FY 2022 – 2023 Annual Operations Report

EAST FLAGLER MOSQUITO CONTROL DISTRICT

Table of Contents

Operations Overview

This report will discuss operations for the fiscal year beginning October 1, 2022 through September 30, 2023.

At the beginning of October mosquitoes produced by Hurricane Ian finally emerged after an unusual cold snap with temperatures overnight dipping into the fifties. The cold weather both delayed the emergence of mosquitoes and made coordinating spray missions with FEMA contractors difficult. Mosquitoes have to be actively flying to contact the tiny droplets of pesticide produced by mosquito spray equipment and low temperatures overnight reduced mosquito activity, postponing missions.

Mosquitoes emerged from flooded areas twelve days after the storm due to the cold weather. Typically, mosquitoes can emerge in less than seven days when temperatures are warm. FEMA contracted spray planes finished spraying on October 23, treating most of the human inhabited areas of Flagler County, well outside of the District's service boundaries (Figure 1). The post-hurricane Ian mosquito population was so large it makes reading the annual population chart difficult (Figure 2), so we have included an additional chart with this report for the 2023 calendar year (Figure 3).

This year we experienced various unusual weather events. We saw extreme heat warnings issued for the first time in Flagler County. An Omega trough blocked precipitation leading to drought conditions at times. And finally, a strong El Nino formed, intensifying precipitation at the end of the year even though there were no named storms.

All of the mentioned weather factors affect mosquito production and you will see the words "unusual" and "unexpected" used often in the weekly operations reports. In the weekly updates that are part of this report we examine the mosquito population and its relationship to weather as well as explain how control measures are applied in response to elevated mosquito populations. These reports emphasize control responses to adult mosquito populations. However, the District works to prevent mosquitoes from emerging in the first place by proactively applying pesticides in the saltmarsh. These pesticides work by targeting mosquito larvae that hatch in saltmarsh areas that flood intermittently, in elevations above the intertidal zone.

Targeting the immature mosquitoes while they are still in the water means less pesticide is needed and control is more complete. Using an extended-release product means operations can be planned in advance and require less equipment as more time is available. In undeveloped areas away from the saltmarsh, breeding sites are too numerous for this strategy and a reactive approach is necessary. Controlling adult mosquitoes is highly weather dependent and there is more variability in the output of adulticides from year to year (Figure 4). Controlling immature mosquitoes using larvicides is less weather dependent with variability stemming from extended dry periods or extensive flooding in the saltmarsh (Figure 5). These conditions allow us to forgo treatments for longer periods and reduce the total applications as it is the oscillation of wet and dry periods that allow the saltmarsh mosquito species to lay eggs in exposed soil and then hatch when flooded to complete the life cycle. The trend has been to increase the amount we are larviciding, while the

adulticiding trend remains virtually flat (Figure 6). The use of pesticides to kill adult mosquitoes is always on as needed basis with more abundant and widespread populations necessitating a greater response. More area in terms of zones is then treated in response (Figure 7).

While there were no mosquito born diseases recorded in Flagler County this year, a state-wide mosquito borne illness advisory was issued for locally acquired malaria transmission in Sarasota County (Addendum 1). A total of seven cases of locally acquired malaria were recorded in Sarasota County. Also of concern were cases of locally acquired Dengue, totaling 175, occurring in Miami-Dade, Broward, Hardee, Palm Beach and Polk Counties. None of these Counties has a special taxing district dedicated solely to mosquito control, and therefore a less robust program exists when it is just one of the many county programs.

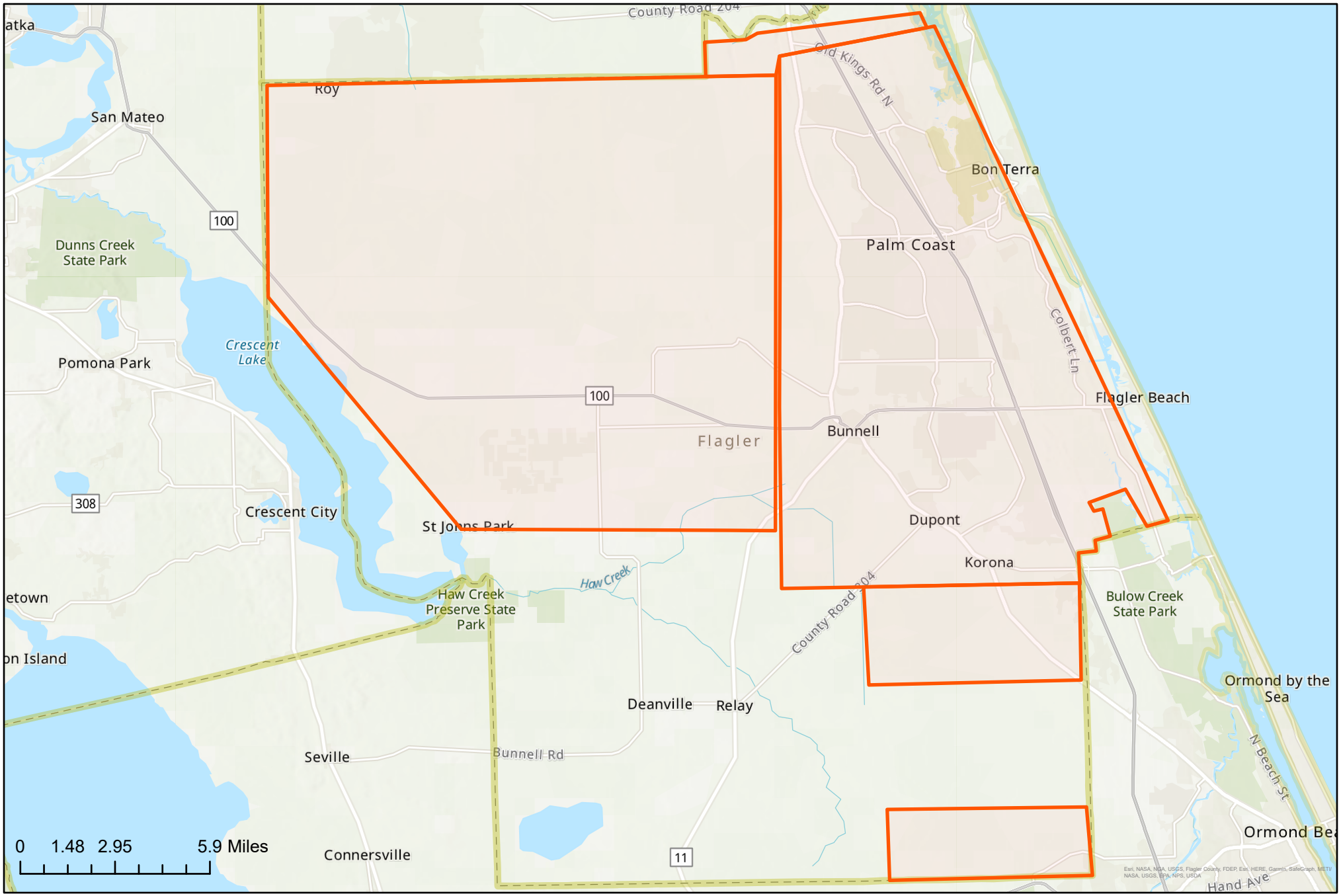
Despite the prevalence of mosquito-borne disease around the state this year our operations were consistent as explained in our public statement issued in response to the state-wide alert (Addendum 2). For people living in or visiting areas in the District, the prevalence of mosquito-borne disease elsewhere in the state has little bearing, as the District is self-sufficient in controlling mosquitoes and can quickly reduce the mosquito population to prevent disease transmission. The Florida Department of Health monitors mosquito-borne diseases around the state and a summary graphic for the year is included in this report (Figure 8).

Accomplishments

The Flagler County Board of Commissioners formally approved expansion of district boundaries in December of 2022. The County had requested the District expand to developing areas to aid in economic growth of the County. The cost to service the expanded areas will exceed collected revenues at the beginning, but over time will likely contribute more to the tax base.

Preparations were made to begin services in the expansion areas in Spring of 2024. In order to serve the additional territory, an additional field technician was brought on in 2023 to complete training ahead of the start of services, bringing the total number of employees to fourteen. Mosquito control can operate with a small number of employees because it makes use of specialized equipment to treat large areas quickly in response to the verified presence of mosquitoes.

The largest part of preparing for expanded services was increasing our ability to aerial adulticide additional areas. The Districts current helicopter was purchased in 2005 and was being budgeted for replacement in fiscal year 2025/2026. However, keeping the current almost twenty-year-old helicopter until then would have limited our ability to respond quickly to surges in mosquito population now that more area would need to be treated. The Board began exploring options to increase aerial capacity and ultimately decided to replace the helicopter ahead of schedule with a larger capacity model. Between budgeting, securing finances and researching options, a considerable amount of administrative time was occupied by this single task.



Flagler_proposed_sprayzone_IAN_projected

Figure 1. FEMA contracted spray plane treatment blocks

Flagler County

213,682 **Proposed** Aerial Acres

Jessica Ber
FDACS/AES
October 19, 2022

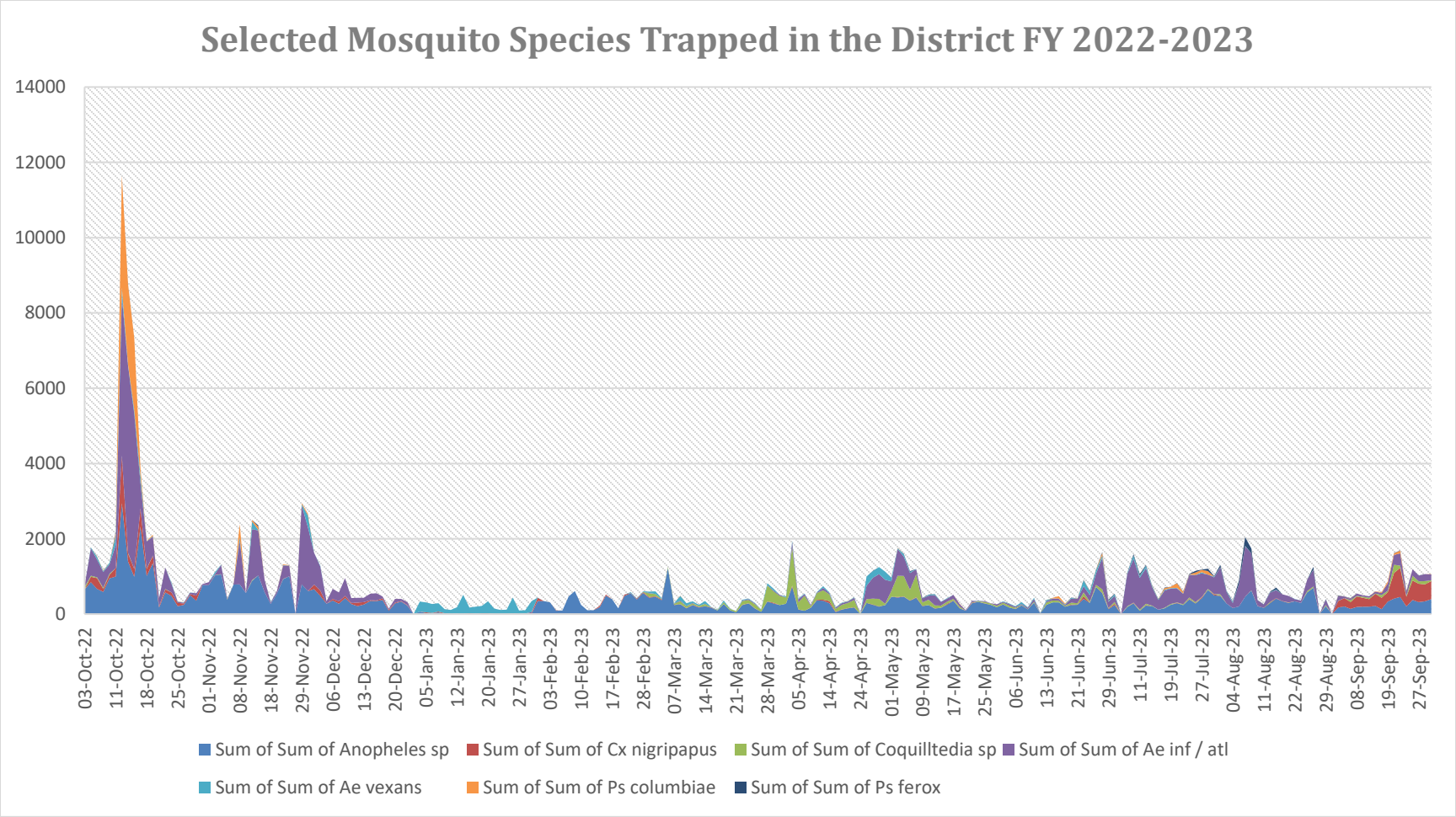


Figure 2. The District maintains a network of traps that are monitored daily on a year-round basis. This information provides the required justification for applications to control adult mosquitoes. Hurricane Ian produced an exceedingly high number of mosquitoes which makes interpreting the change in mosquito population throughout the year difficult and an additional graph containing only data for the calendar year follows.

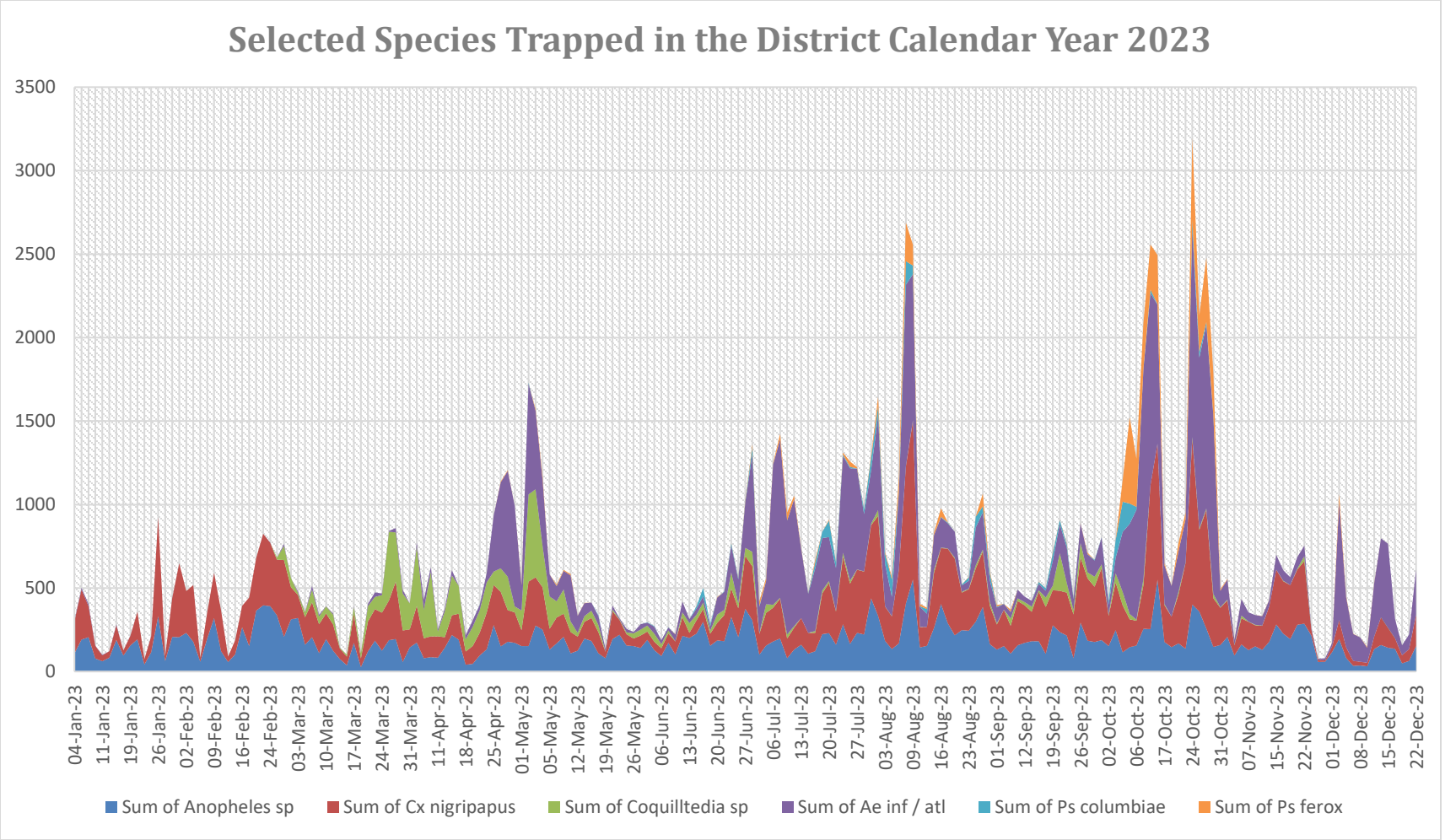


Figure 3. Daily mosquito population data for 2023 calendar year. This chart is with out the data following Hurricane Ian from the beginning of the fiscal year.

Pesticide Usage by Fiscal Year

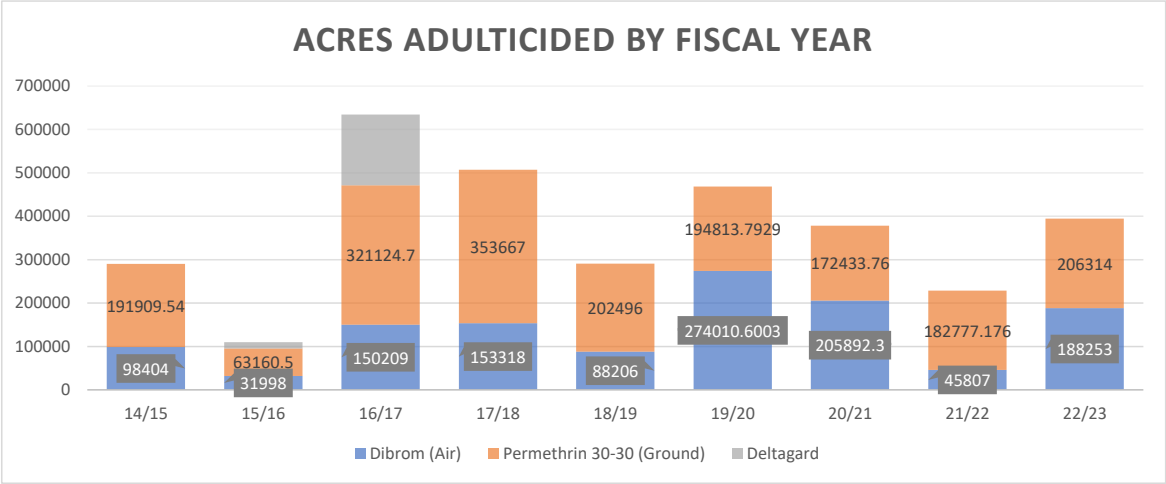


Figure 4. Controlling adult mosquitoes is highly weather dependent and there is more variability in the output of adulticides from year to year.

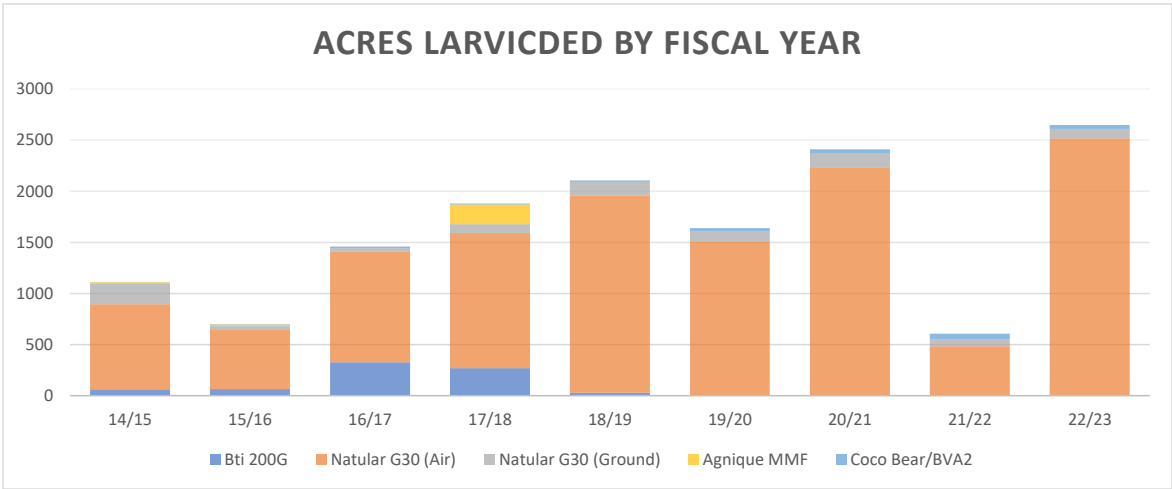


Figure 5. Controlling immature mosquitoes using larvicides is less weather dependent with variability stemming from extended dry periods or extensive flooding in the saltmarsh.

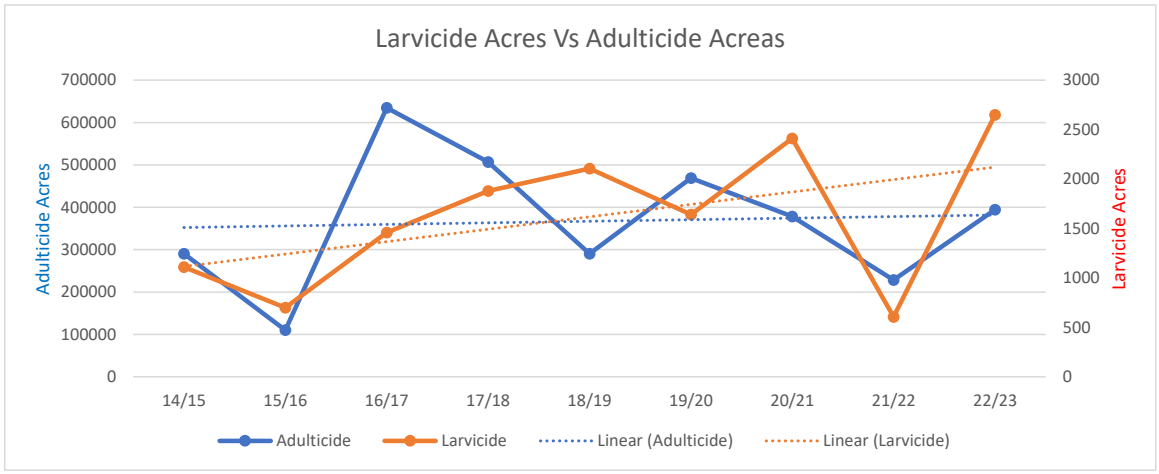


Figure 6. The trend has been to increase the amount we are larviciding, while the adulticiding trend remains virtually flat.

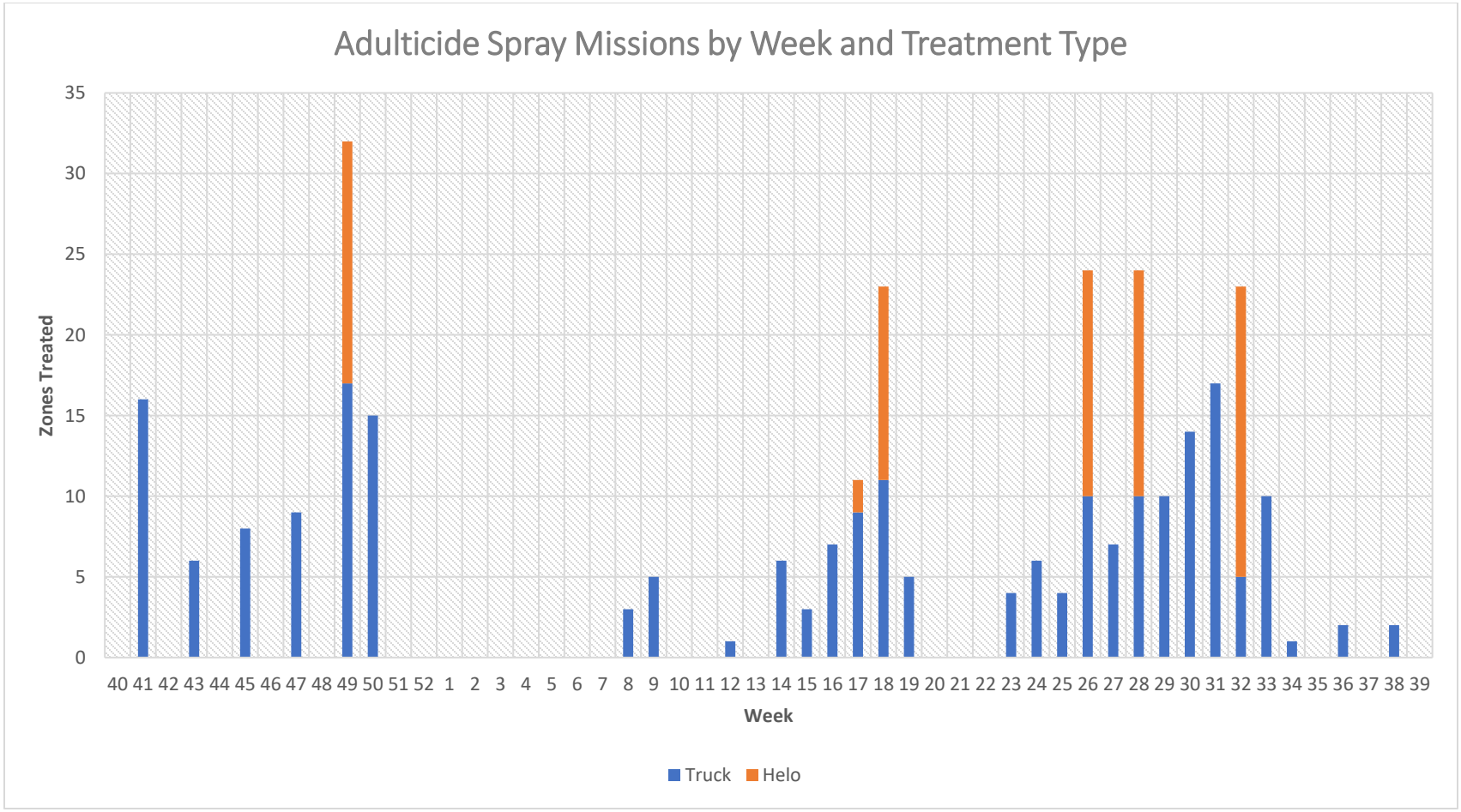


Figure 7. The use of pesticides to kill adult mosquitoes is always on as needed basis with more abundant and widespread populations necessitating a greater response. More area in terms of zones is then treated in response to a greater abundance of mosquitoes. When the mosquito population is at low levels no spray missions are conducted.

