticus	4	23
	Cx. nigripalpus		7
	Cx. quinquefasciatus	8	32
	Cx. salinarius		1
	Ps. columbiae	2	
Madison	*Ae. albopictus*	5	
	An. quadrimaculatus		1
	Culex spp. (male)	2	7
	Cx. erraticus	2	2
	Cx. nigripalpus		10
	Cx. quinquefasciatus	52	24
	Oc. triseriatus	1	
Morgan	*Ae. albopictus*	12	4
	Ae. albopictus (male)	3	
	An. punctipennis	2	
	Culex spp.	1	
	Culex spp. (male)		4
	Cx. quinquefasciatus	13	60
	Cx. restuans	5	
	Ps. ferox	5	
Oconee	*Ae. albopictus*	3	3
	Ae. vexans	2	3
	Cx. erraticus		2
	Cx. nigripalpus	1	
	Cx. quinquefasciatus	3	31
	Oc. japonicus		4
	Oc. triseriatus		2
Oglethorpe	*Ae. vexans*	4	3
	An. quadrimaculatus	13	1
	Culex spp. (male)		3
	Cx. coronator		1
	Cx. nigripalpus		1
	Cx. quinquefasciatus	4	53

Oglethorpe	*Oc. canadensis*	8	
	Oc. japonicus	2	10
	Oc. trivittatus	7	5
Walton	*Ae. albopictus*	61	15
	Ae. albopictus (male)		3
	Ae. vexans	4	3
	An. punctipennis	3	
	Culex spp. (male)		4
	Cx. erraticus	3	3
	Cx. quinquefasciatus	11	92
	Oc. triseriatus		2
	Ps. ferox	1	




Surveillance by Species, District 10
district 10
surveillance by species
aegypti
albopictus
perturbans
melanura
coronator
nigripalpus
quinquefasciatus
restuans
salinarius
japonicus
triseriatus
Georgia counties
Towns
Rabun
Union
White
Habersham
Stephens
Lumpkin
Dawson
Forsyth
Hall
Banks
Franklin
Hart
Jackson
Madison
Elbert
Barrow
Clarke
Gwinnett
Oconee
Oglethorpe
Walton
Lincoln
Wilkes
Rockdale
Newton
Morgan
Greene
Taliaferro
McDuffie
Warren
Henry
Jasper
Putnam
Hancock
Butts
Glascock
Monroe
Washington
Jones
Baldwin
Jefferson
N