Addendum 1

Monday, June 26, 2023

The Florida Department of Health Issues Mosquito-Borne Illnesses Advisory

Four malaria cases in Sarasota county have been treated and recovered.

Tallahassee, Fla. – The Florida Department of Health (Department) is issuing a statewide mosquito-borne illness advisory following four confirmed and recovered local cases of malaria in Sarasota County. **All individuals have been treated and have recovered.** Malaria is transmitted through infected mosquitoes. Residents throughout the state should take precautions by applying bug spray, avoiding areas with high mosquito populations, and wearing long pants and shirts when possible - especially during sunrise and sunset when mosquitos are most active.

The Department continues to work closely with local partners and county mosquito control. Aerial and ground mosquito spraying continues to be conducted in these areas to mitigate the risk of further transmission.

In Florida, Malaria is transmitted through infected *Anopheles* mosquitoes. The cause of malaria in these cases has been identified as the *Plasmodium vivax species.* Effective treatment is readily available through hospitals and other health care providers. Individuals in this area with symptoms of fever, chills, sweats, nausea/vomiting, and headache should seek immediate medical attention.

The Department advises the public to remain diligent in their personal mosquito protection efforts by remembering to **"Drain and Cover**."

DRAIN standing water to stop mosquitoes from multiplying.

- **Drain** water from garbage cans, house gutters, buckets, pool covers, coolers, toys, flowerpots, or any other containers where sprinkler or rainwater has collected.
- **Discard** old tires, drums, bottles, cans, pots and pans, broken appliances and other items that aren't being used.
- **Empty and clean** birdbaths and pet's water bowls at least once or twice a week
- **Protect** boats and vehicles from rain with tarps that don't accumulate water.
- **Maintain** swimming pools and keep appropriately chlorinated. Empty plastic swimming pools when not in use.

COVER doors and windows with screens to keep mosquitoes out of your house.

- Repair broken screening on windows, doors, porches, and patios.

COVER skin with clothing or appropriate repellent.

- **Clothing** - Wear shoes, socks, and long pants and long-sleeves. This type of protection may be necessary for people who must work in areas where mosquitoes are present.
- **Repellent** - Apply mosquito repellent appropriately.
    - Always use repellents according to the label. Repellents with DEET, picaridin, oil of lemon eucalyptus, para-menthane-diol, 2-undecanone, and IR3535 are effective.
    - Use mosquito netting to protect children younger than 2 months old.

Tips on Repellent Use

- Always read label directions carefully for the approved usage before you apply a repellent.
- Apply insect repellent to exposed skin or clothing, but not under clothing.
- Treat clothing and gear with products containing 0.5% permethrin. **Do not** apply permethrin directly to skin.
- Some repellents are not suitable for children. Ensure repellent is safe for children and age appropriate:
    - Mosquito repellents containing lemon eucalyptus oil or para-menthane-diol **should not** be used on children under the age of three years.
    - DEET **is not recommended** on children younger than two months old.
    - Avoid applying repellents to the hands of children.
    - Parents should apply repellent to their hands first and then transfer it to the child's skin and clothing.

The Department continues to conduct statewide surveillance for mosquito-borne illnesses, including West Nile virus infections, Eastern equine encephalitis, St. Louis encephalitis, malaria, chikungunya, and dengue. Residents of Florida are encouraged to report dead birds to the Florida Fish and Wildlife Conservation Commission.

For more information on what repellent is right for you, consider using the Environmental Protection Agency's search tool to help you choose skin-applied repellent products.

For more information, visit the Department's website here.

About the Florida Department of Health

The Florida Department of Health, nationally accredited by the Public Health Accreditation Board, works to protect, promote and improve the health of all people in Florida through integrated state, county and community efforts.

Addendum 2

June 30, 2023

Statement Concerning Local Transmission of Malaria in Florida

The Centers for Disease Control and the Florida Department of Health have both issued a mosquito-borne illness advisory for all of Florida, after four (4) confirmed cases of locally acquired malaria have been found in Sarasota County.

While malaria is a very serious disease and the genus of mosquitoes (*Anopheles*) that vectors the parasite that causes malaria is found throughout Florida, there is no cause for alarm. The East Flagler Mosquito Control District (District) works year-round to suppress the 48 species of mosquitoes that inhabit Flagler County in order prevent any outbreak of mosquito-borne disease. The District monitors mosquito populations daily via a network of traps and landing rate count stations, allowing the District to respond quickly when there are increases in mosquito populations. The District's helicopter and fleet of fog trucks are able to quickly reduce flying biting mosquitoes throughout our boundaries as soon as an increase in mosquitoes is registered by surveillance. Reducing the mosquito population to low numbers is key to preventing the spread of any mosquito-borne disease by reducing the contact between mosquitoes and humans.

While some species of mosquitoes can fly up to 20 miles, the *Anopheles* mosquito does not fly far, only about a mile. This mosquito inhabits swamps and is active primarily between dusk and dawn. Because of the limited flight range of this mosquito, the threat of local malaria spread is primarily by infected humans traveling to Flagler County. Mosquito-borne diseases represent an ongoing threat, as in where international travelers may return from abroad infected with a mosquito-borne disease such as malaria. Public health officials monitor for disease among international travelers and will expand those monitoring efforts to non-international travelers. At the District, we will continue to monitor the population of mosquitoes to keep them low and prevent the spread of all mosquito-borne diseases, as has been our mission for the past 70 years here in Flagler County. The District was founded in 1952 and operates as a single purpose local government agency run by an elected board independent of the County and City governments.

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East Flagler Mosquito Control District

210 Airport Executive Drive
Palm Coast, Florida 32164

Phone: 386-437-0002
Fax: 386-437-0200

flaglermosquito.com

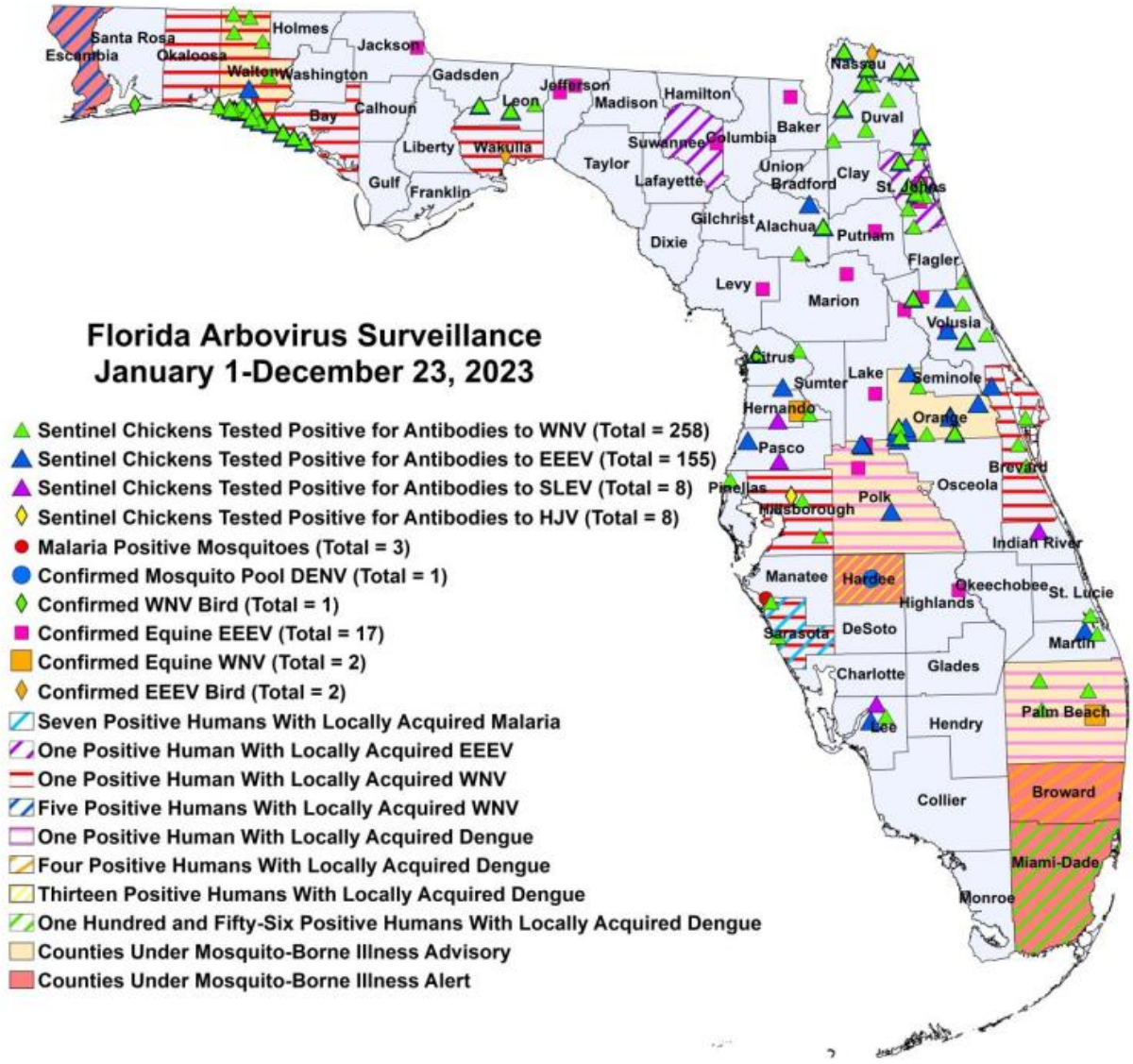
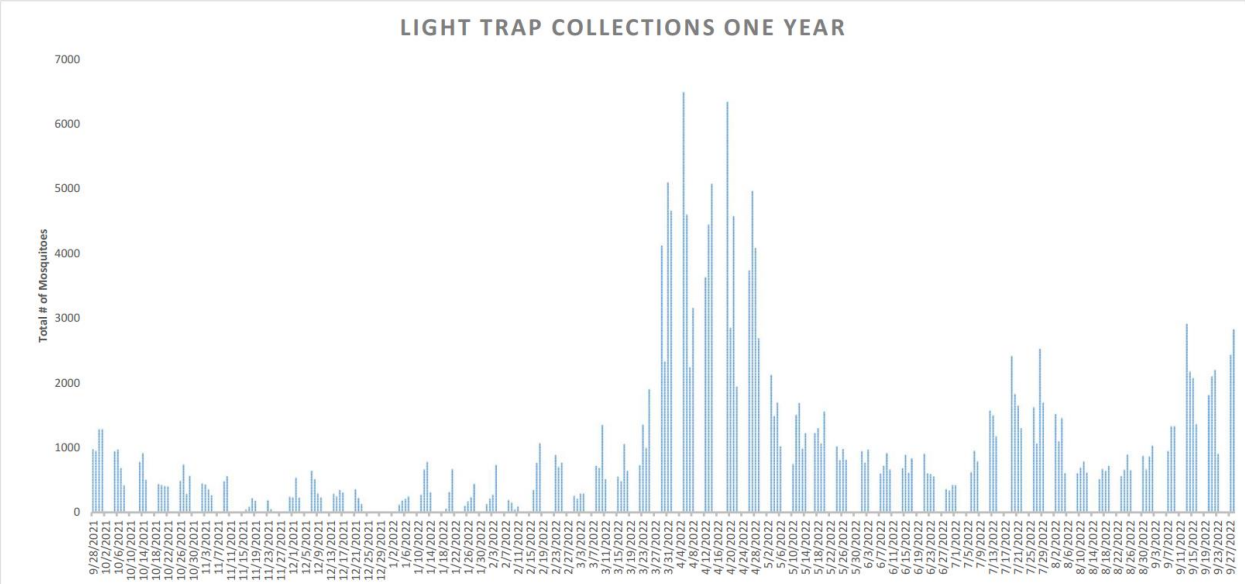


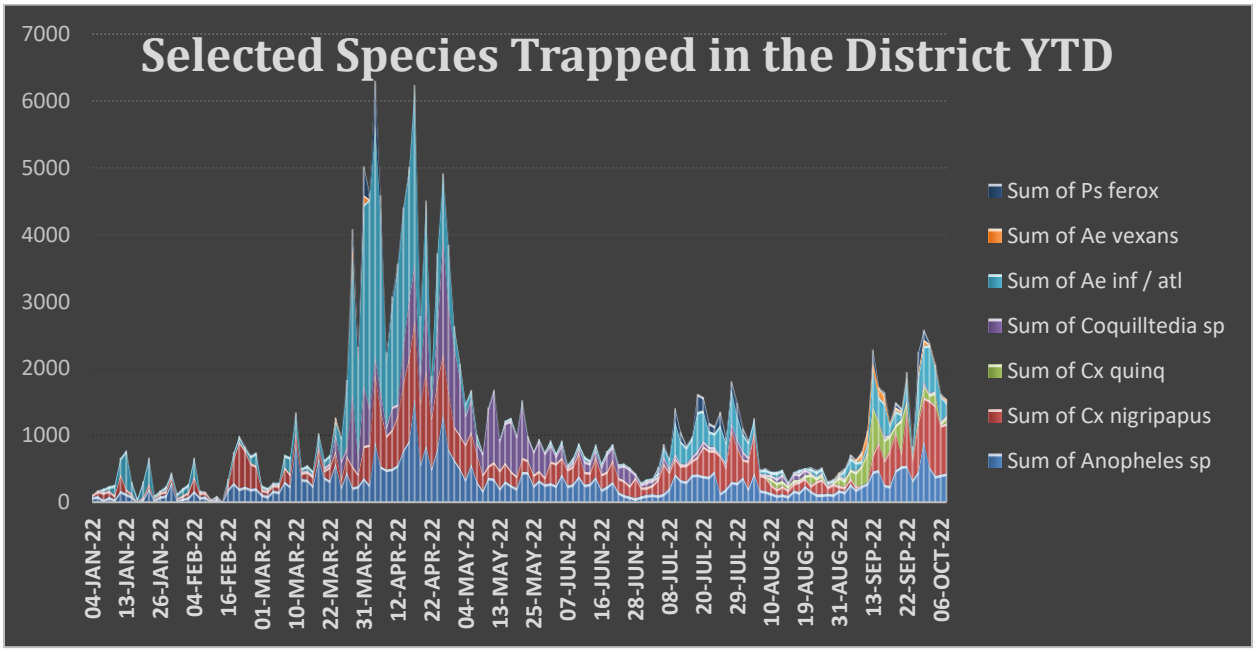
Figure 8. Chart is from the Florida Arbovirus Surveillance Week 51: December 17-23, 2023. You can read the full report here.

Week of 10/3/2022 Operations Update

An uptick in flood water species last week persisted this week with mosquito activity suppressed due to temperatures overnight in the upper 50's and low 60's. The bar graph below shows the total adult mosquitoes from all traps in the District for the past year (TTM).



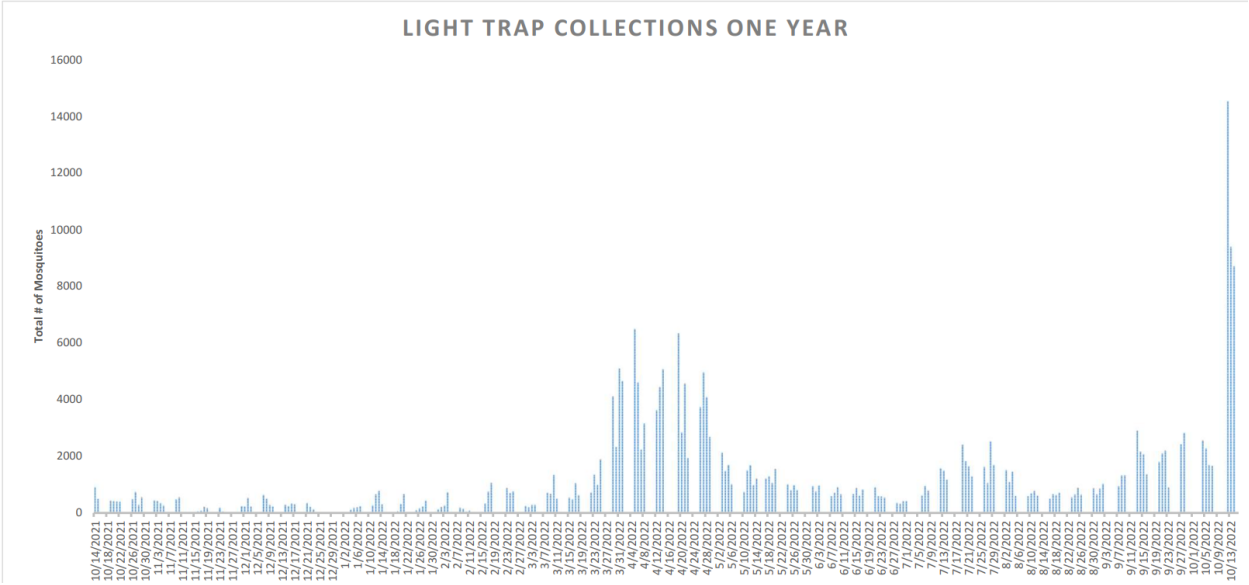
The flood water species *Aedes infirmatus* activity remained elevated this week following Hurricane Ian, but spray operations were not possible due to low temperatures. The mosquito population is likely much higher than the collections would indicate because activity is less with cold temperatures (Chart Below).



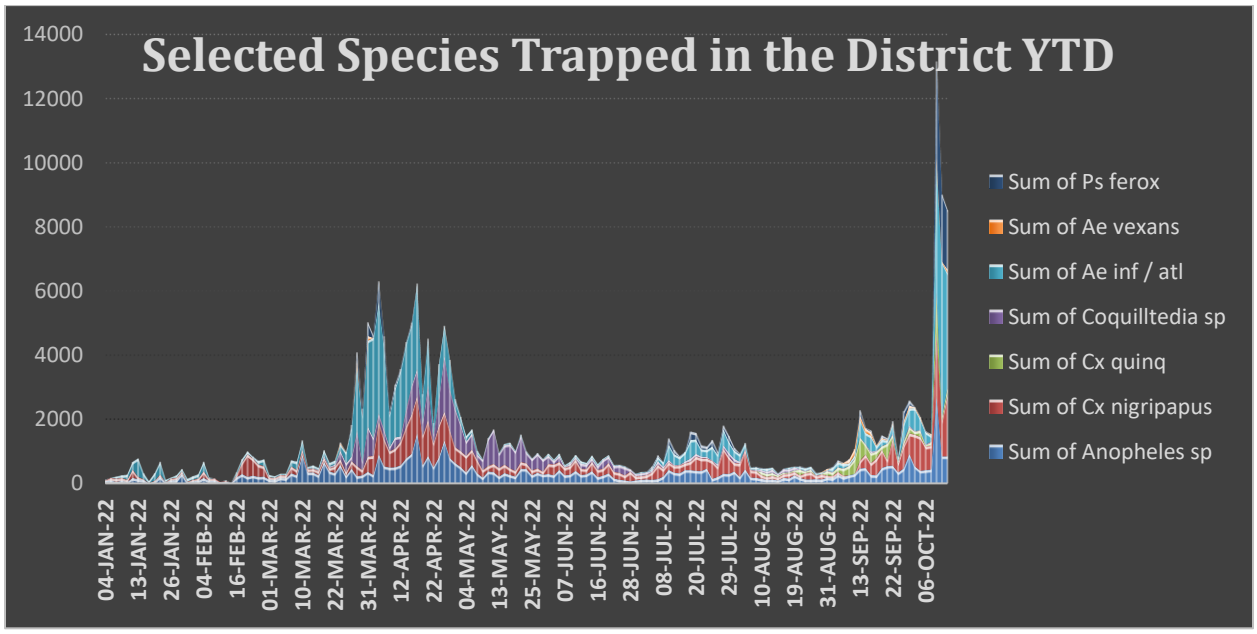
No spraying this week due to low temperatures overnight following Hurricane Ian.

Week of 10/10/2022 Operations Update

At almost two weeks post Hurricane Ian an extreme level of mosquito activity in the traps this week. The bar graph below shows the total adult mosquitoes from all traps in the District for the past year (TTM).



A surveillance flight conducted on Saturday morning October 1 observed wide-spread flooding in the saltmarsh and undeveloped areas west of the District. All monitoring of environmental factor indicates the severity of the flooding (see Hurricane Ian supplemental Report). Cooler temperatures following the tropical cyclone delayed the emergence of flood water mosquitoes beyond the normal seven-day incubation period. By 12 days post event the mosquitoes caused by the flooding were registered in our traps (Chart Below). This is an extreme event, emergency procedures were instituted immediately and State resources are being deployed via contracted spray planes to treat wide areas of Flagler County.



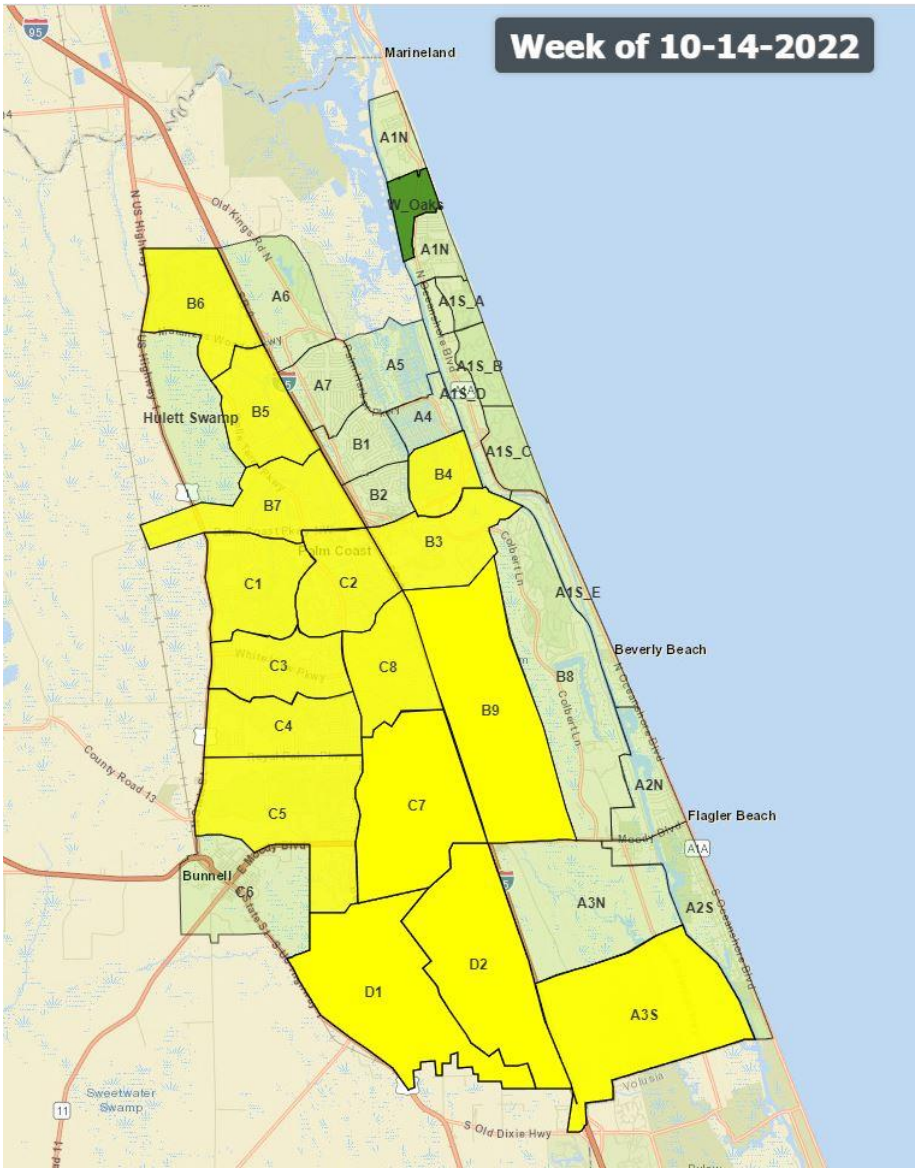
From the Florida Department of Health Arbovirus Surveillance Week 40: October 2-8, 2022 Report:

Advisories/Alerts: Miami-Dade and Volusia Counties are currently under a mosquito-borne illness alert. Bay, Charlotte, Collier, Hillsborough, Lee, Osceola, Palm Beach, Pinellas, Sarasota, and Walton counties are currently under a mosquito-borne illness advisory. No other counties are currently under a mosquito-borne illness advisory or alert.

West Nile Virus Illnesses Acquired in Florida: Two human cases of WNV illness acquired in Florida have been reported in 2022 from Volusia County (July, August).

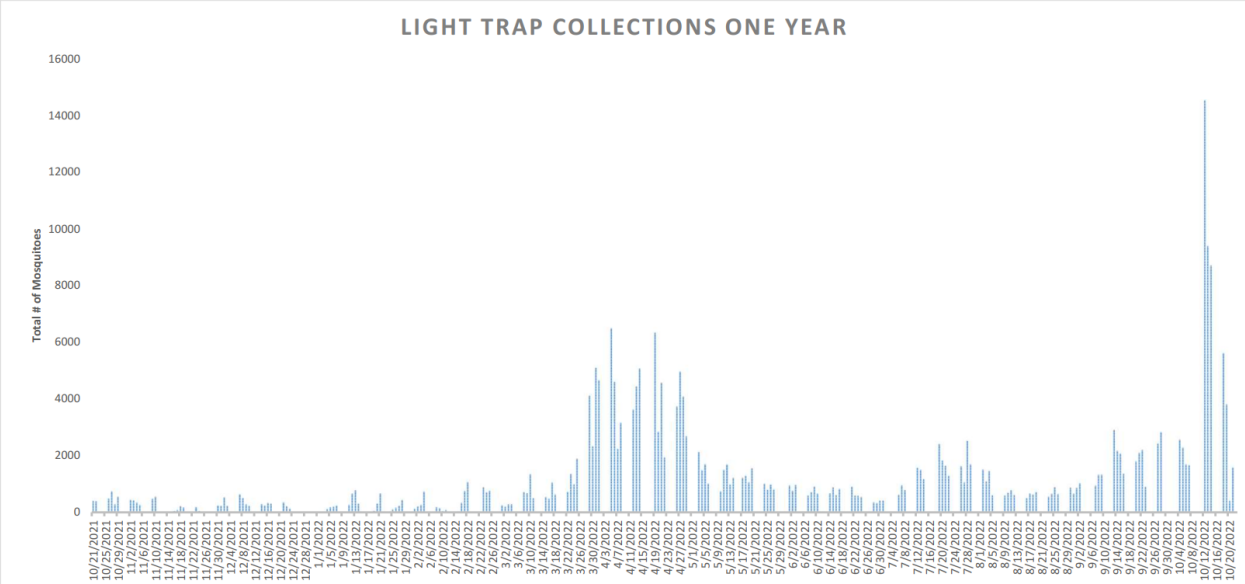
Dengue Cases Acquired in Florida: Four cases of locally acquired dengue was reported this week in Miami Dade County. In 2022, 27 cases of locally acquired dengue have been reported.

Zones high-lighted in yellow were sprayed by truck this week.



Week of 10/17/2022 Operations Update

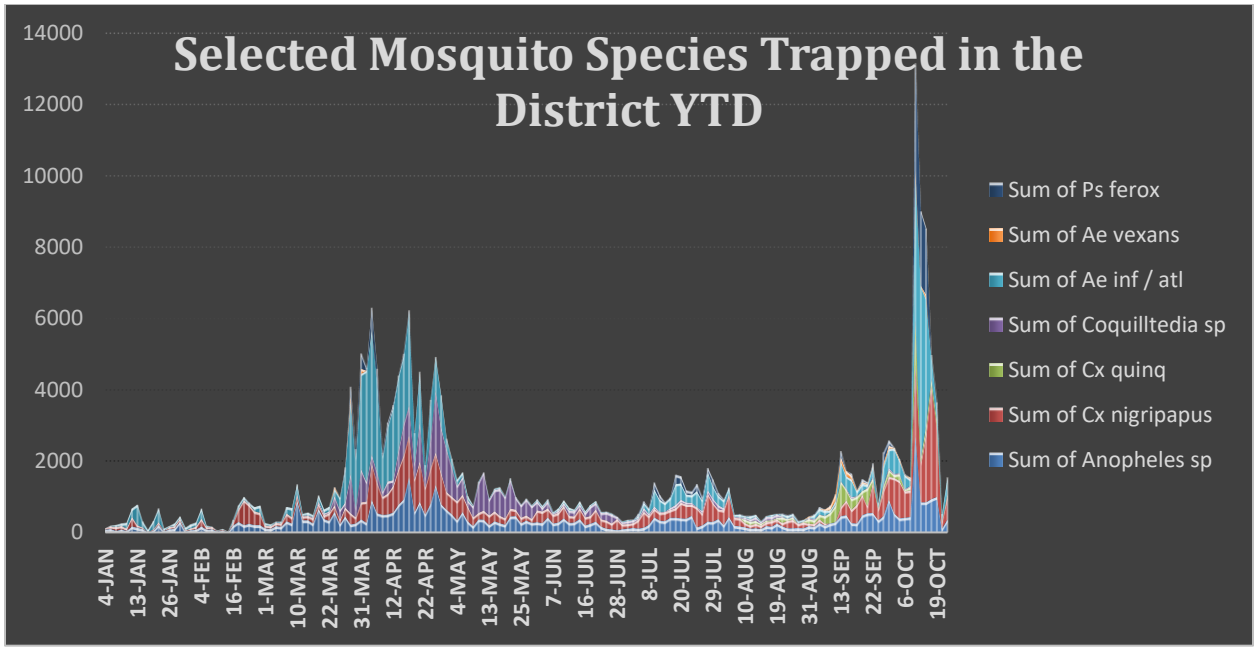
This week saw low temperatures with intermittent aerial spraying conducted by contractors working for the Florida Department of Agriculture as part of the FEMA post Hurricane Ian response. The bar graph below shows the total adult mosquitoes from all traps in the District for the past year (TTM).



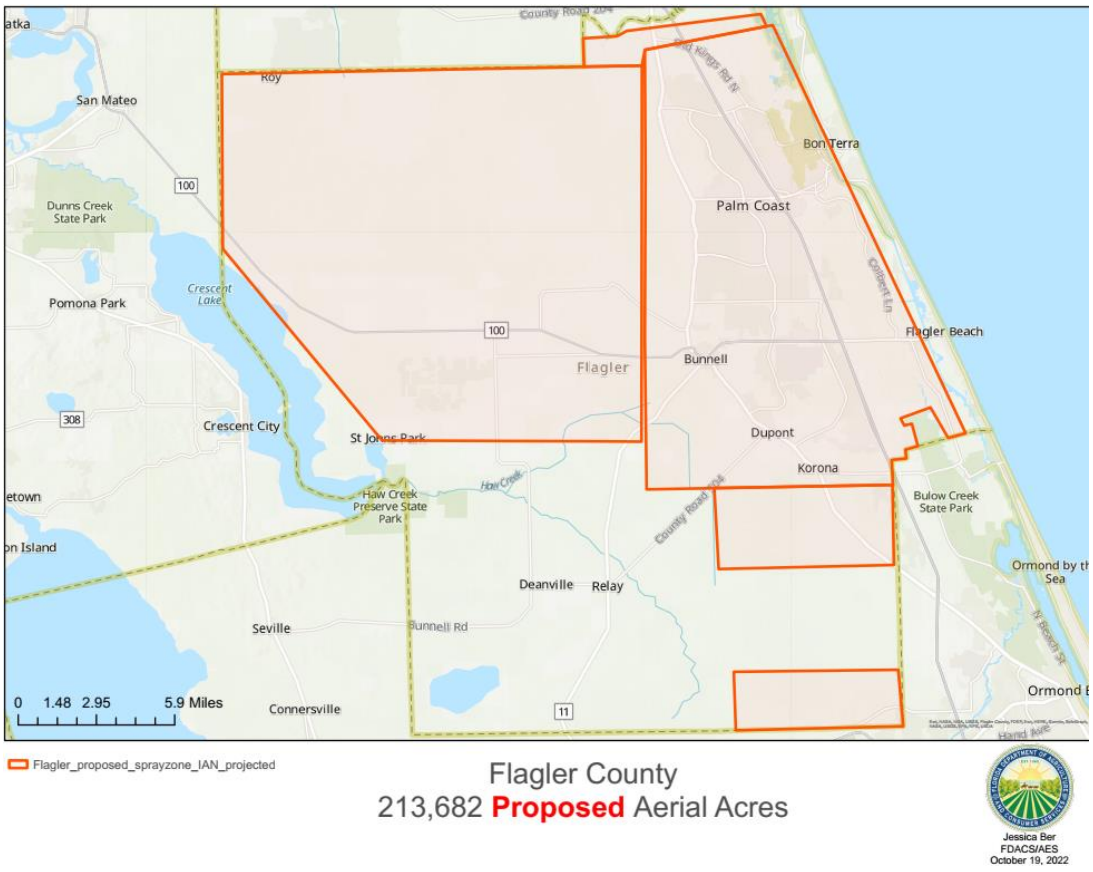
A surveillance flight conducted on Saturday morning October 1 observed wide-spread flooding in the saltmarsh and undeveloped areas west of the District. All monitoring of environmental factor indicates the severity of the flooding (see Hurricane Ian supplemental Report). Cooler temperatures following the tropical cyclone delayed the emergence of flood water mosquitoes beyond the normal seven-day incubation period. By 12 days post-event the mosquitoes caused by the flooding were registered in our traps. This was an extreme event, emergency procedures were instituted immediately and State resources were deployed via contracted spray planes to treat wide areas of Flagler County.

- Aerial spraying was completed Sunday night 10/23/2022 – a single plane operated out of the Flagler Executive Airport due to a shortage of pesticide. The District was able to resupply the contractor from our inventory to complete the mission.
- Friday night 10/21/2022 – two planes operating out of New Smyrna Airport treated Rima Ridge and Hunters Ridge, started the eastern Block, and finished the western block.
- Tuesday night October 10/18/2022 – Western block was partially treated, two planes operating out of New Smyrna Airport worked in tandem but were unable to complete the block due to low temperatures

The graph below shows the impact of the cold temperatures on mosquito activity, dropping a peak of 13,000 mosquitoes trapped daily to just 500 total as low temperatures pushed mosquitoes into diapause, a state of reduced activity to survive cold weather. The last day of trap data available this week does not illustrate the impact of treatments as the data is from within the District only, in areas not treated at the time.

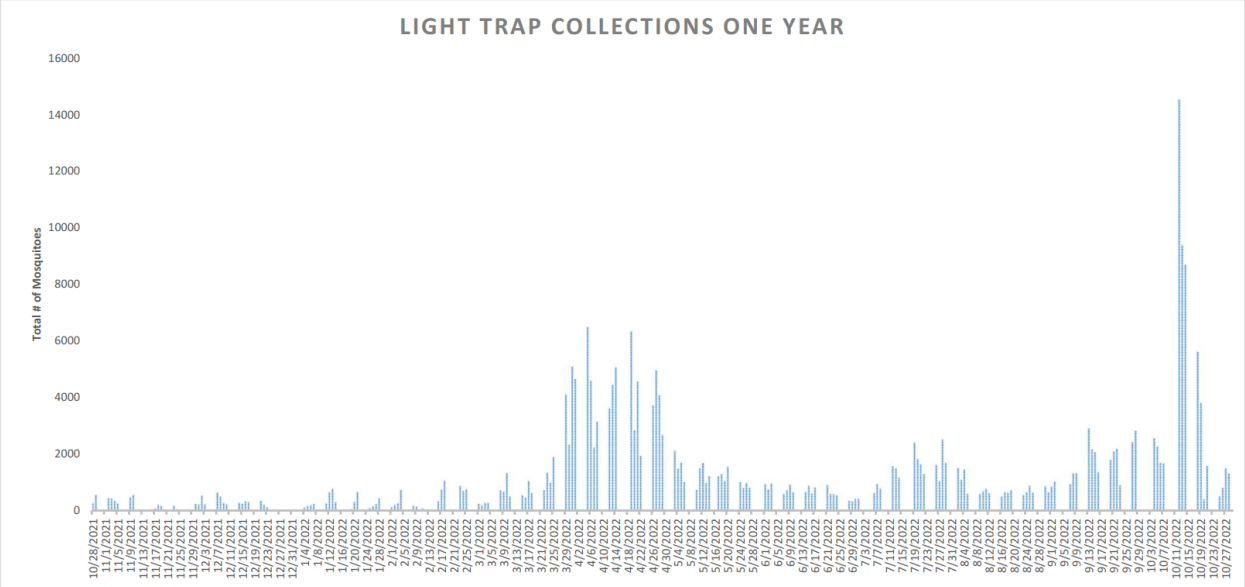


Spray blocks treated by contractors working for the Florida Department of Agriculture as part of the FEMA post Hurricane Ian response.



Week of 10/24/2022 Operations Update

Following a week with cold weather, this week demonstrates the impact aerial spraying on the mosquito population by contractors working for the Florida Department of Agriculture as part of the FEMA post Hurricane Ian response. The bar graph below shows the total adult mosquitoes from all traps in the District for the past year (TTM).



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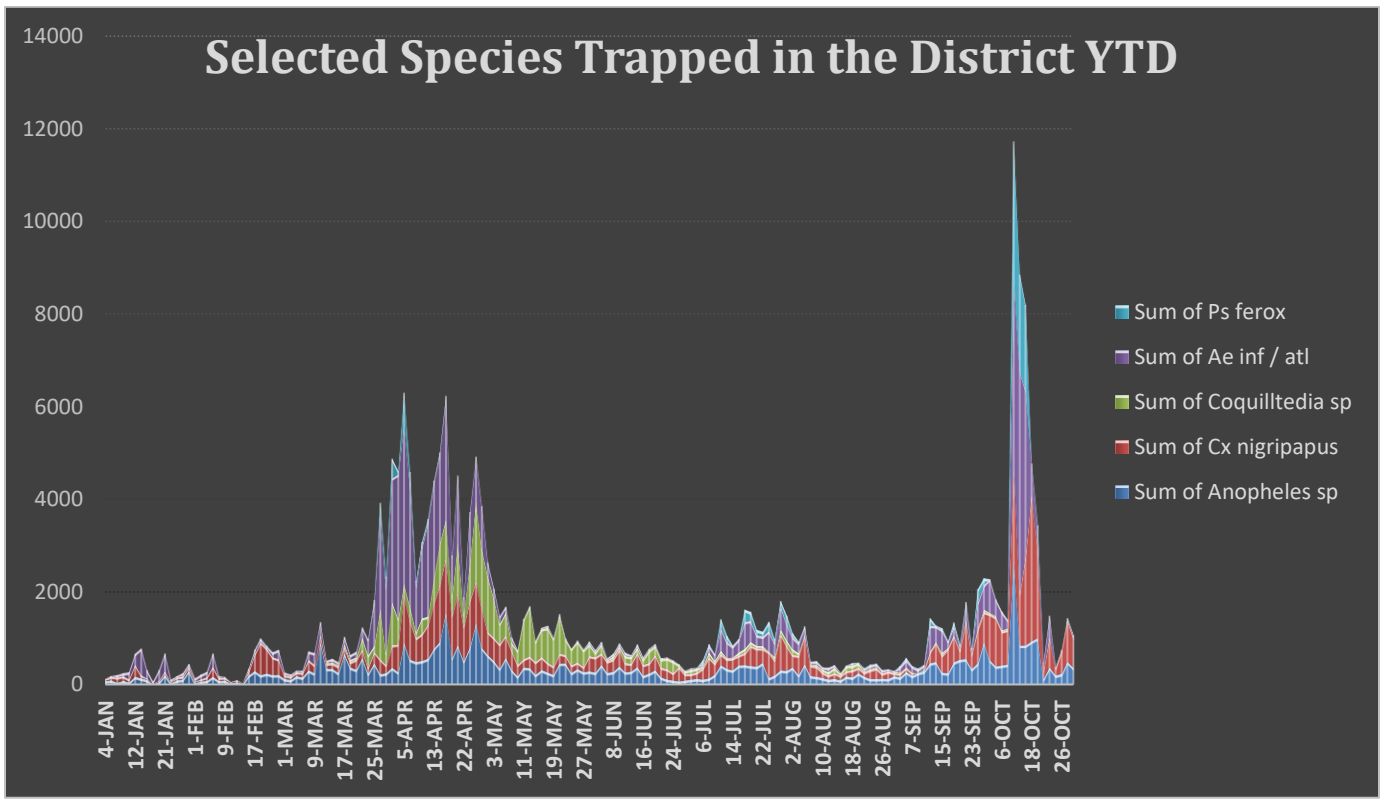
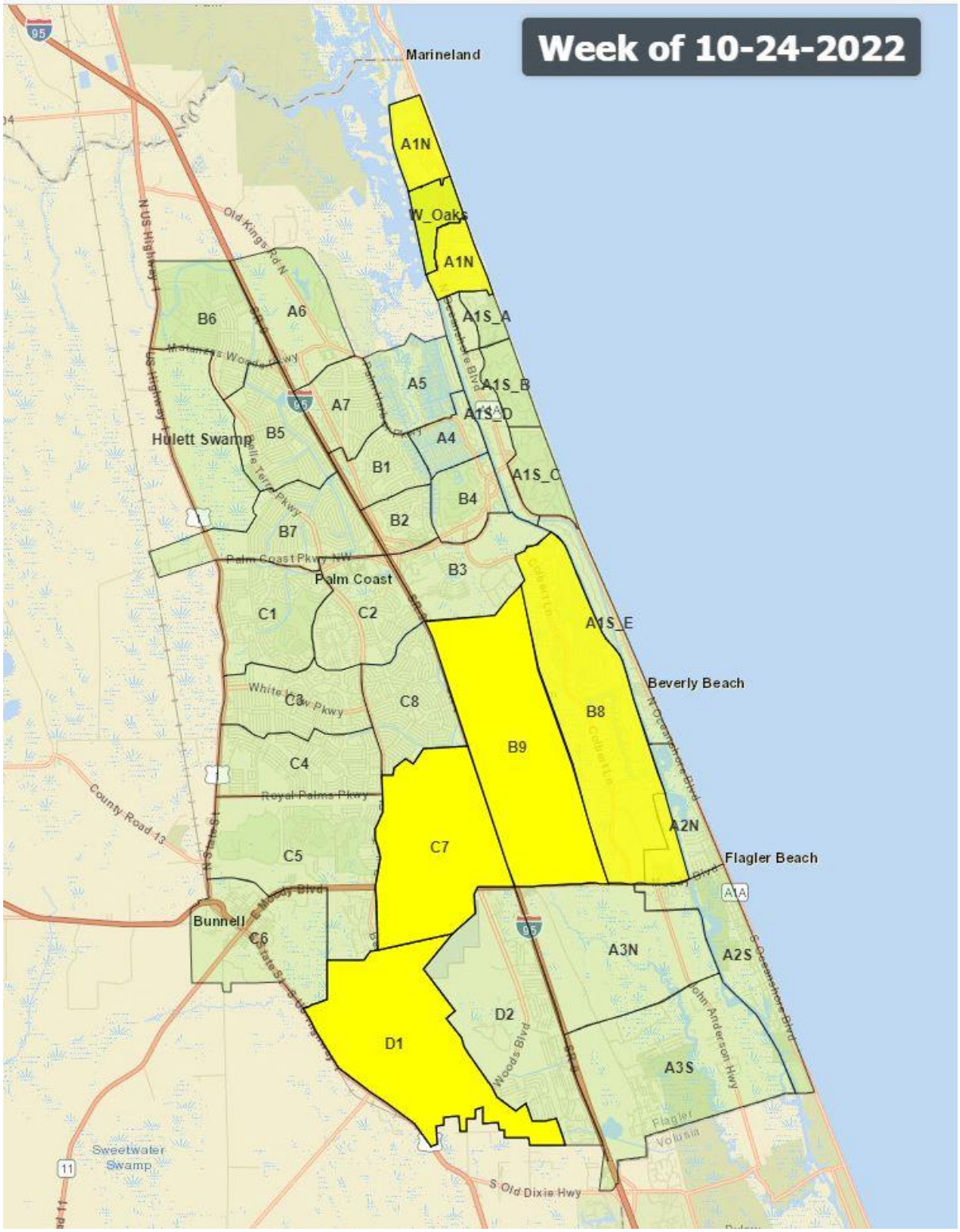
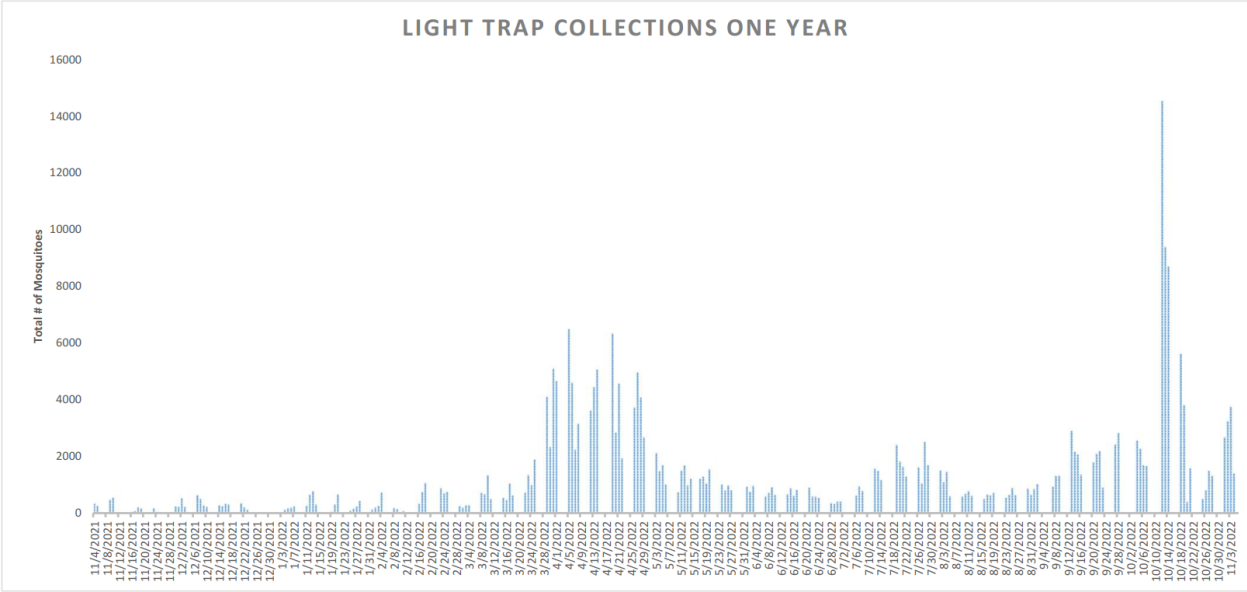


Zones hi-lighted in yellow were sprayed by truck this week.

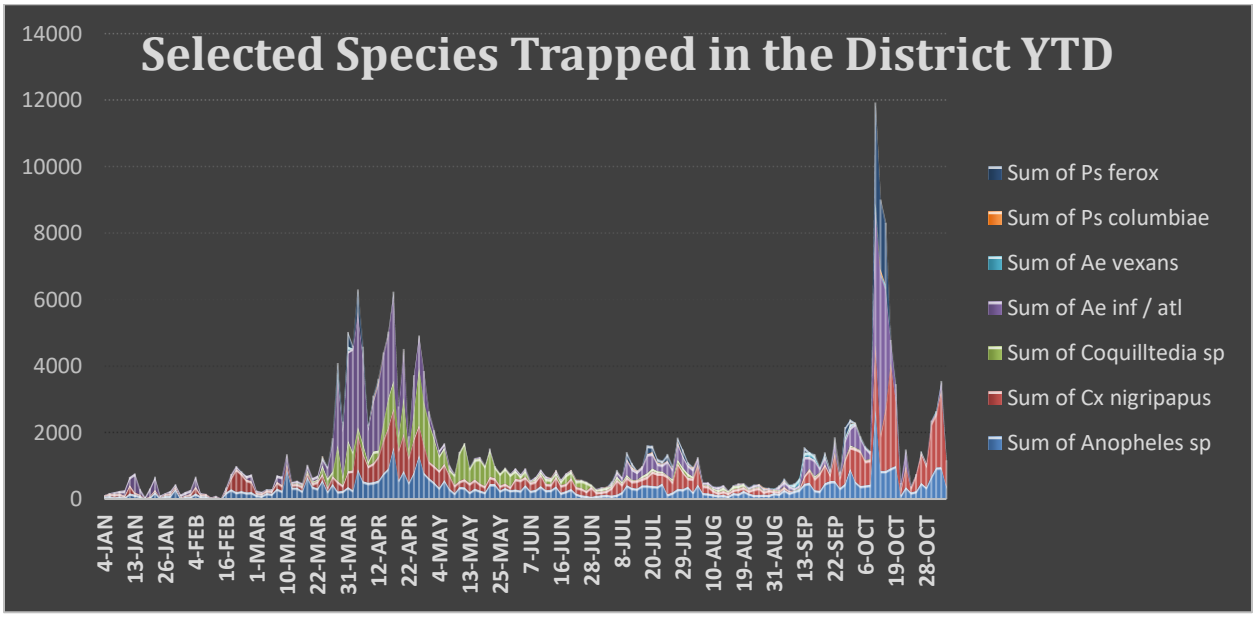


Week of 10/31/2022 Operations Update

Having moved past the extreme level of mosquitoes following Hurricane Ian and week of low mosquito activity, permanent water mosquitoes repopulated from the still abundant standing water. The bar graph below shows the total adult mosquitoes from all traps in the District for the past year (TTM).



Permanent water species of mosquitoes dominated the trap collections this week (Chart below). *Culex nigripalpus* numbers are inflated due to the abundant standing water. As long as the flooded areas remain this species will continuously lay eggs in standing water and replenish its numbers.