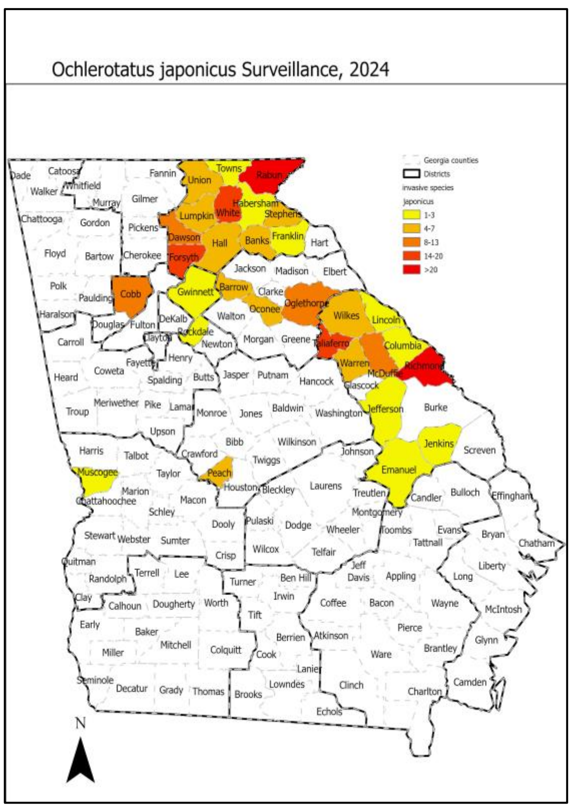
Invasive Mosquito Species

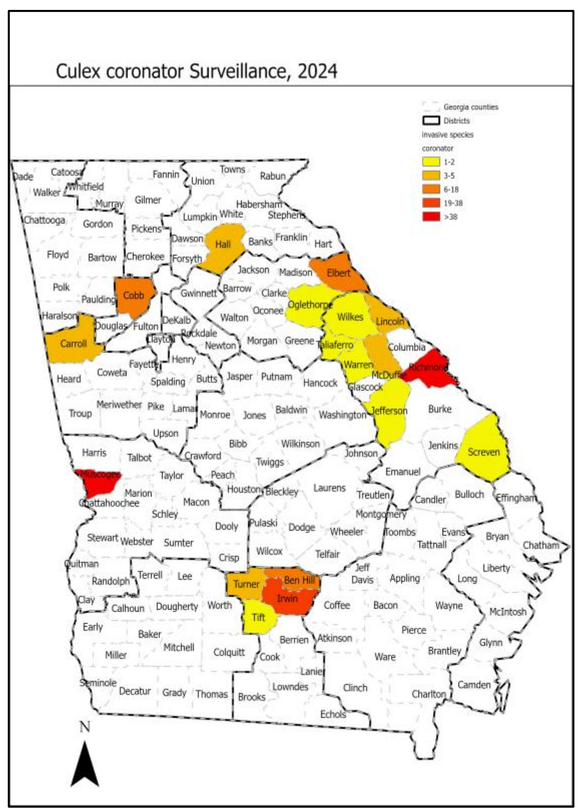
One of the benefits of mosquito surveillance is determining where mosquito species are found. This is especially important for vector species and for invasive species which may become involved in arboviral disease cycles.

Culex coronator was first detected in Georgia in 2006. It was found initially in counties below the Fall line. Mosquito surveillance done in 2017 - 2020 has shown that this species can now be found in most regions of Georgia. It is important to monitor *Cx. coronator* as it has the potential to be involved in the WNV cycle. (https://www.gamosquito.org/resources/papers/CulexcoronatorGA.pdf)

Ochlerotatus japonicus was first detected in Georgia in 2002. This species lays its eggs in rock pools, so was initially found only above the Fall line. Mosquito surveillance done in 2017 - 2020 has shown that this species can now be found in most regions of Georgia. It is important to monitor *Oc. japonicus* as it has the potential to be involved in the WNV cycle. (https://www.gamosquito.org/resources/papers/AedesJaponicusIn%20Georgia.pdf)

The Mosquito Biodiversity Enhancement and Control of Non-native Species (BEACONS) working group works on the surveillance of invasive species (https://fmel.ifas.ufl.edu/invasivemosquito/).





Pesticide Resistance Testing

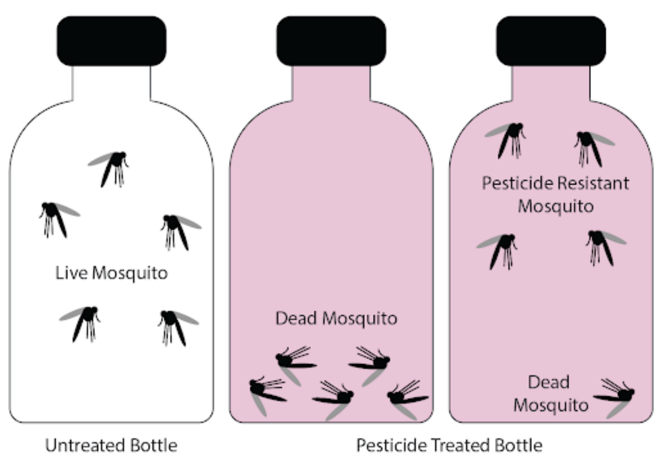
As we continue to see arboviral diseases such as Eastern Equine Encephalitis and West Nile Virus in Georgia in 2024, mosquito control methods are critical. Pesticide resistance has been found to be a component for ineffective mosquito control. There is a lack of insecticide resistance studies conducted statewide in Georgia and minimal knowledge of which pesticides mosquitoes are resistant to.