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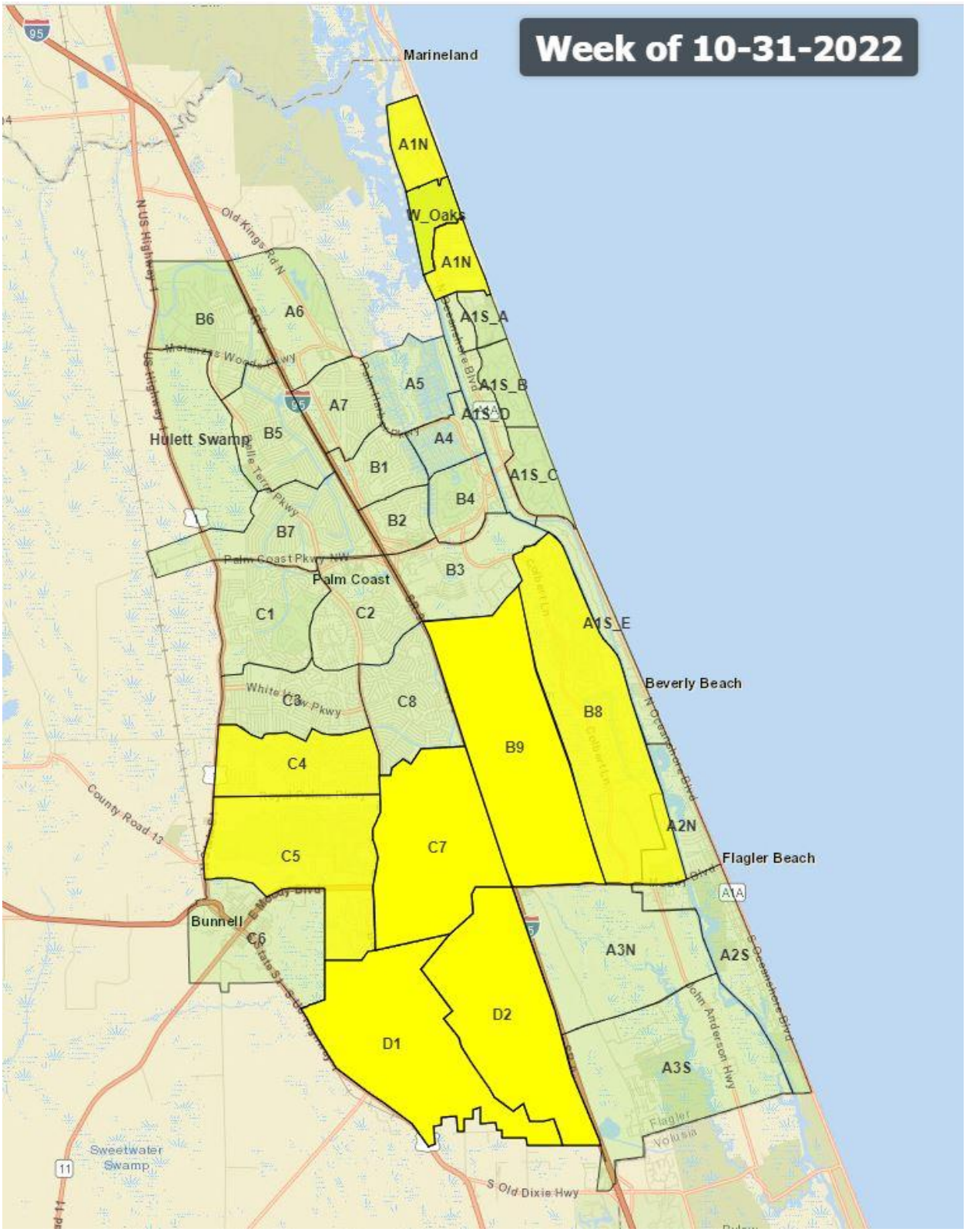
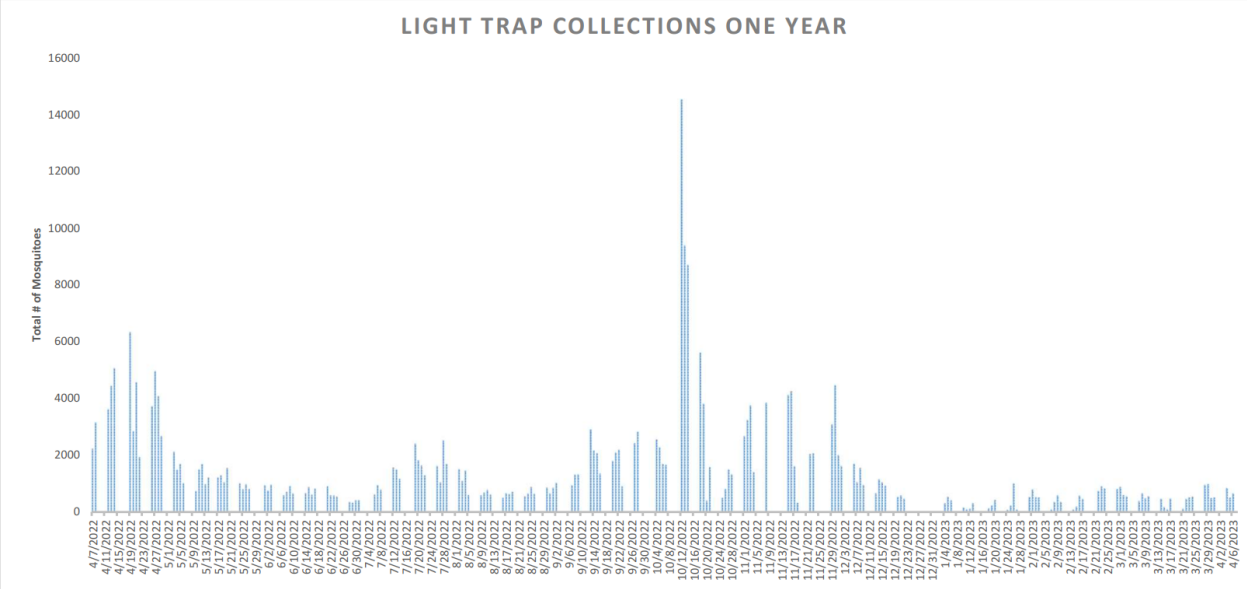
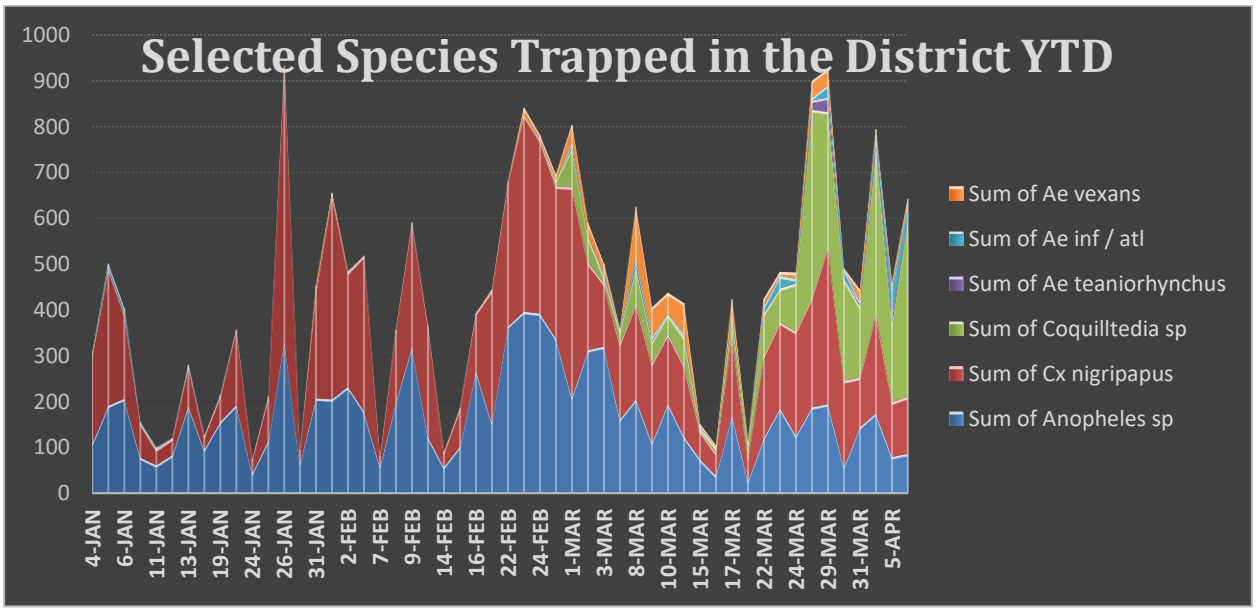


Week of 4/3/2023 Operations Update (14)

Mosquito activity has been above normal for this time of year. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).



Mosquito activity picked-up the last week of February, which is earlier than usual but not unheard of in Sub-Tropical Florida. *Coquilletidia perturbans* has been the dominant species of mosquito since late March. Typically, this species of permanent water species emerges from cattail swamps in Early April after over-wintering as larvae, but this year we began spraying to control this species in early March.



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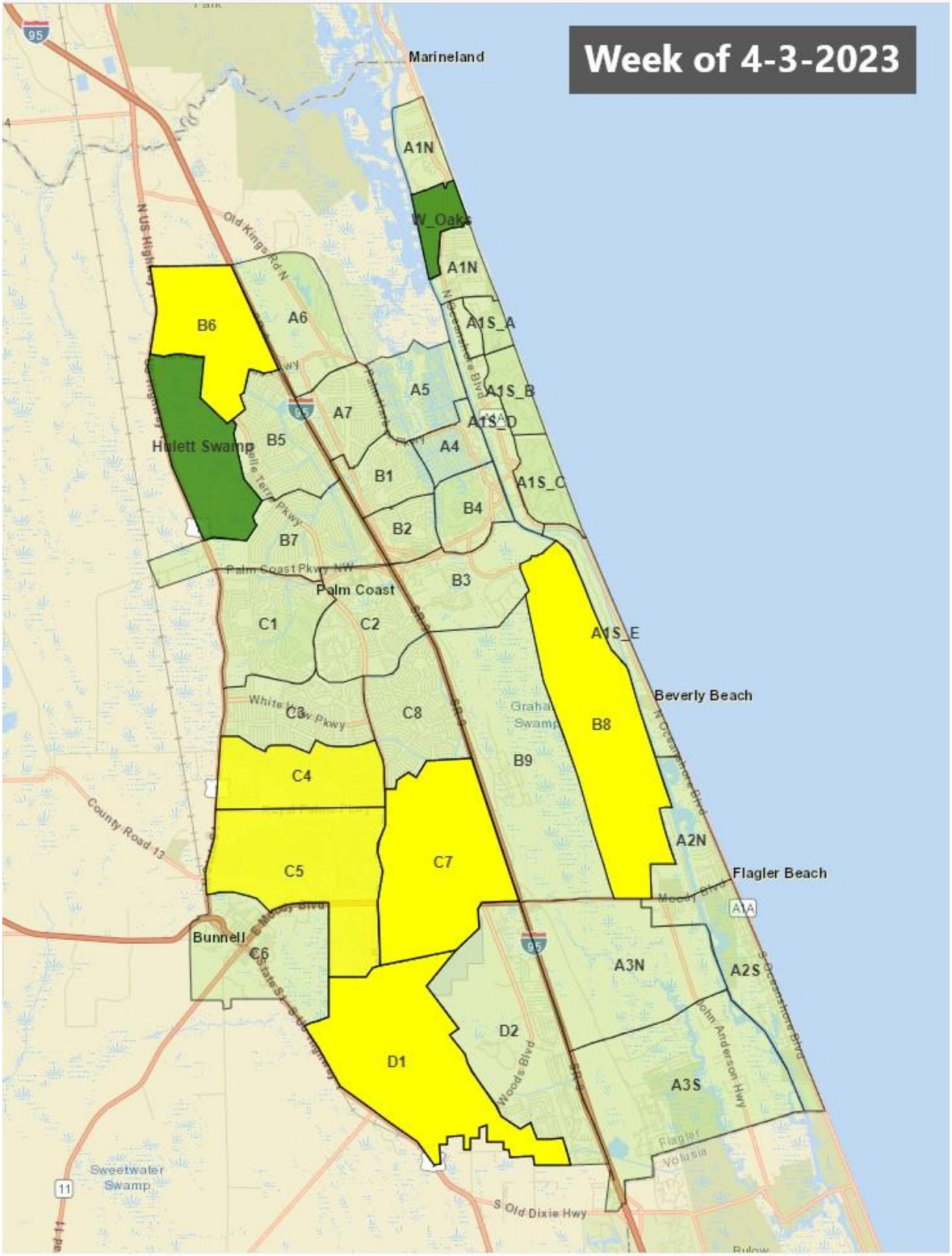
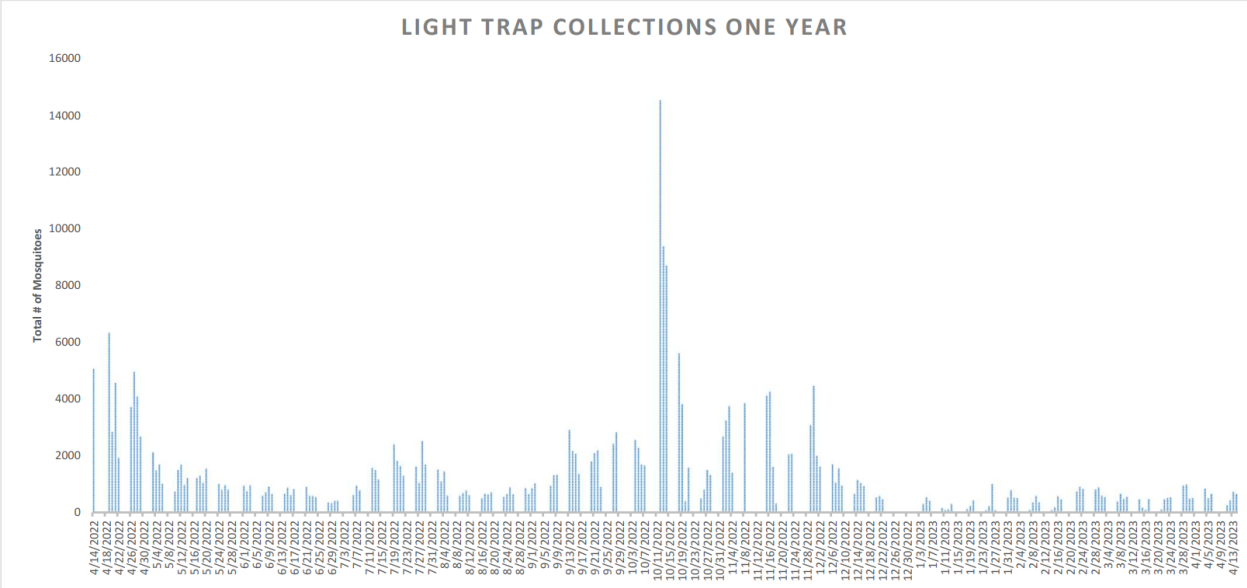


Week of 4/10/2023 Operations Update (15)

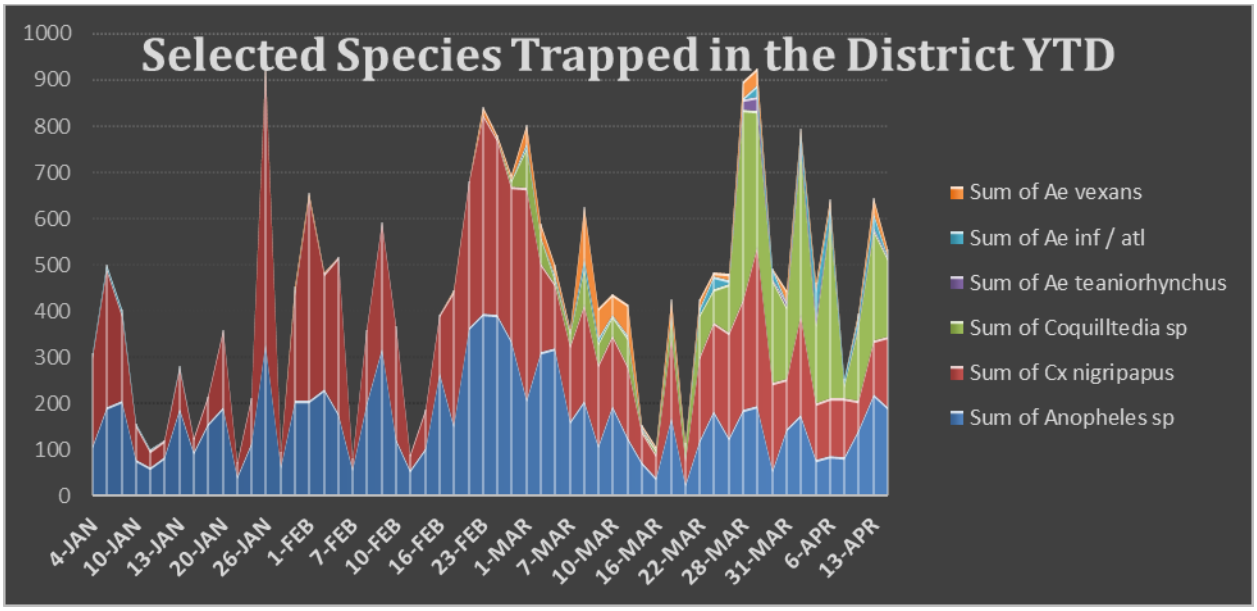
Second week in a row of spraying for *Coquilletidia perturbans*. Completed first round of larvicide treatments in the saltmarsh. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).

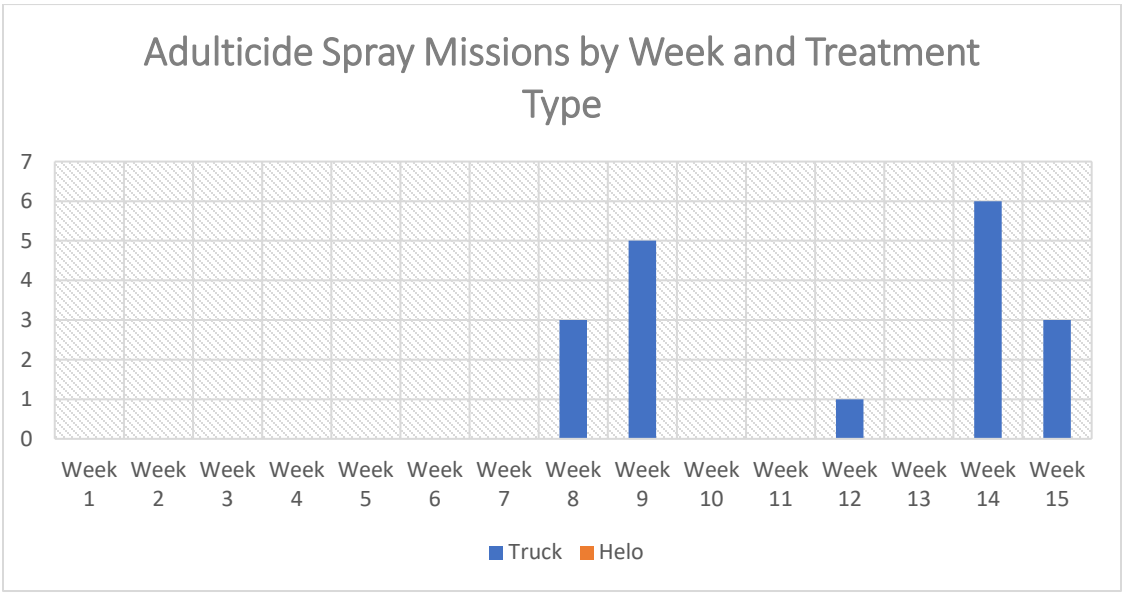


To recap:

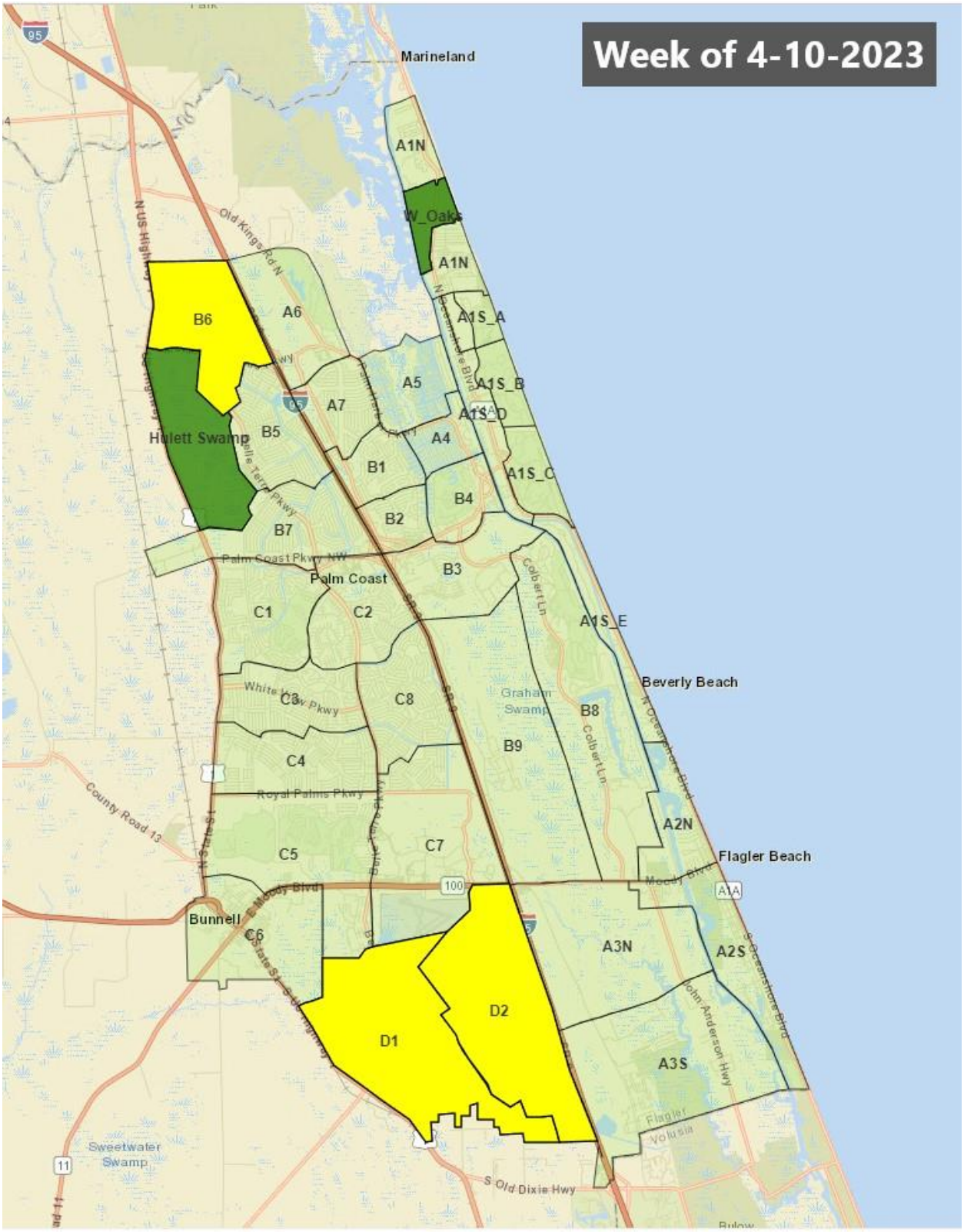
> *Coquilletidia perturbans* has been the dominant species of mosquito since late March. Typically, this species of permanent water species emerges from cattail swamps in Early April, but this year we began spraying to control this species since the beginning of March.

This mosquito species overwinters in cattail swamps, cleverly attached to the cattail plants in the water to avoid predation from fish. In the spring the adults emerge over several weeks requiring successive rounds of spraying to suppress ongoing emergence (See spray missions chart below).


Selected Species Trapped in the District YTD
1000
900
800
700
600
500
400
300
200
100
0
4-JAN
10-JAN
13-JAN
20-JAN
26-JAN
1-FEB
7-FEB
10-FEB
16-FEB
23-FEB
1-MAR
7-MAR
10-MAR
16-MAR
22-MAR
28-MAR
31-MAR
6-APR
13-APR
Sum of Ae vexans
Sum of Ae inf / atl
Sum of Ae teaniorhynchus
Sum of Coquilltedia sp
Sum of Cx nigripapus
Sum of Anopheles sp

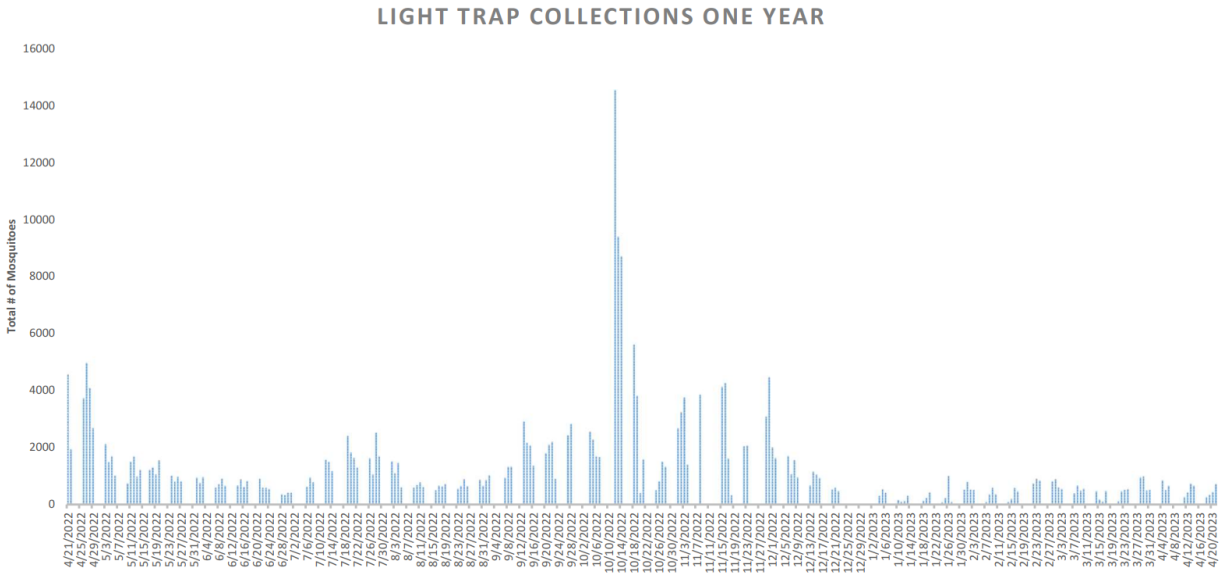

Adulticide Spray Missions by Week and Treatment Type
7
6
5
4
3
2
1
0
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9
Week 10
Week 11
Week 12
Week 13
Week 14
Week 15
Truck
Helo

Zones hi-lighted in yellow were sprayed by truck this week.

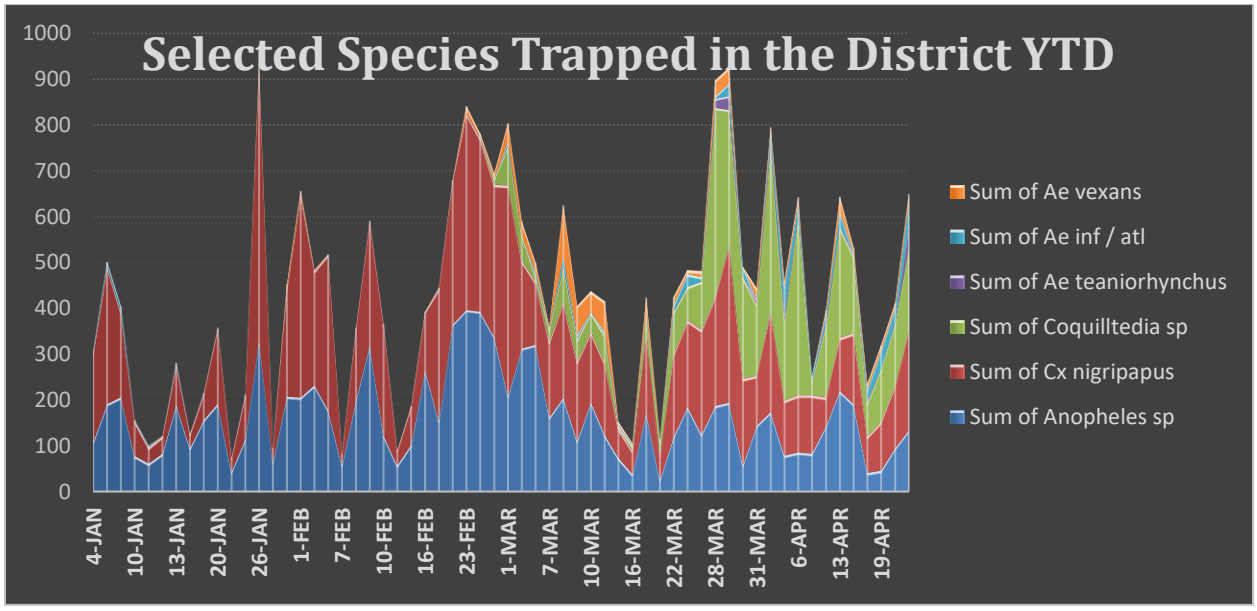


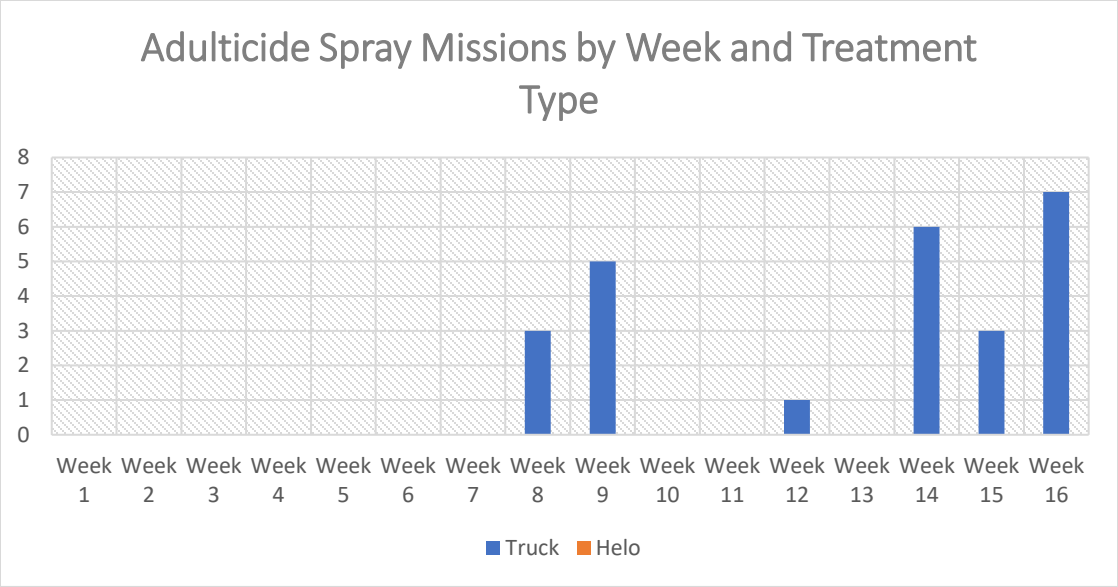
Week of 4/17/2023 Operations Update (16)

Third week in a row of spraying, this week saw some saltmarsh mosquito activity. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).

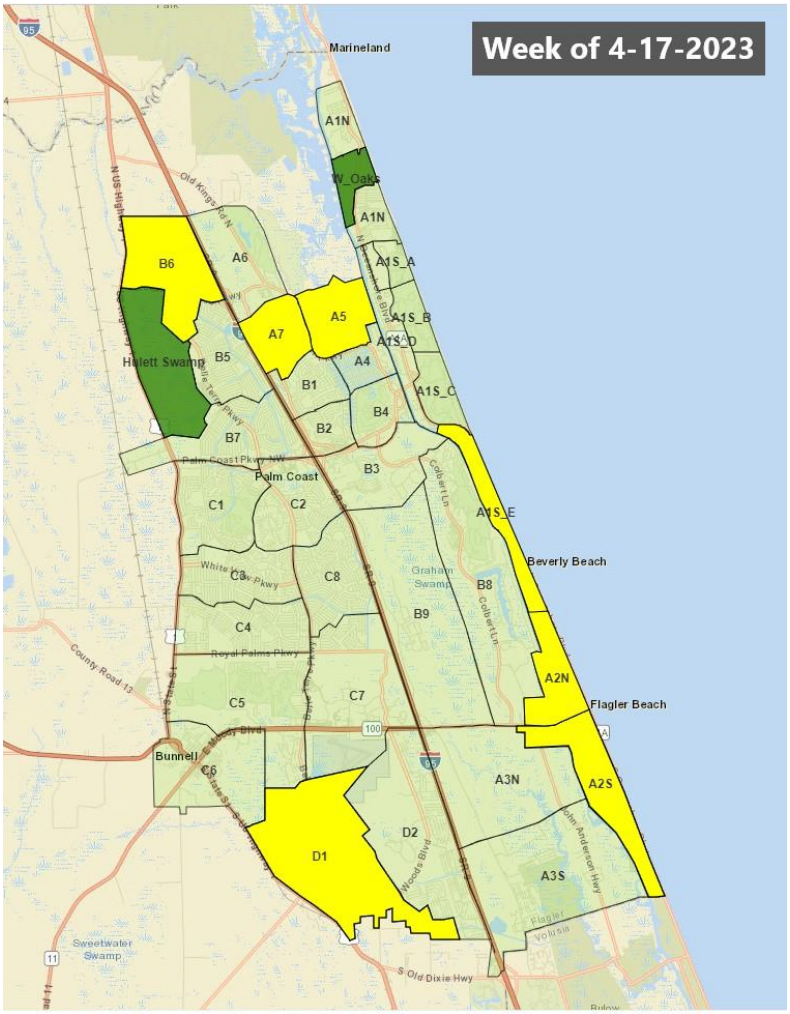


The distribution of species has been fairly even since the beginning of March, with limited spraying to keep adult mosquito populations in check.



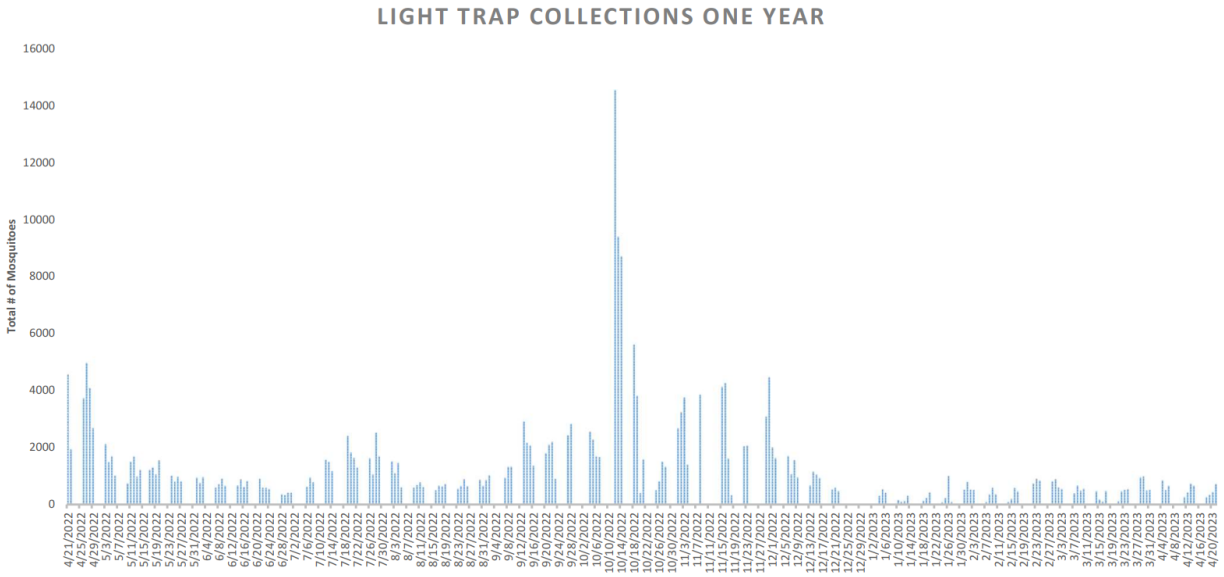


Zones hi-lighted in yellow were sprayed by truck this week.

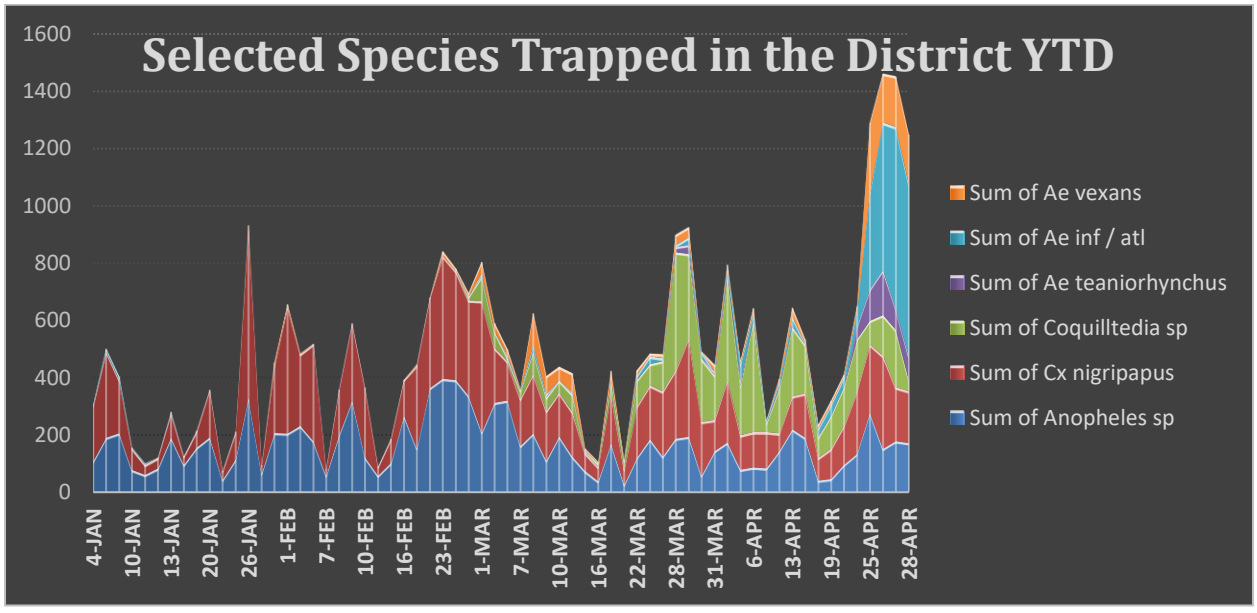


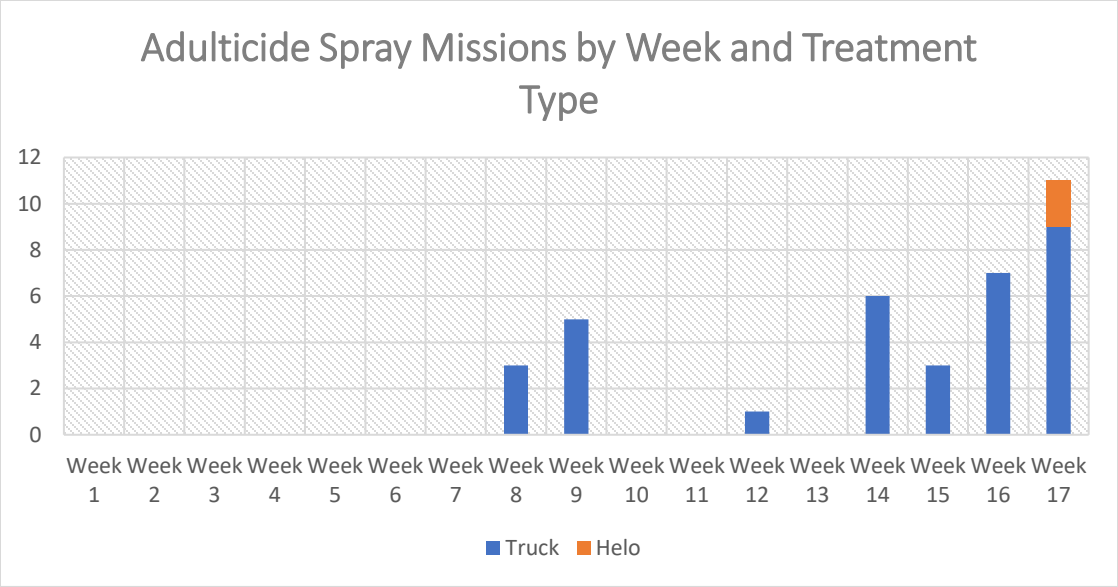
Week of 4/24/2023 Operations Update (17)

Floodwater species of mosquitoes surged this week. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).

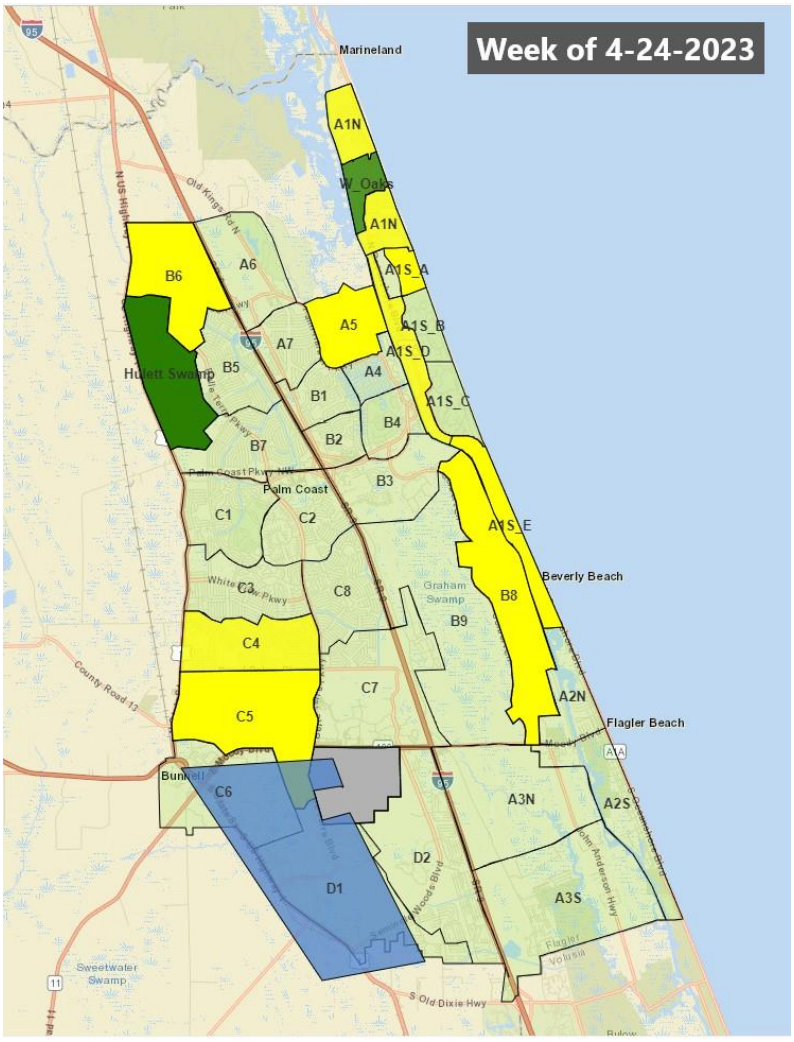


The floodwater species *Aedes vexans* and *Aedes infirmatus* surged in the traps this week (see graph below). Floodwater species of mosquitoes lay their eggs in dry soil in areas that become temporarily flooded either form a big rain event or an accumulation of rain from multiple events.



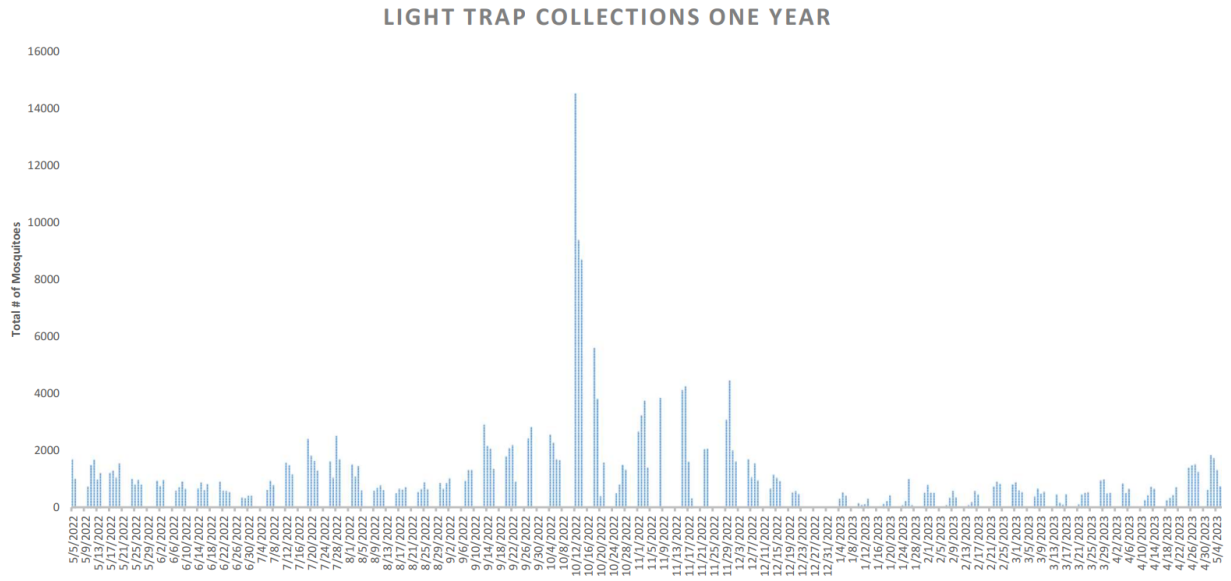


Zones hi-lighted in yellow were sprayed by truck, blocks in blue were sprayed by helicopter this week.

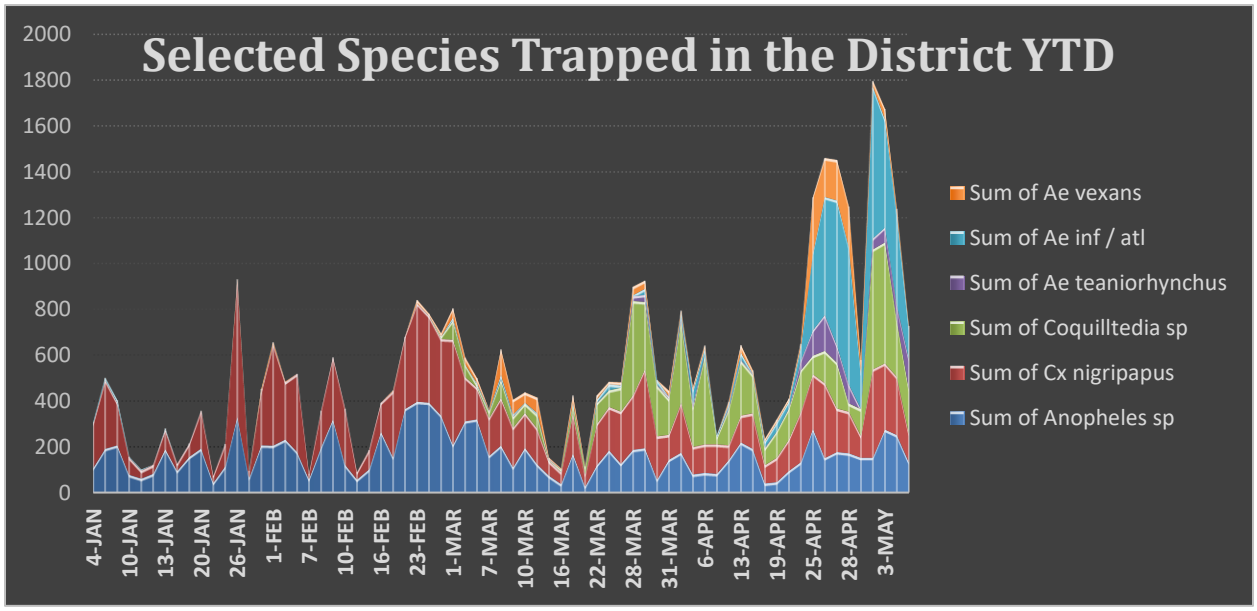


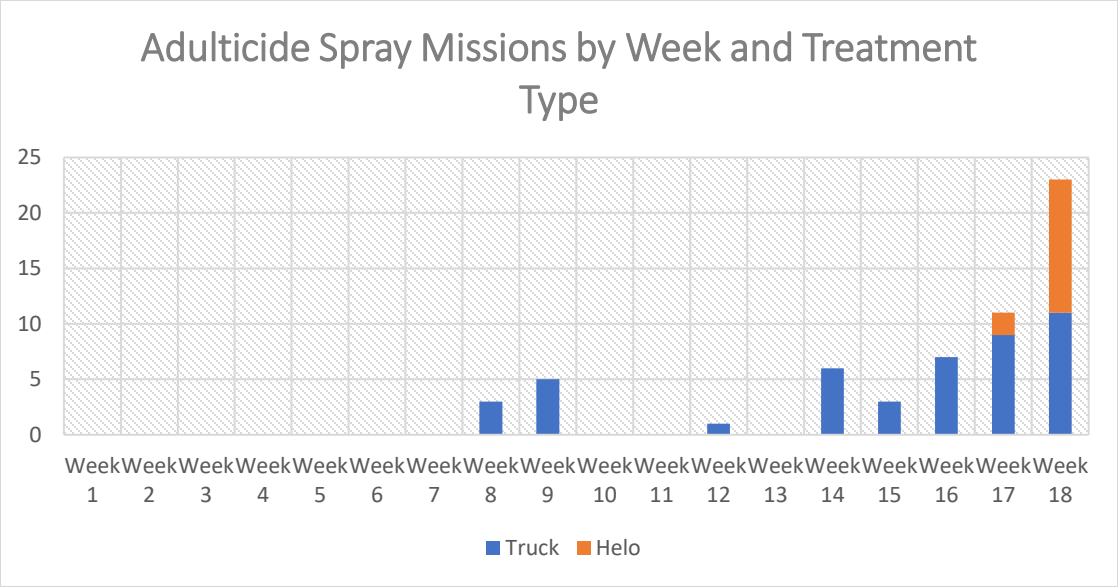
Week of 5/1/2023 Operations Update (18)

Peak mosquito activity this week for the year to date. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).

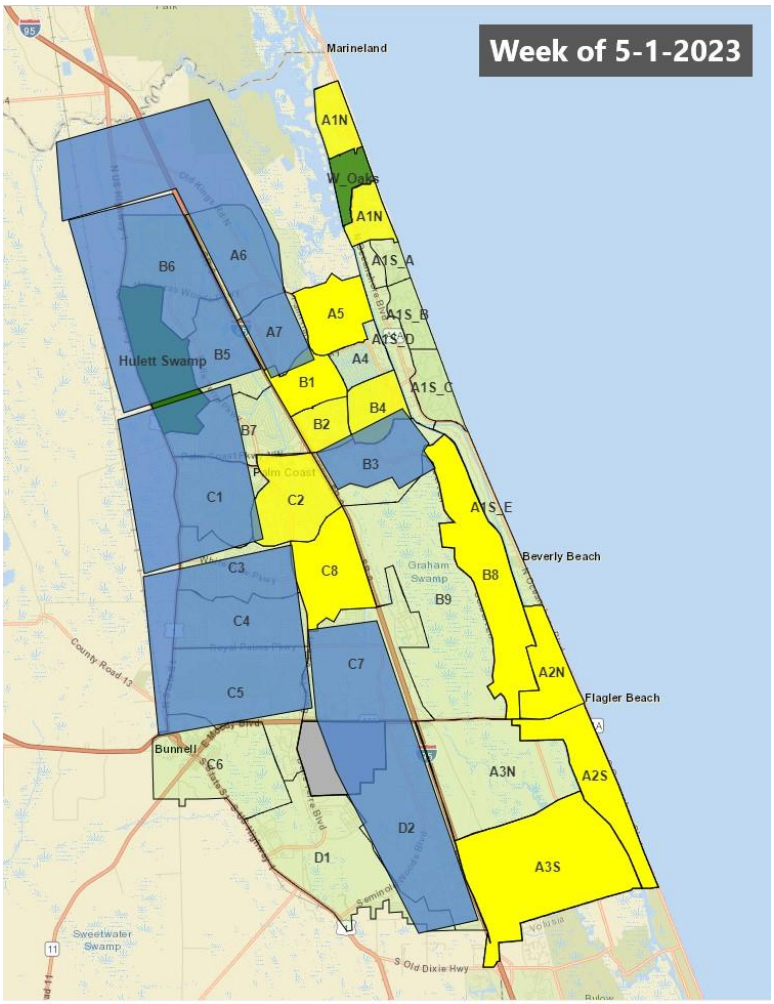


This week continued a high volume of control measures with completion of the first aerial adulticide missions of the season. Species of floodwater, permanent-water, and saltmarsh mosquitoes were in abundance (graph below).