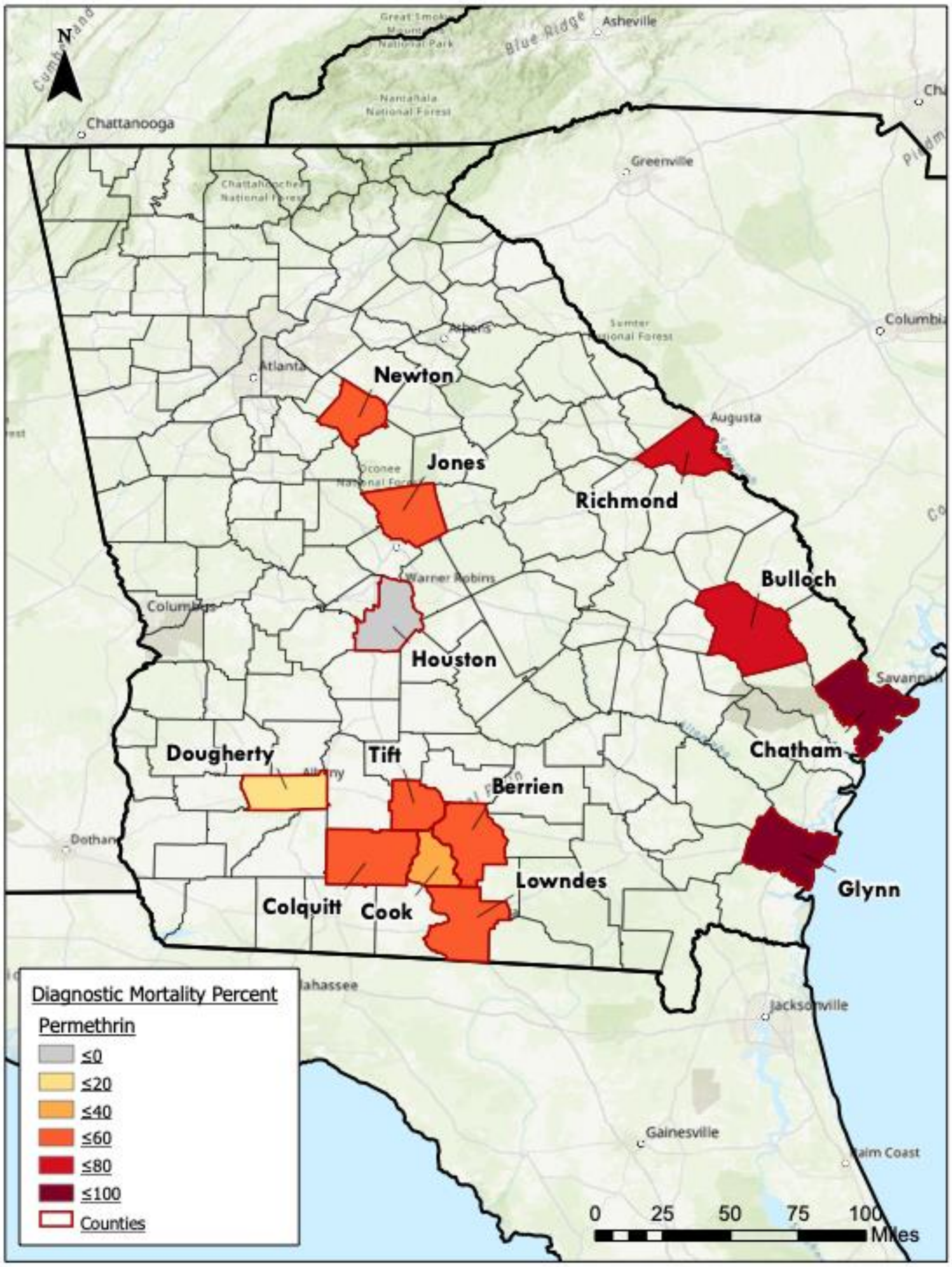
The state entomologists and the Richmond County regional mosquito surveillance coordinator are tasked to conduct insecticide resistance testing in all high-risk urban regions of Georgia. Mosquito egg collections were initially performed by regional vector surveillance coordinators. Environmental Health Specialists are now assisting with egg collections. Mosquito egg collection training can be provided to all who assist with this endeavor.