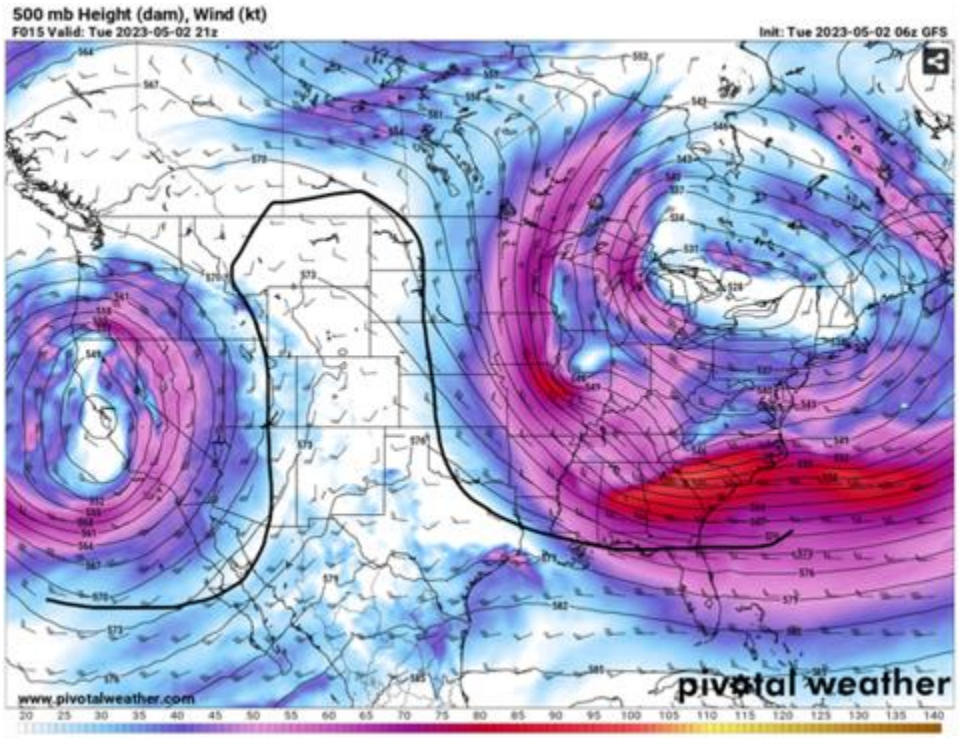




Zones hi-lighted in yellow were sprayed by truck this week.

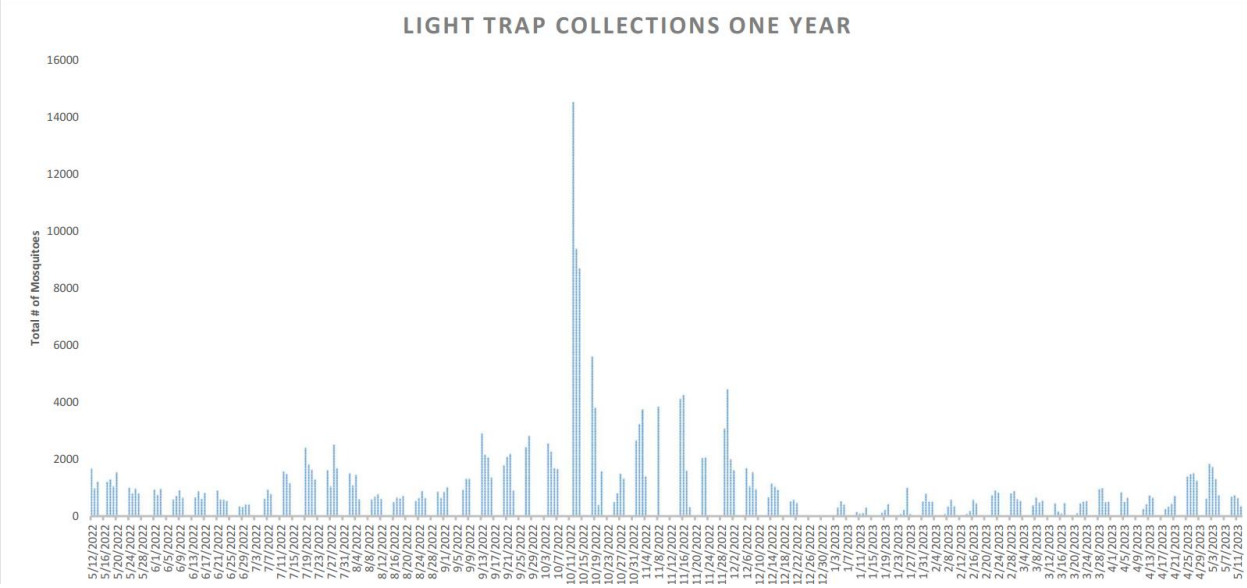


A dry week from an interesting weather pattern. *"The weather for much of this week will be dominated by what's called an Omega block, where our setup is low-high-low, going from west to east. This blocking pattern earned its name because it's shaped like the Greek capital letter omega: Ω (see below). Troughing will keep most areas of rainfall in the west and northeast. The rest of the country—including Florida—will remain generally dry, under the influence of a high-pressure dome. Mostly sunny conditions will prevail across Florida today and tomorrow. A little bit of instability could shake out a stray shower or two, but nothing widespread is expected. The rest of the week also looks to be generally quiet, which won't help matters concerning the drought in Central Florida."*

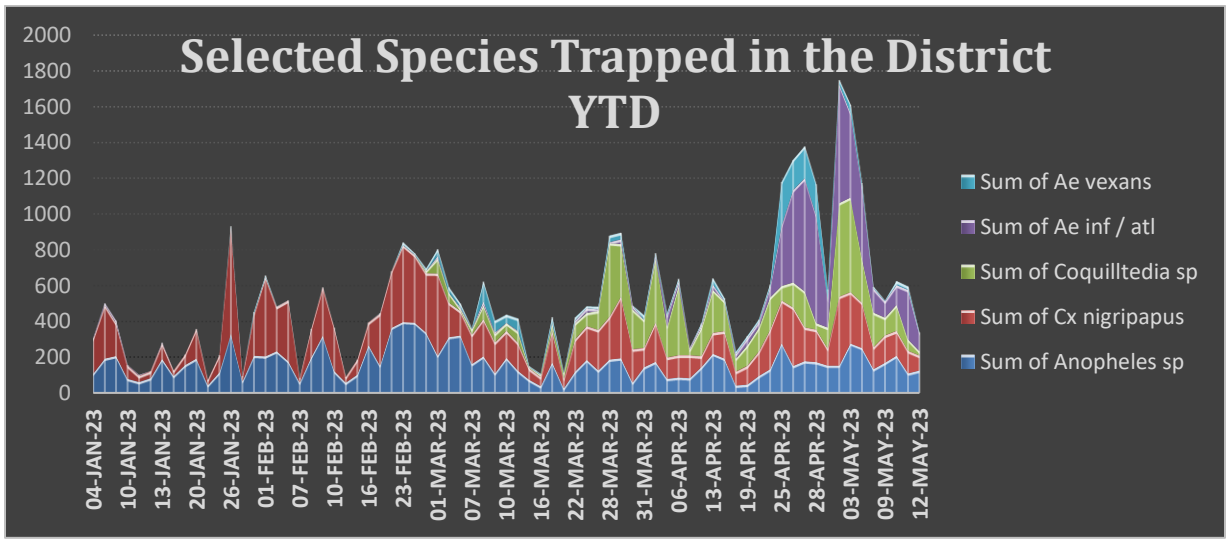


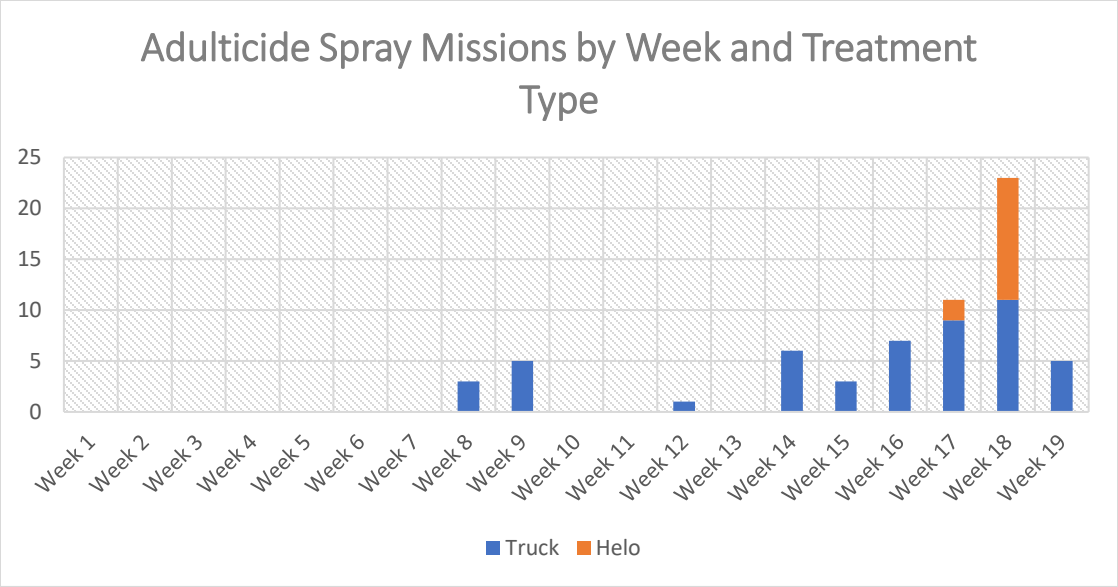
Week of 5/8/2023 Operations Update (19)

This week mosquito populations were much reduced with only limited spray missions. Completed second round of monthly larvicide pretreatments. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).

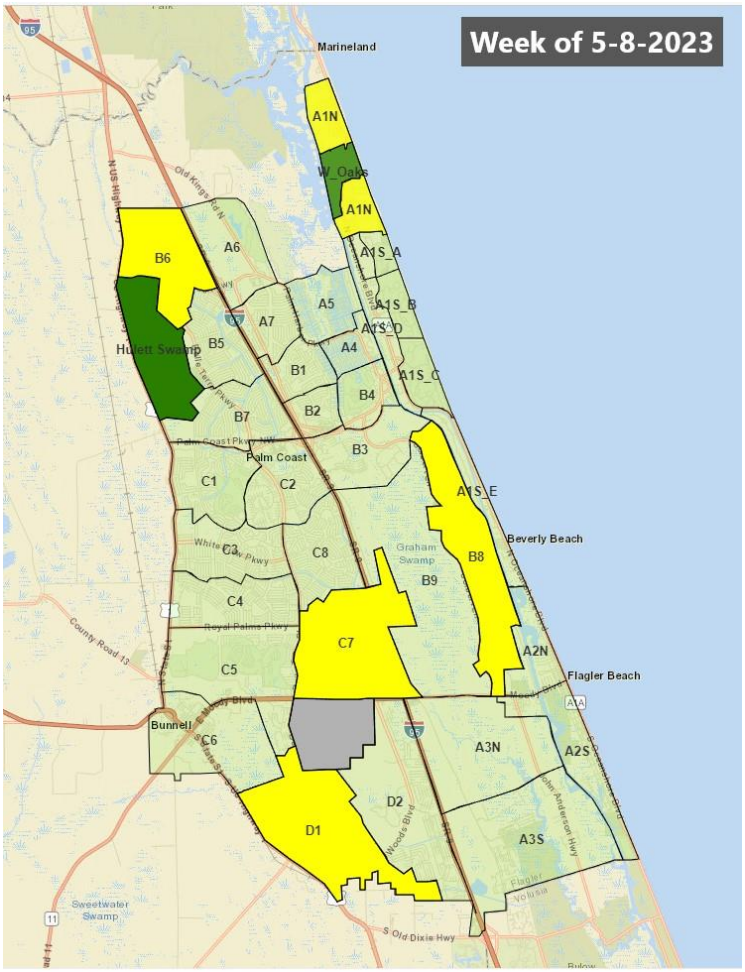


Mosquito populations trended down this week. With the completion of aerial adulticide missions last week, *Coquilletidia perturbans* population is much reduced and did not rebound by the end of the week. Typically, this species of permanent water species emerges from cattail swamps in Early April, but this year we began spraying to control this species since the beginning of March.



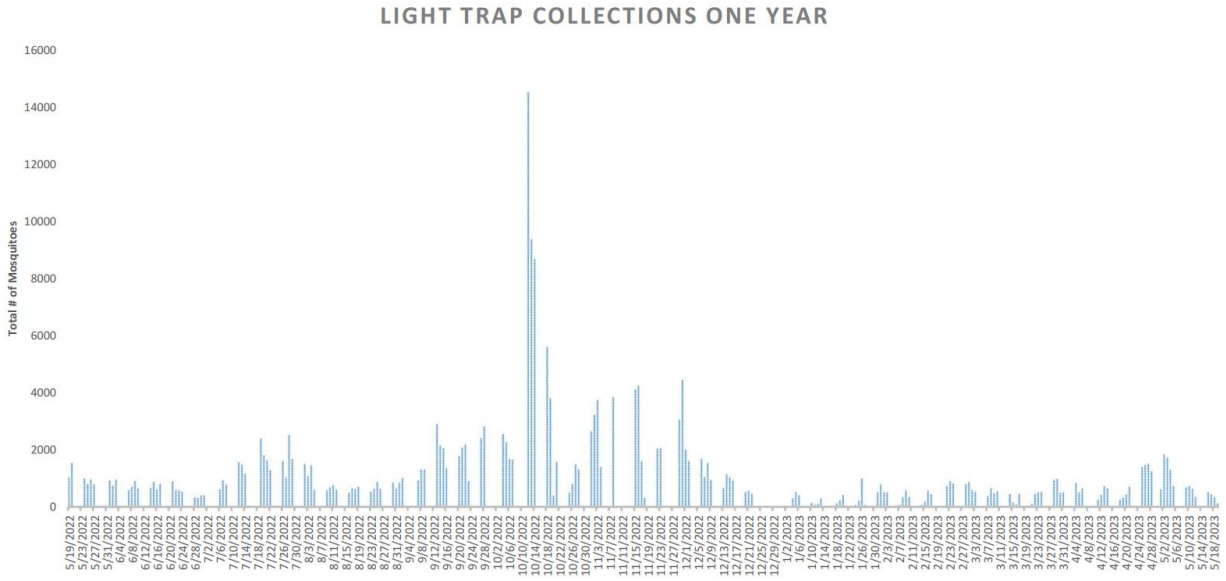


Zones hi-lighted in yellow were sprayed by truck this week.

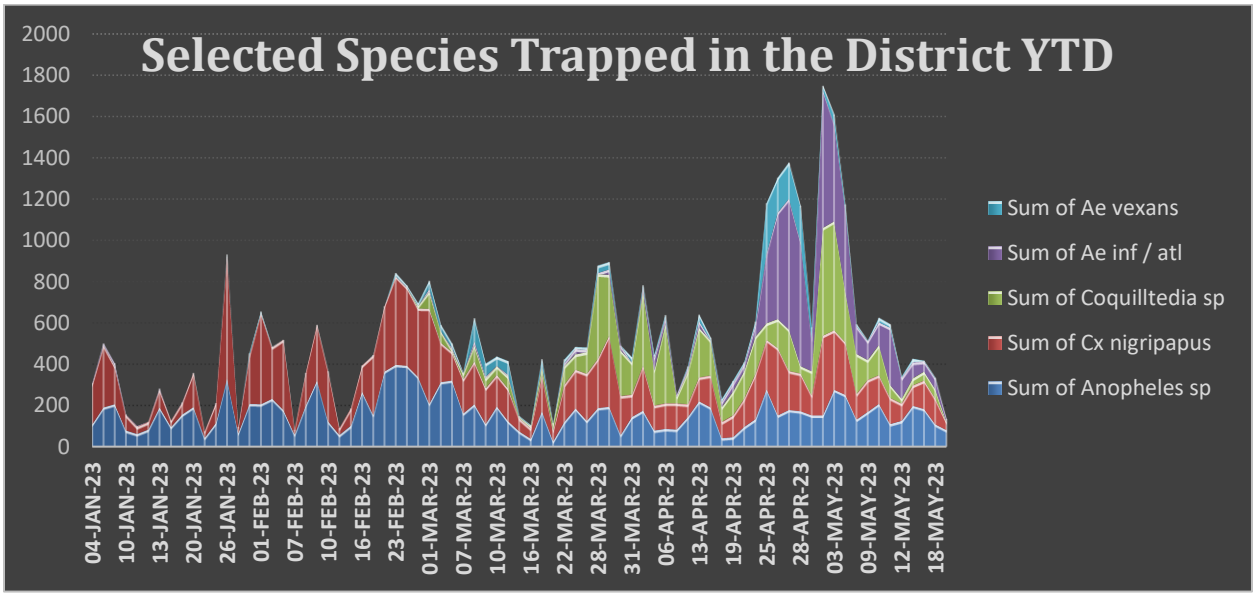


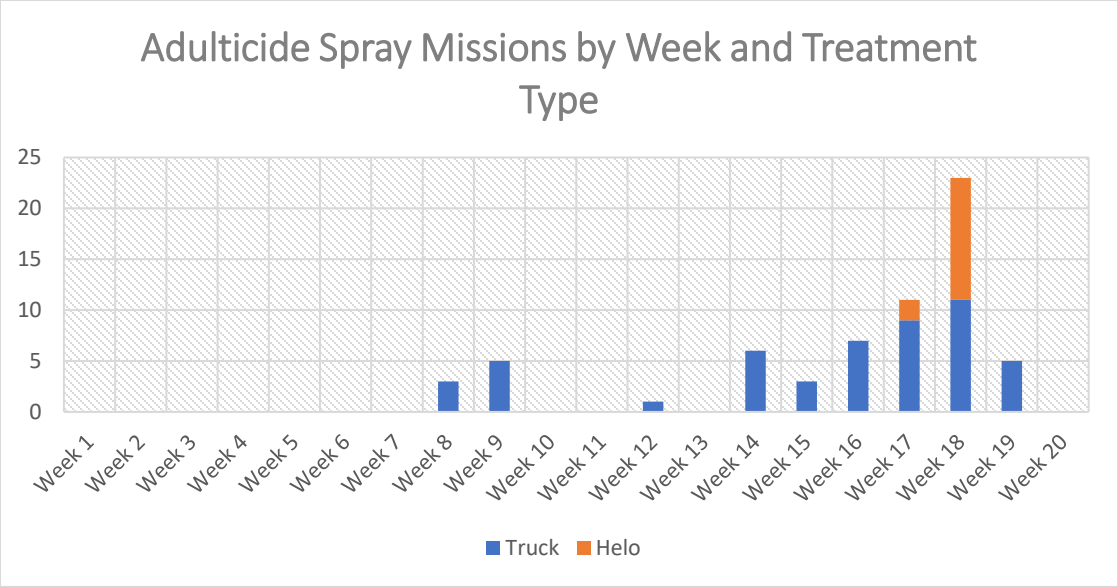
Week of 5/15/2023 Operations Update (20)

Mosquito populations were below baseline levels by week's end. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).



Following six weeks of spraying with extensive aerial adulticiding last week, no spraying was justified this week. Permanent-water species of mosquitoes, *Culex nigripalpus* and Anopheles spp. were at levels below what were recorded during the winter months.

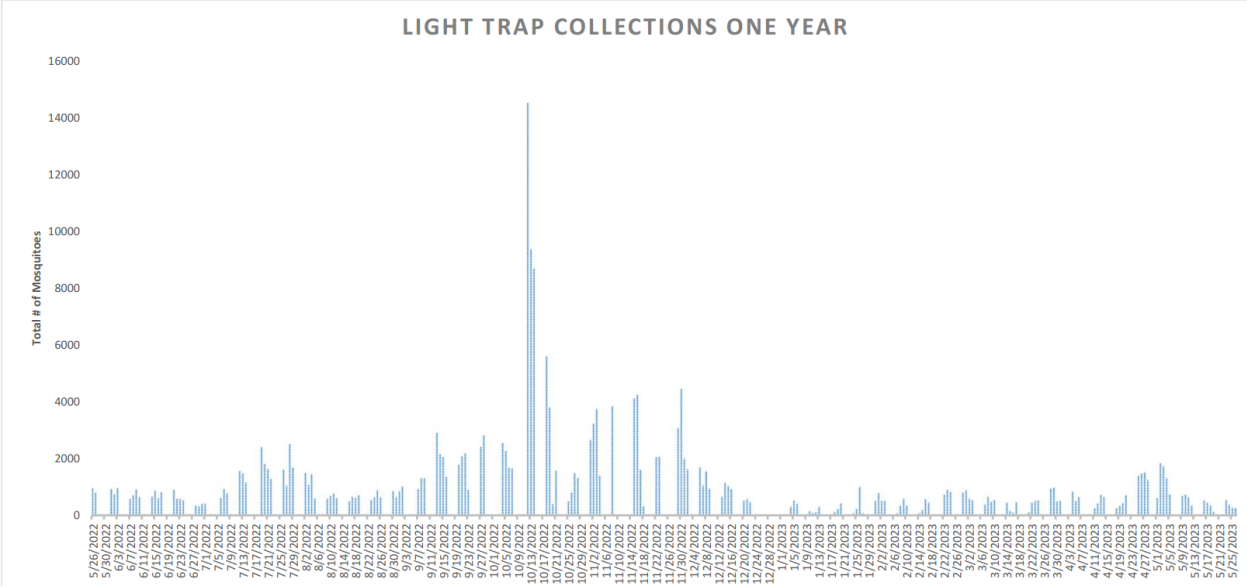




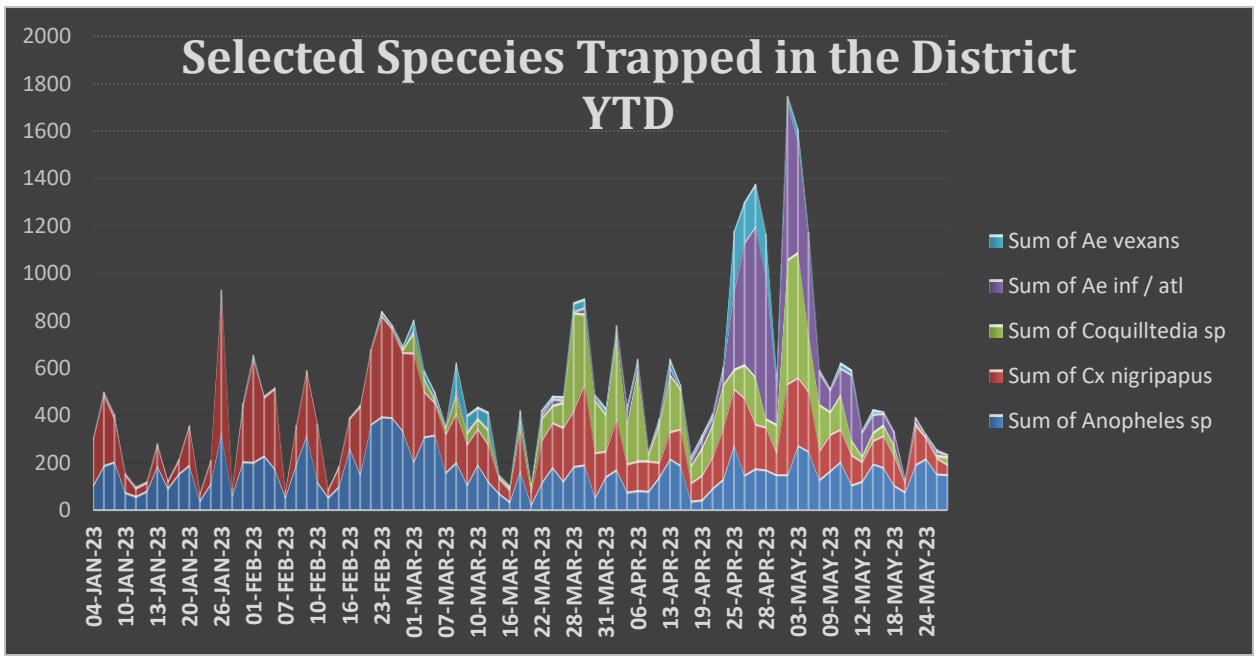
*No Spray missions this week.

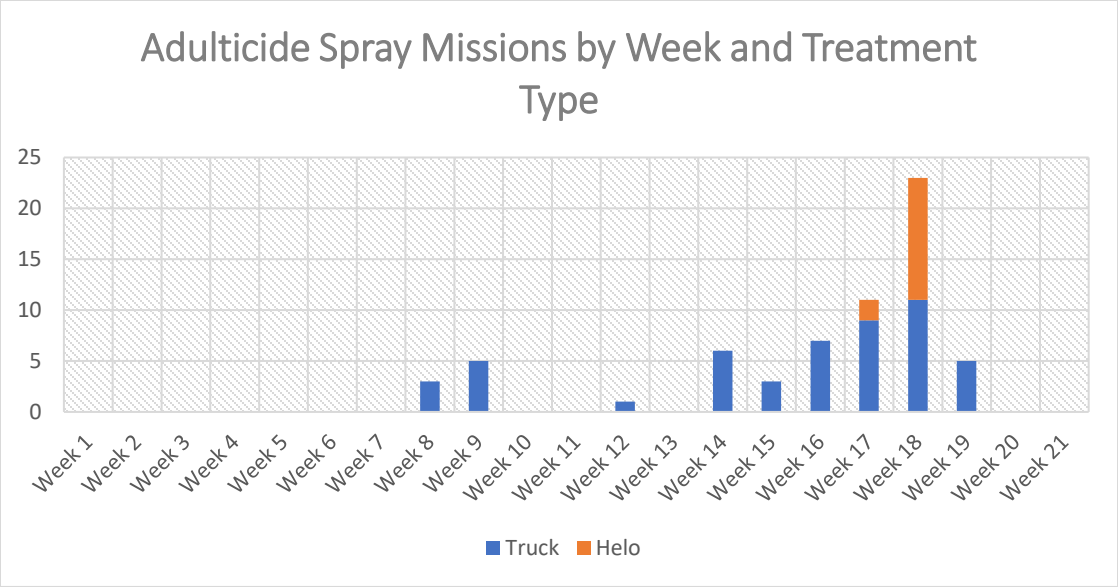
Week of 5/22/2023 Operations Update (21)

Mosquito populations remained below baseline levels this week. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).



Following six weeks of spraying with extensive aerial adulticiding the final week, no spraying was justified the past two weeks. Permanent-water species of mosquitoes, *Culex nigripalpus* and Anopheles spp. were at levels below what were recorded during the winter months.

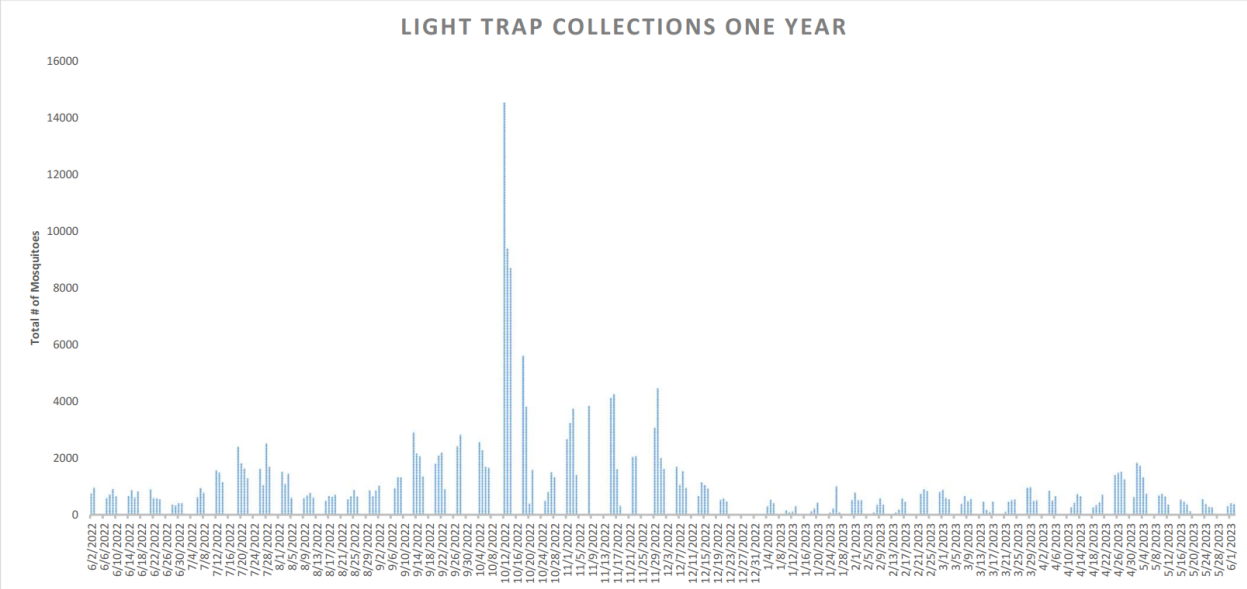




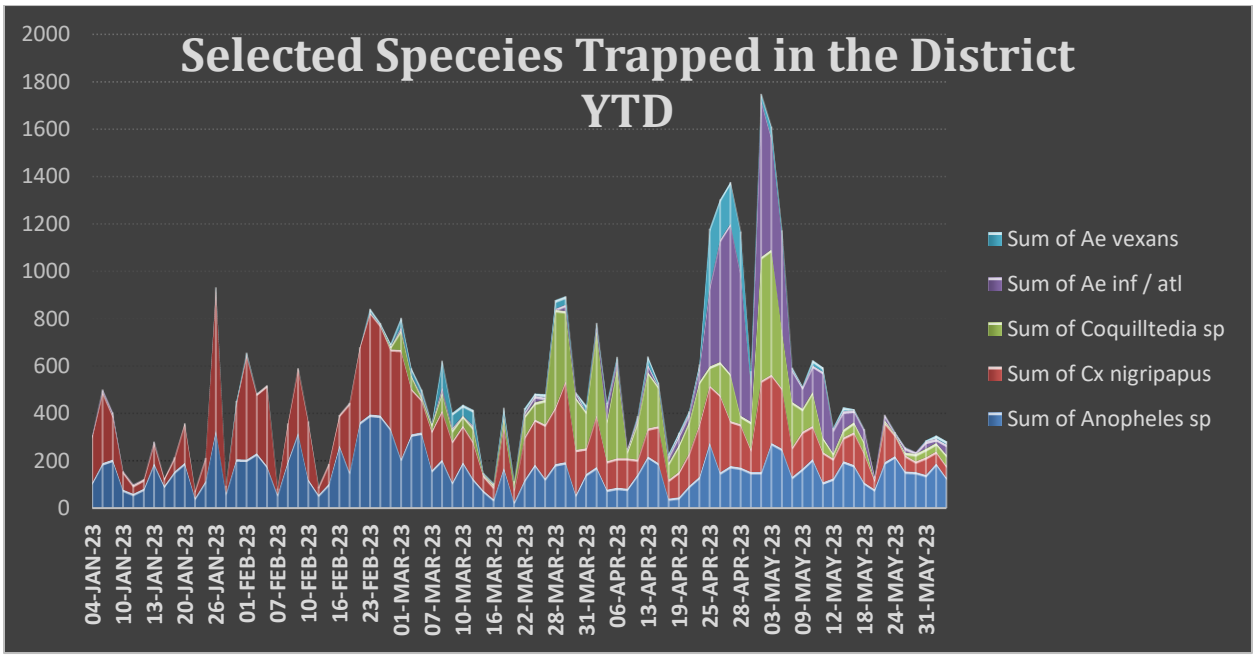
*No Spray missions this week.

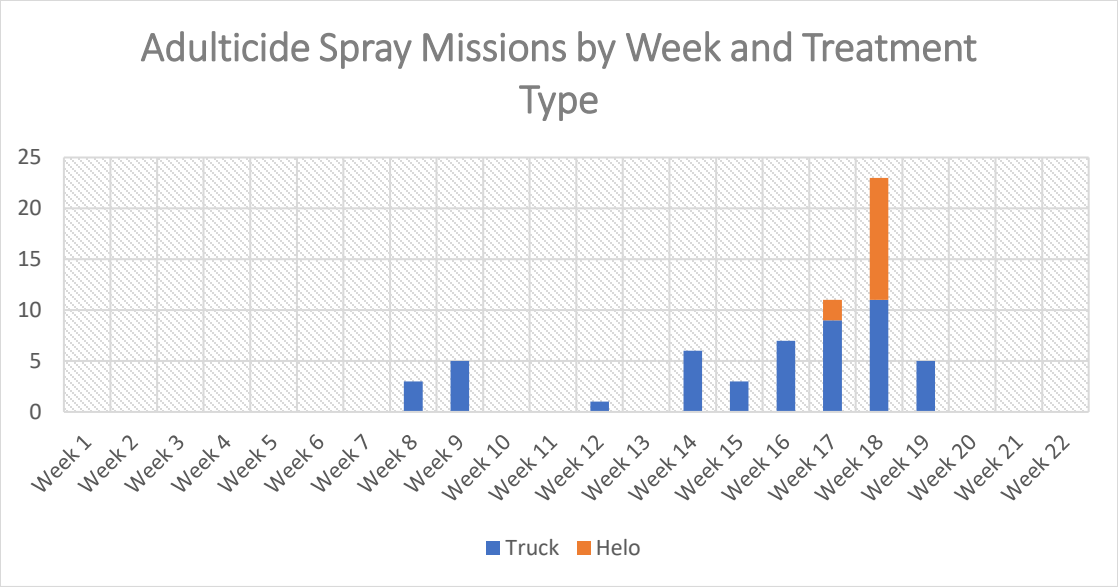
Week of 5/29/2023 Operations Update (22)

Mosquito populations remained below baseline levels for the third week. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).

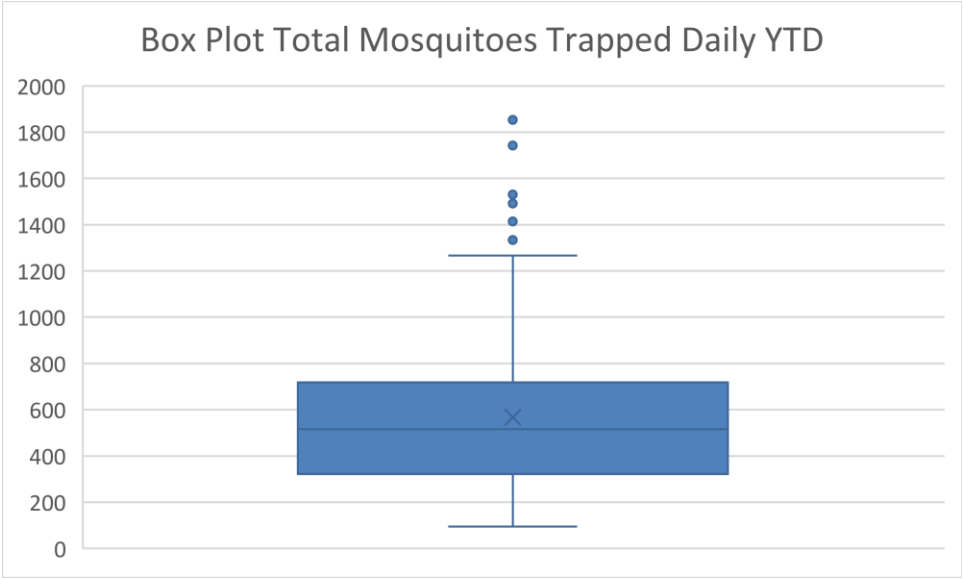


Following six weeks of spraying with extensive aerial adulticiding, no spraying was justified the past three weeks. Permanent-water species of mosquitoes, *Culex nigripalpus* and Anopheles spp. were at levels below what were recorded during the winter months.





So how low is the relative mosquito population and where did they go? You can get a sense of the changes in the mosquito population for the year so far from a very basic statistical representation of the population by looking at inter-quartile deviation and outliers using a box plot. Outliers, more than 1.5 times the interquartile deviation, are represented by dots. These correspond to peaks in population from surges in floodwater mosquitoes, times of excessive wetness proliferating permanent water species, and emergence of *Coquilletidia perturbans* from Cattail swamps.



As far as the prolonged and drastic decline in total mosquitoes, we speculate that as the floodwater mosquito population was peaking we conducted aerial adulticiding and this happened to coincide with permanent water sites drying down so that the majority of the permanent water species were in the flying adult life stage and succumbed to our control measures. This has left a markedly reduced permanent-water species population unable to rebound for lack of larvae to replenish, at least until there is more standing water.

The Florida Department of Health has issued a mosquito-borne illness advisory for local transmission of Malaria in Sarsota County . The Malaria plasmodium cycles back and forth between human and mosquito populations in warmer parts of the world. Local transmission in Florida is now uncommon and happens when an infected traveler returns and infects the local population of mosquitoes when the mosquito feeds on the infected traveler. The now infected mosquito can transmit the virus to other humans that have not traveled and then you have “local transmission.” Press release below.

While we have the moquito species that can transmit malaria in Flagler County, and everywhere in Florida for that matter, mosquito populations are monitored daily and kept suppressed by strategically applying pesticides when adults are present and preemptively treating waters before adult mosquitoes can emerge.

Local transmisison of Dengue has also been found this year again in Miami. This is a continuation from last year’s outbreak. While there are 48 species of mosquitoes in Flagler County, only two breed in containers around your home and both are competent vectors of Dengue. Keeping your yard clear of containers that hold water is key to eliminating the species of mosquitoes that transmit Dengue. Bromeliads are popular ornamental plants but they hold water and breed these mosquitoes as well. Removal is the best option for control.

*No Spray missions this week.

May 26, 2023

DOH-MANATEE ISSUES MOSQUITO-BORNE ILLNESS ADVISORY: SINGLE CASE OF MALARIA IDENTIFIED AND TREATED

Contact:
Christopher Tittel, Public Information Officer
Florida Department of Health-Manatee County
Christopher.Tittel@flhealth.gov
(941) 720-6145

Manatee County, Fla. -- The Florida Department of Health in Sarasota County and Manatee County (DOH-Sarasota and DOH-Manatee) is responding to one confirmed case of malaria among an individual who spent extensive time outdoors. The patient was promptly treated at a hospital and has recovered. DOH is working closely with local partners and county mosquito control. Aerial and ground mosquito spraying is being conducted in these areas to mitigate the risk of further transmission.

This case has been identified as the *P. vivax* species of malaria, which is not as fatal as other species. Malaria is not transmitted from person to person. Only infected *Anopheles* mosquitoes can transmit malaria to humans.

Effective treatment is readily available through hospitals and other health care providers. Individuals in this area with symptoms of fever, chills, sweats, nausea/vomiting, and headache should seek immediate medical attention.

To protect yourself from any mosquito-borne illness, take the following prevention steps:

- Use mosquito repellent that contains DEET (10-30 percent), picaridin, oil of lemon eucalyptus, para-menthane-diol, 2-undecanone or IR3535.
- Wear long sleeves and pants.
- Check and repair screens on doors and windows to prevent mosquitoes from entering your home.

To help reduce the population of mosquitoes around your home, please drain and cover areas around your home. Mosquitoes reproduce in freshwater from rainstorms, sprinklers and other sources. Drain pools of freshwater around your home and yard. Empty pet bowls, garbage cans, garbage can lids, bottles, tires, and anything where freshwater has accumulated.

Residents of Sarasota County and Manatee County should contact their local government for more information about specific mosquito control.

More information on mosquito prevention in Florida can be found here, which also contains materials for local partners to display or distribute in their communities. More information about malaria worldwide can be found through the CDC.

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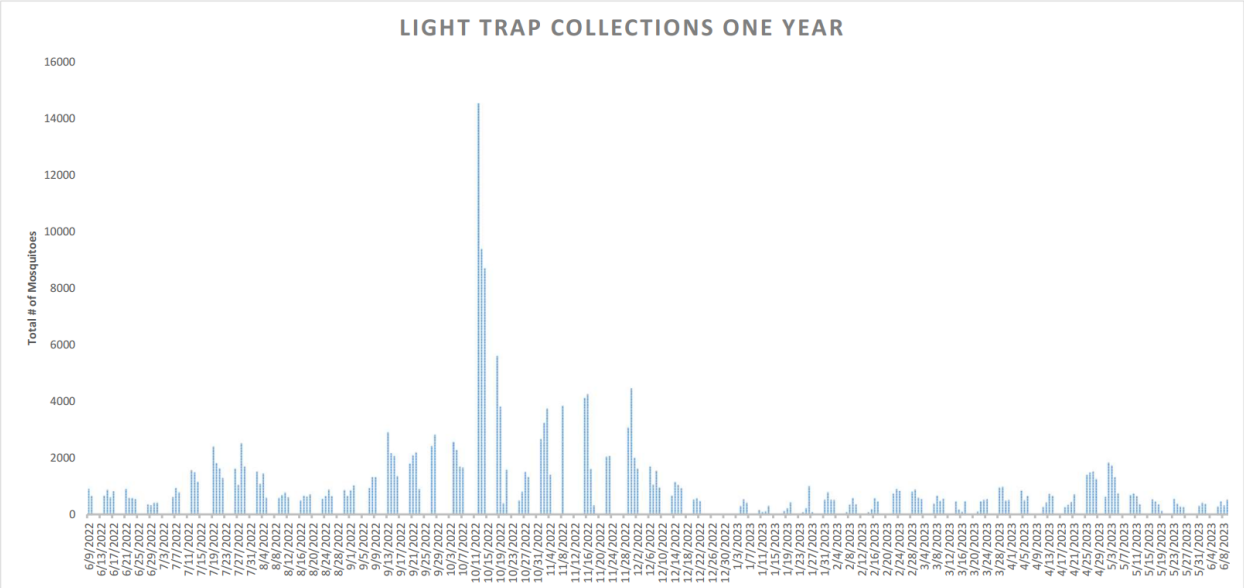
About the Florida Department of Health

The Florida Department of Health, nationally accredited by the Public Health Accreditation Board, works to protect, promote and improve the health of all people in Florida through integrated state, county and community efforts.

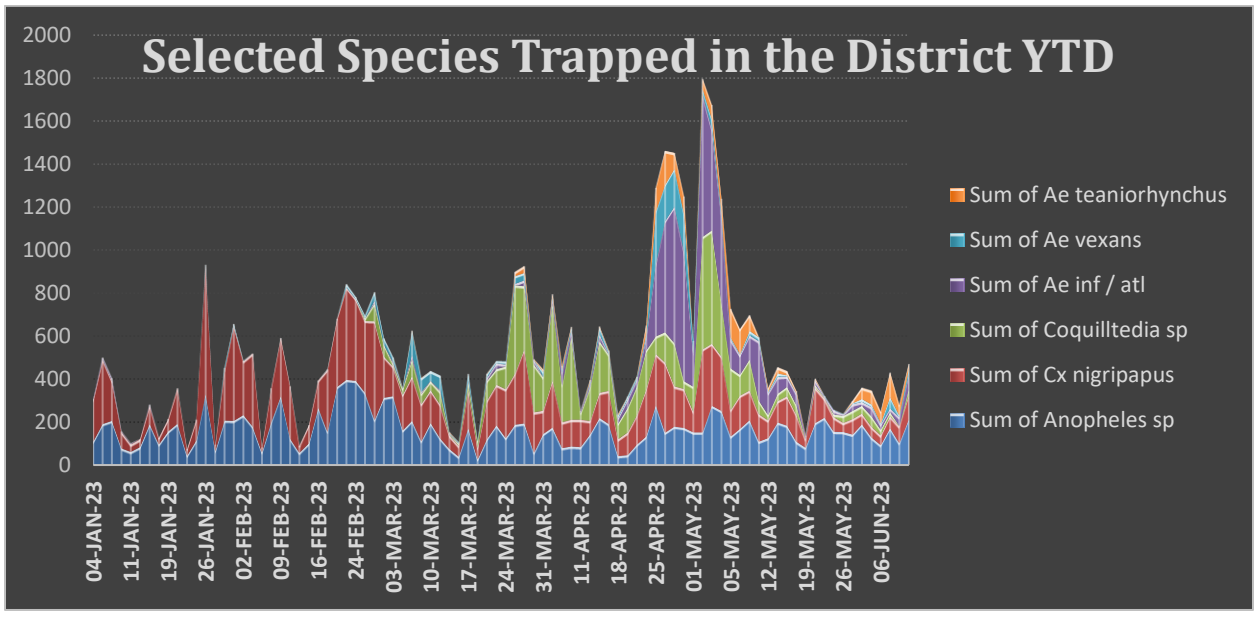
Follow us on Facebook, Instagram and Twitter at @HealthyFla. For more information please visit www.FloridaHealth.gov.

Week of 6/5/2023 Operations Update (23)

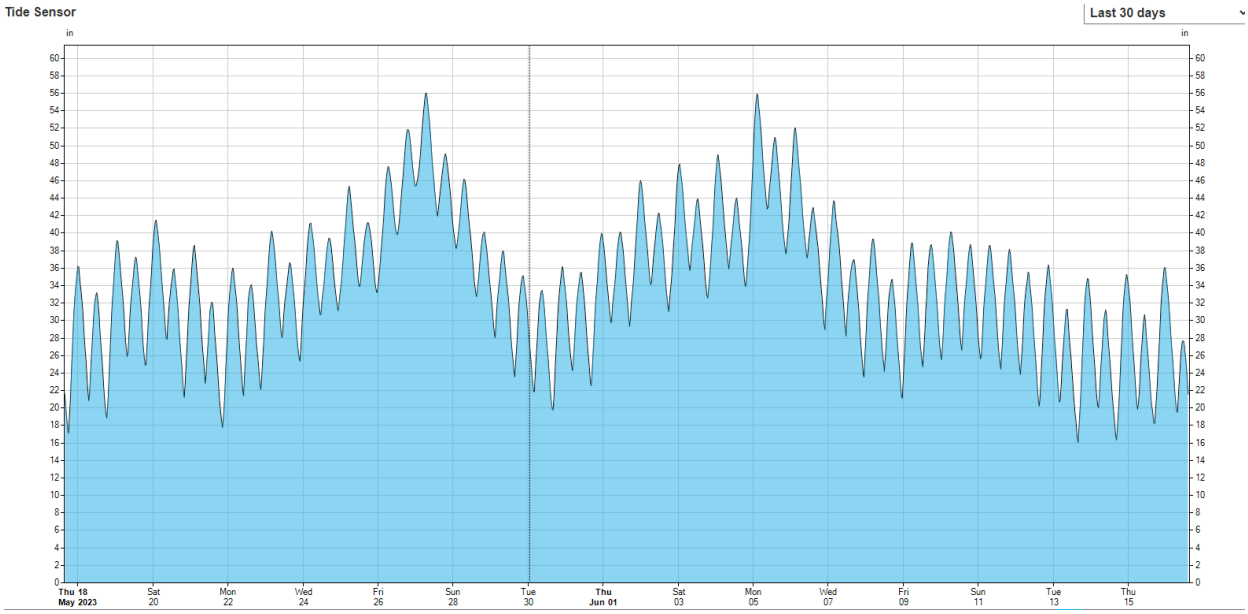
After three weeks of mosquito populations below baseline levels, this week saltmarsh mosquito activity picked up along the coast. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).



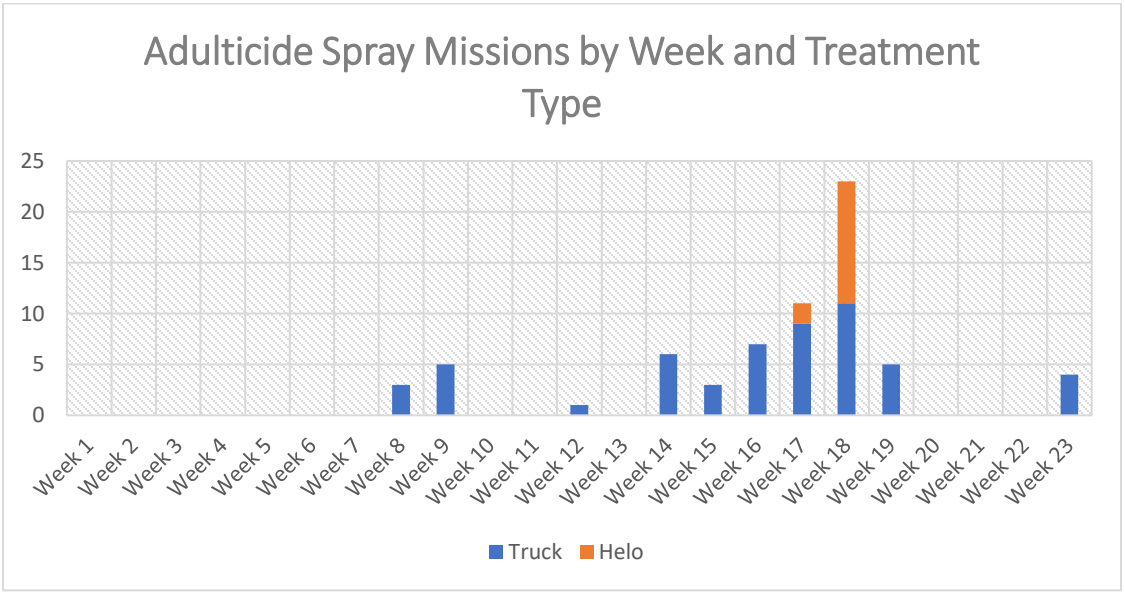
Saltmarsh mosquitoes are floodwater-type mosquitoes. This means they lay their eggs in dry soil and then hatch when intermittently flooded. This method allows the mosquito larvae to be isolated and to therefore evade predation by fish. Areas that breed saltmarsh mosquitoes are monitored and pretreated with an organically certified pesticide to prevent emergence of mosquito larvae.



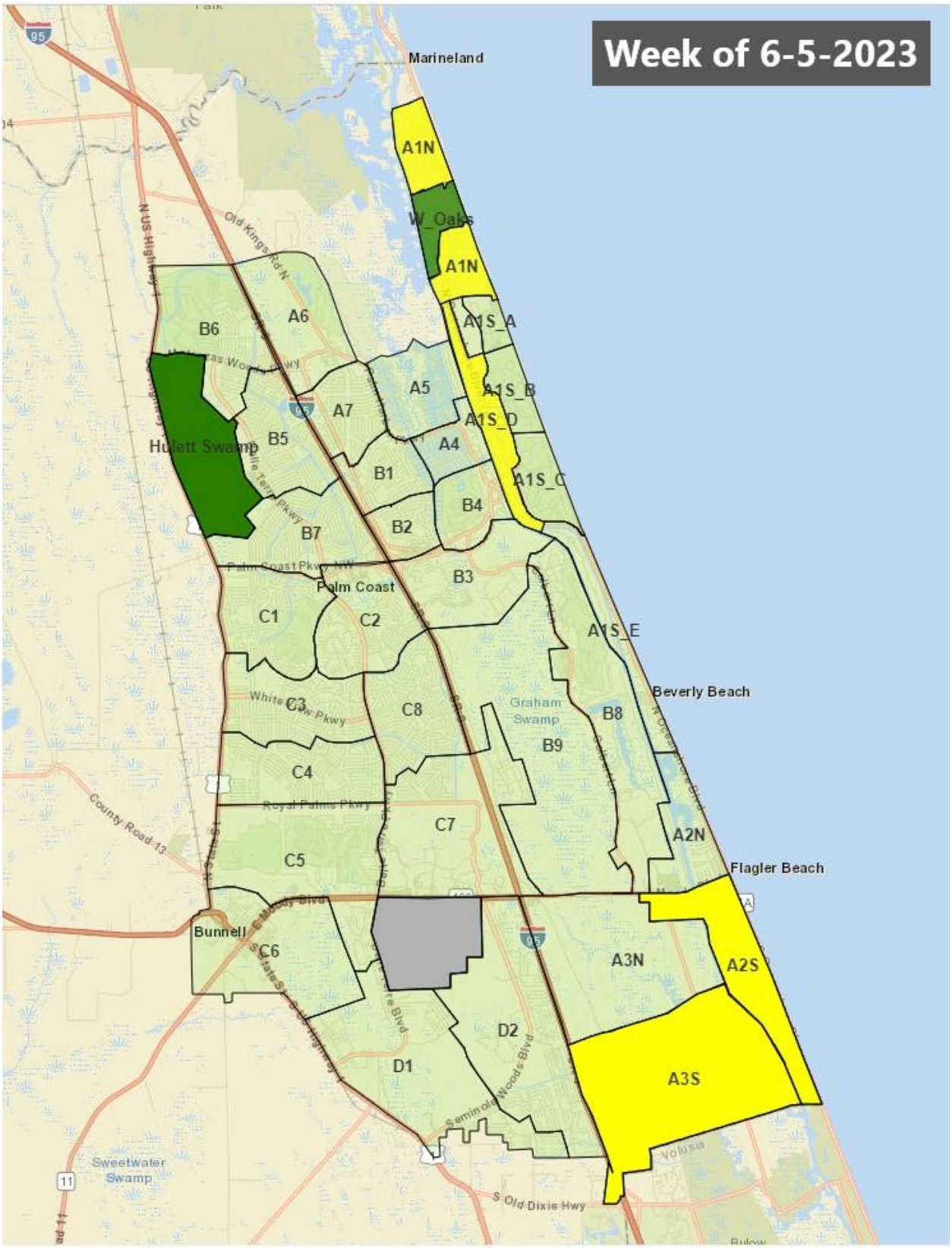
Saltmarsh breeding sites are susceptible to flooding by rain but also by higher tides. Over the past several weeks water elevations measured in the in the saltmarsh have been high due to storms turning up the Atlantic. Subsequent flooding beyond the areas routinely pretreated has led to elevated saltmarsh mosquito production.