Resistance testing is performed using the CDC Bottle Bioassay procedure and the chemicals that were provided in the CDC Bottle Bioassay kits. Preliminary data from several central and southern counties showed *Ae albopictus* to be exhibiting varied levels of resistance to permethrin and deltamethrin but were susceptible at varied levels to bifenthrin and deltamethrin used along with the synergist, PBO. *Culex quinquefasciatus* showed varied levels of resistance to permethrin, lambda cyhalothrin, and deltamethrin; they were susceptible to malathion.

With the implementation of the first statewide pesticide resistance testing program, a clearer picture of the type of mosquitoes and their resistance to specific pesticides commonly used in Georgia will be determined. This information enables DPH to advise and train current mosquito control operators in using the most effective and cost-efficient pesticide for their target-mosquito. The statewide pesticide resistance testing program is a major component in reducing the exposure of mosquito-borne disease risk to the public.

The map below shows resistance to permethrin in Georgia. Permethrin is the most widely used mosquito adulticide in the US and is used to treat 9 to 10 million acres annually (out of 32-39 million acres treated with a mosquito adulticide). Permethrin's widespread use can be attributed to its low cost, high effectiveness, low incidence of pest resistance, and broad labeling.

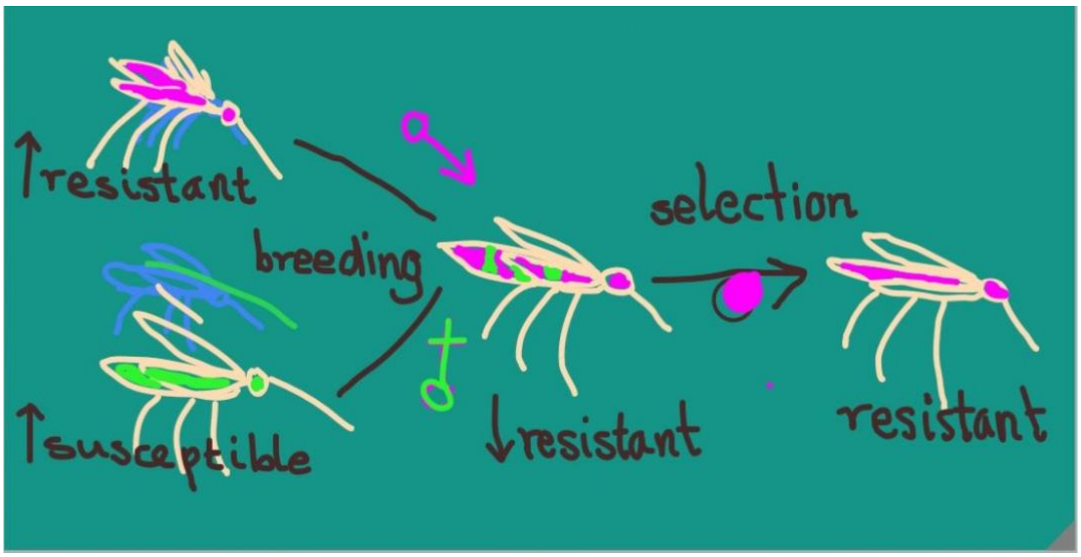




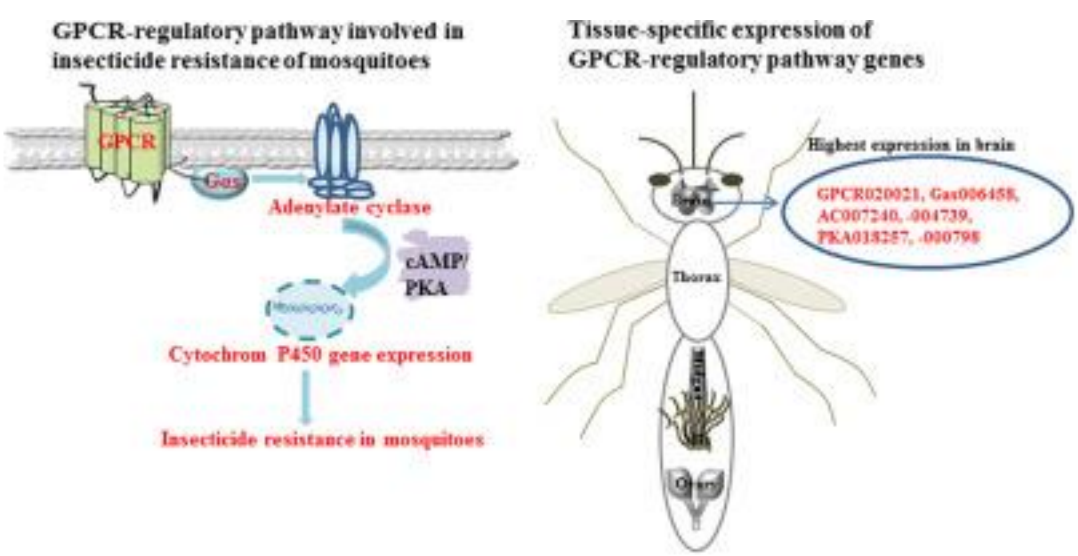
Map of Mosquito Resistance to Permethrin, Georgia

Resources

- http://www.gamosquito.org/publications.htm
- http://cdcsercoevbd-flgateway.org/
- https://www.cdc.gov/parasites/hcp/bottle-bioassay/
- https://www.researchgate.net/publication/230625904_The_possible_role_of_entomological_surveillance_in_mosquito-borne_disease_prevention



https://www.sciencedirect.com/science/article/pii/S240558081730136X



MOSQUITO SURVEILLANCE 2024

Conclusions

In 2024, mosquito surveillance was done in 78 of Georgia's 159 counties.

Year	# counties doing surveillance	% of counties
2001	2	1.3%
2002	11	6.9%
2003	26	16.4%
2004	56	35.2%
2005	55	34.6%
2006	28	17.6%
2007	28	17.6%
2008	28	17.6%
2009	26	16.4%
2010	22	13.8%
2011	19	11.9%
2012	12	7.5%
2013	13	8.2%
2014	15	9.4%
2015	13	8.2%
2016	60	37.7%
2017	159	100.0%
2018	159	100.0%
2019	159	100.0%
2020	142	89.3%
2021	103	64.8%
2022	79	49.7%
2023	101	63.5%
2024	78	49.0%

Surveillance was done in areas of highest risk of vector-borne diseases, but in many counties, surveillance was non-existent or limited. Surveillance was unfortunately lacking completely in 4 Health Districts (1-2, 3-3, 8-2, & 9-2).

This level of surveillance was only possible through the combined effort of State, District, and County Environmental Health, as well as assistance from several other agencies, including mosquito control, contracted services, interns, and volunteers.

Our goals for the 2025 mosquito surveillance season continue to be:

- Doing some level of mosquito surveillance in every county in Georgia
- Doing targeted surveillance in areas where *Ae aegypti* were found in the 1950s
- Providing continued training to Environmental Health Specialists
- Support local outreach for mosquito complaints and arboviral disease cases
- Continued testing for adulticide resistance, especially in high-risk areas of Georgia
- Beginning testing for larvicide resistance in localized areas
- Spatial analysis of pesticide resistance in Georgia

The accomplishment of these goals will allow the Georgia Department of Public Health to be better prepared for the next mosquito-borne disease to emerge. However, these goals are not attainable without sustainable funding.

Acknowledgements

I would like to thank everyone who assisted with this mosquito surveillance project, at the State, District, and County Public Health levels, as well as the mosquito control programs, interns, and others who contributed data.

District Map