This excessive tidal flooding in the saltmarsh without accompanying flooding rains inland has lead to unusual situation where very little adulticiding is required to keep mosquito populations in check and in areas that are not usually sprayed for mosquitoes, which is a reactive solution versus proactive larvicide pretreatments with larvicide.

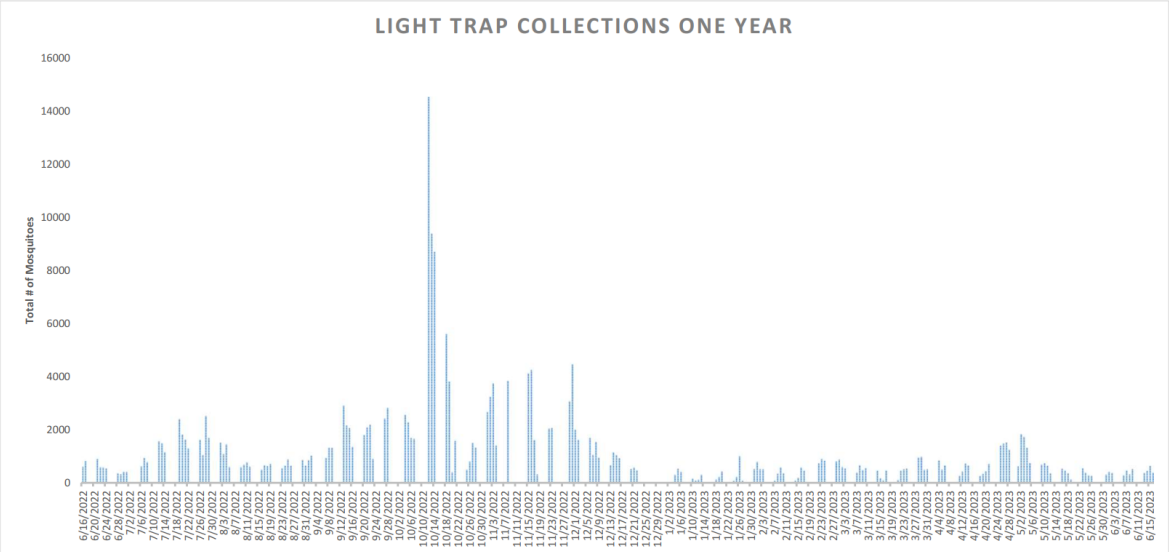


Zones highlighted in yellow were treated by truck this week.

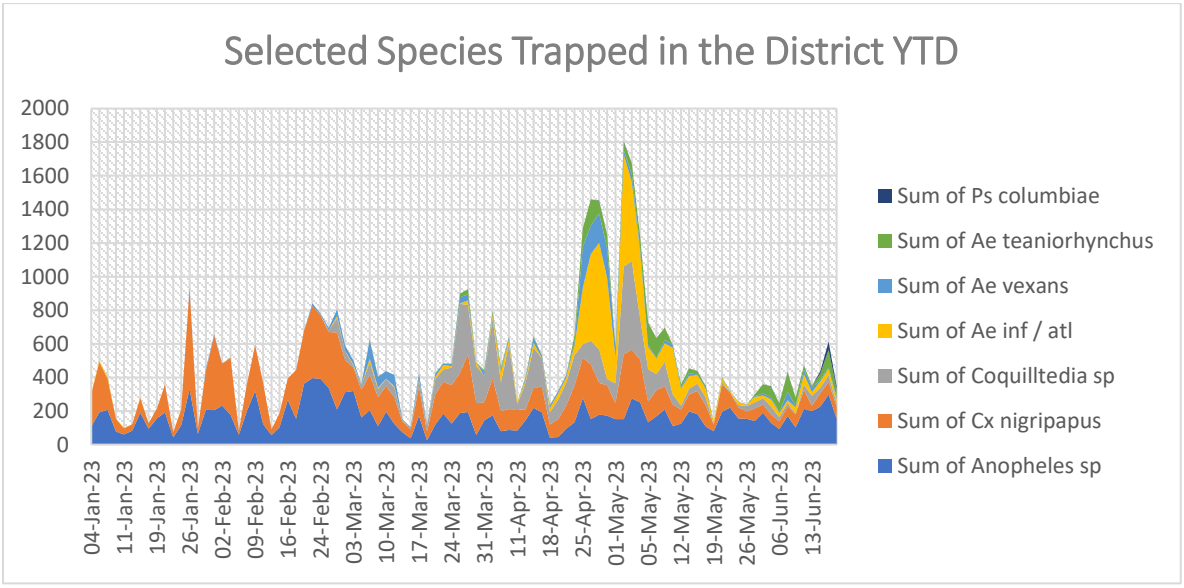


Week of 6/12/2023 Operations Update (24)

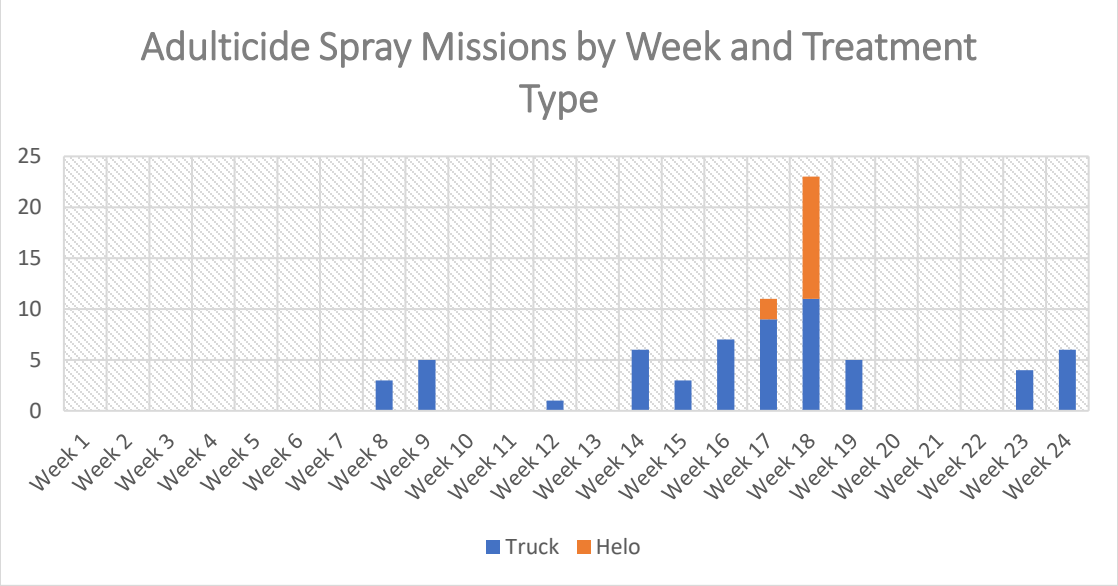
This was the second week of elevated saltmarsh mosquito activity. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).



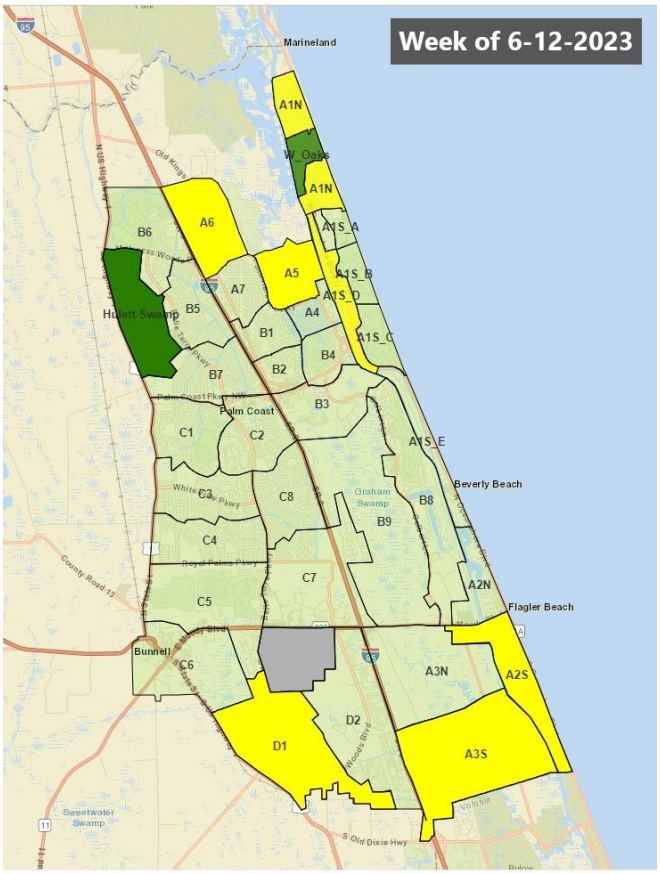
Saltmarsh mosquito activity had been elevated for the past two weeks. Storm activity in the Atlantic has caused flooding beyond the areas routinely pretreated with larvicide to prevent the emergence of saltmarsh mosquitoes. In addition, this week saw an additional mosquito species present in our surveillance traps. This species, *Psorophora columbiae* (the dark rice field mosquito), usually shows up after a surge in other floodwater mosquito species, but in this case, there was no preceding surge. Rainfall has been in distinct bands recently and may have flooded areas more remote to the District. This species has a ten-mile flight-range and may have belatedly made its way into our surveillance traps.



The genus Psorophora derives from the Greek words ‘Psoros’ (itching) and ‘pherein’ (to carry). The Dark Rice field Mosquito is often found in environments influenced by human activities. Irrigated fields such as rice paddies, flooded pastures, and rain-filled depressions make ideal breeding grounds for these mosquitoes. In Flagler County, it breeds in the furrows of bedded pines that surround the District.

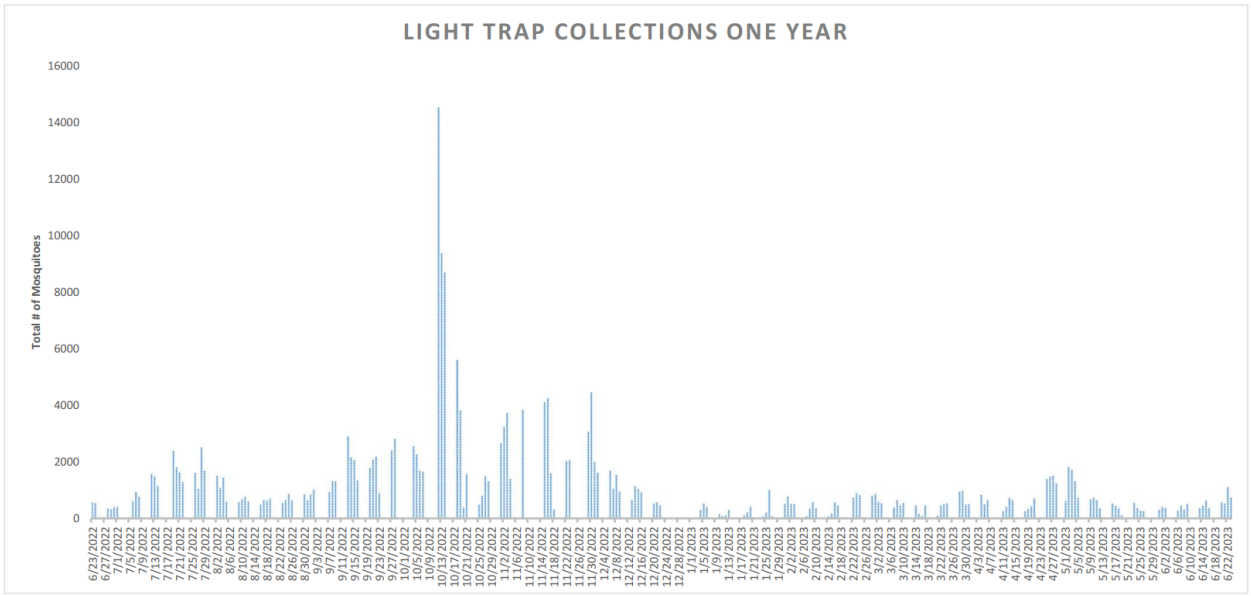


Zones highlighted in yellow were treated by truck this week.

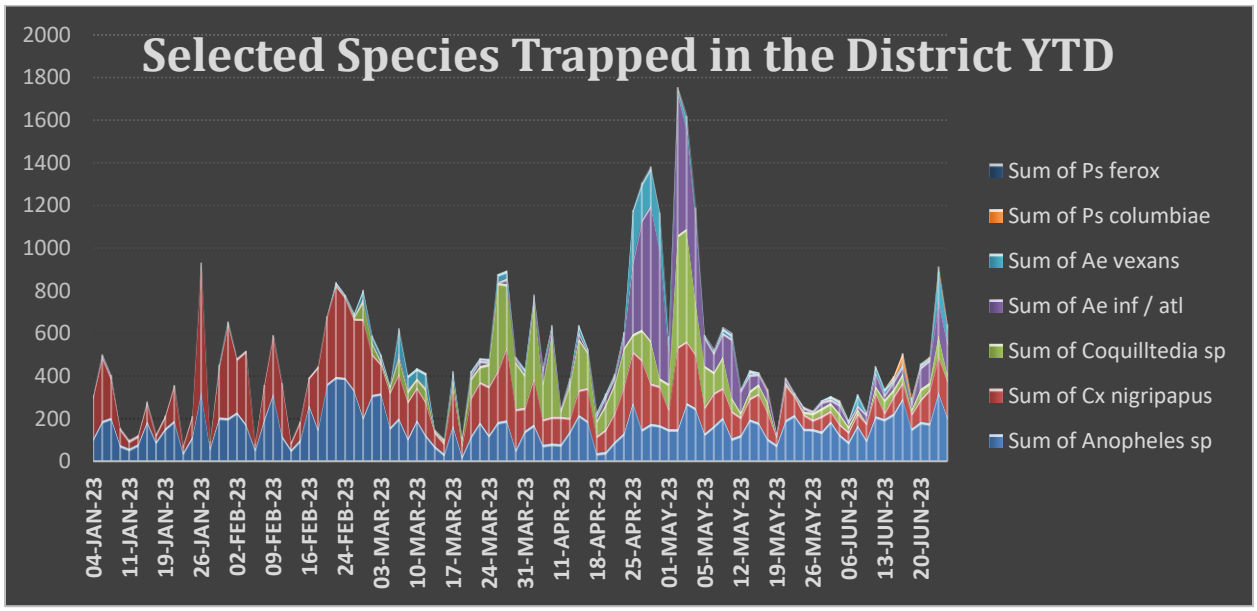


Week of 6/19/2023 Operations Update (25)

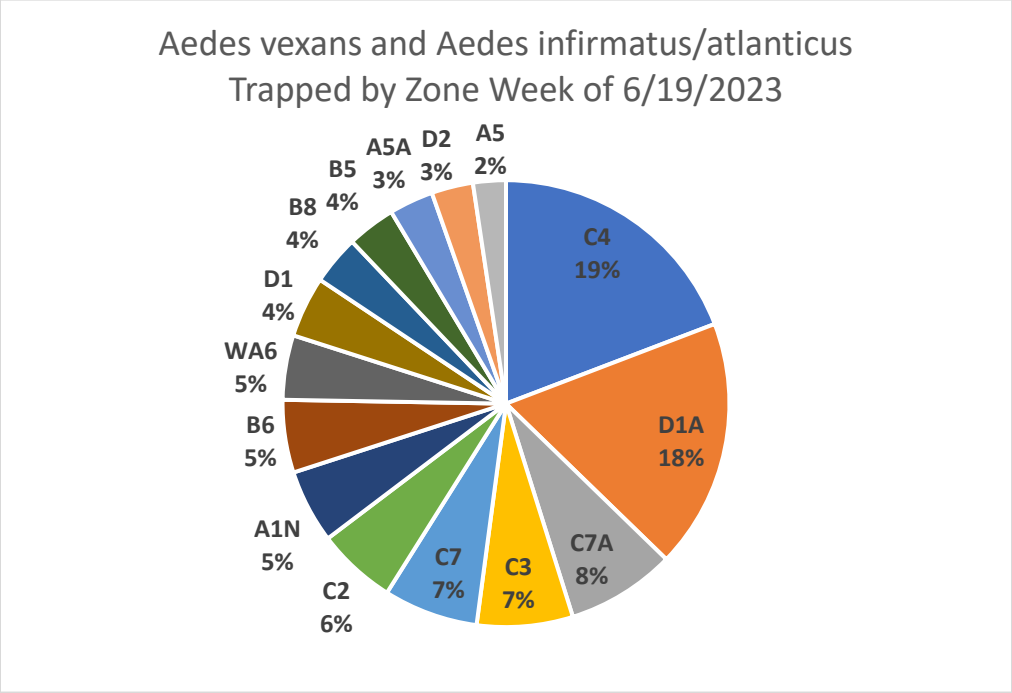
After two weeks of elevated saltmarsh mosquito activity, floodwater mosquitoes surged for the first time since early May. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).

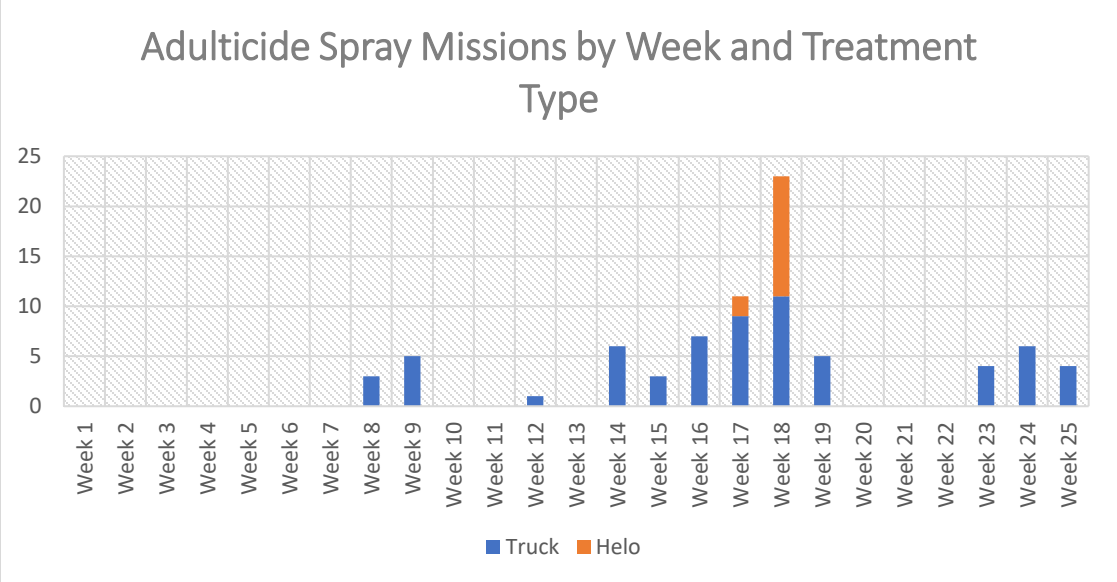


A relatively small peak of *Aedes vexans* and *Aedes infirmatus/atlanticus* occurred this week. Typically these two species do not simultaneously surge, but can overlap in occurrence.

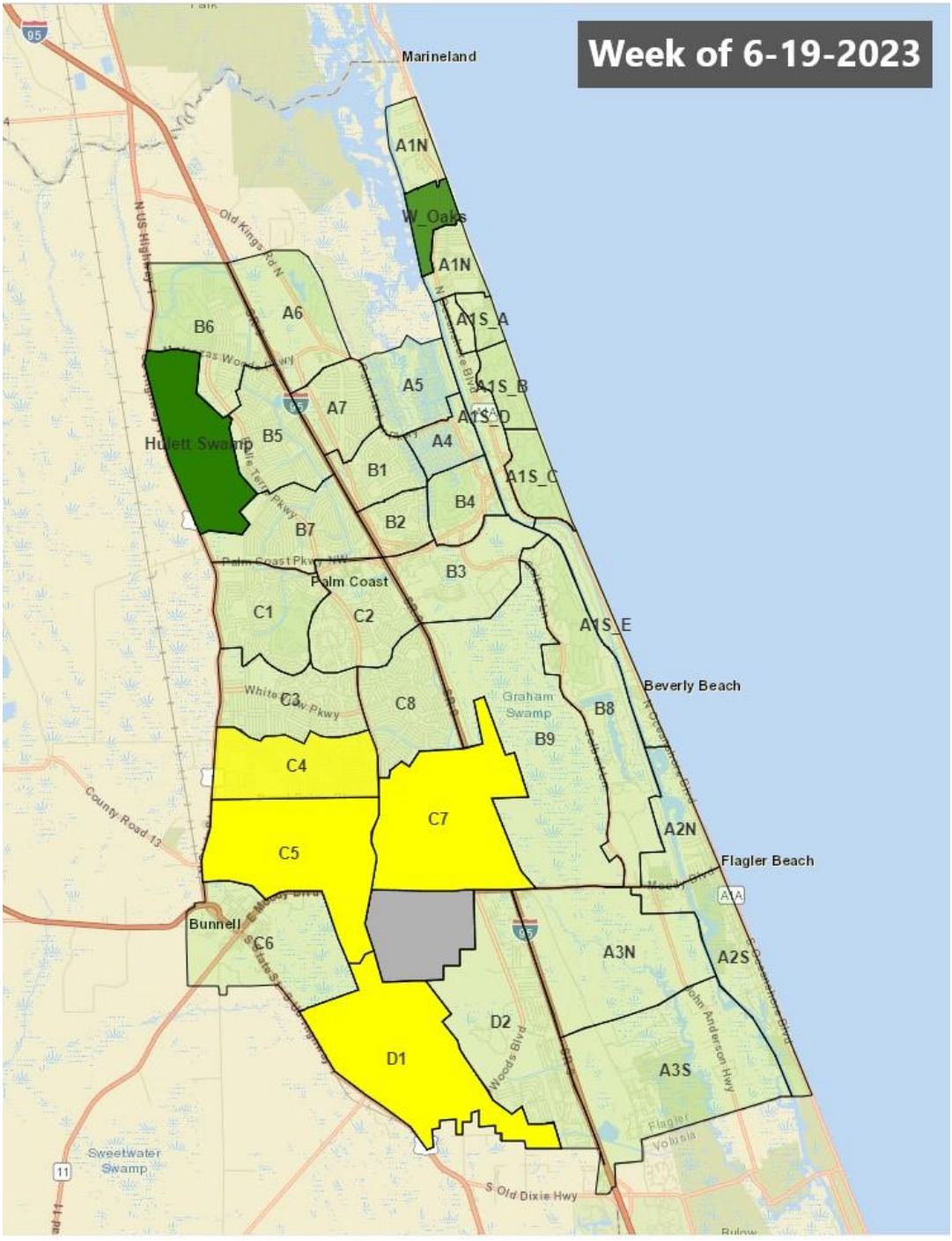


A relatively limited distribution of these two species occurred in the Southern portion of the District and along the powerlines that parallel Royal Palms Parkway.



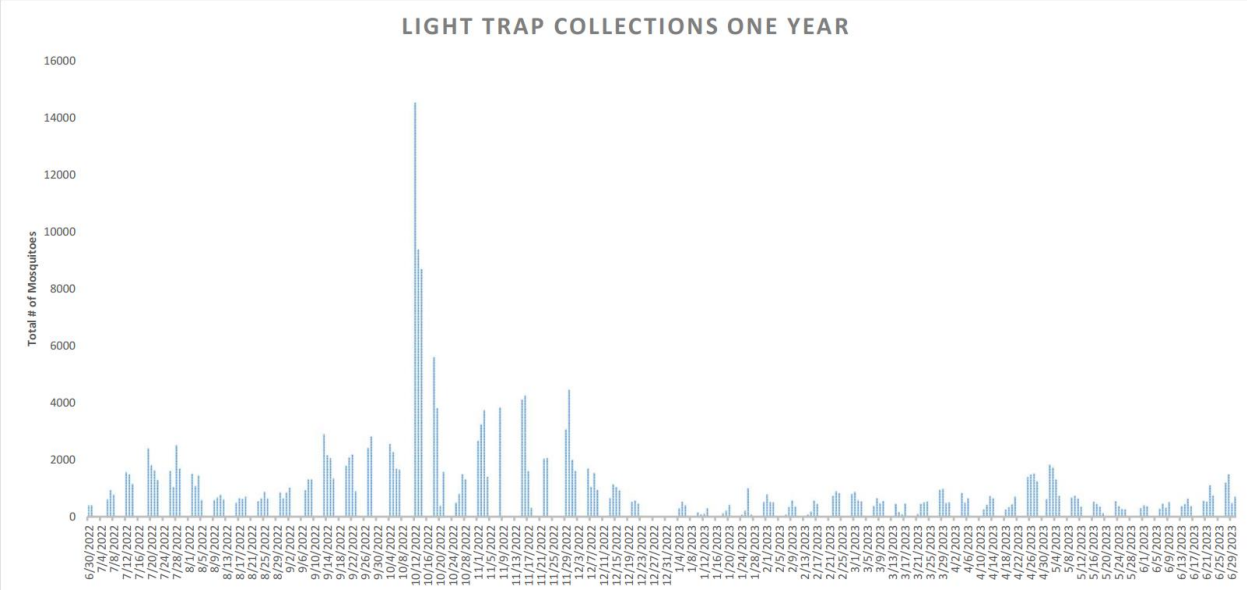


Zones highlighted in yellow were treated by truck this week.

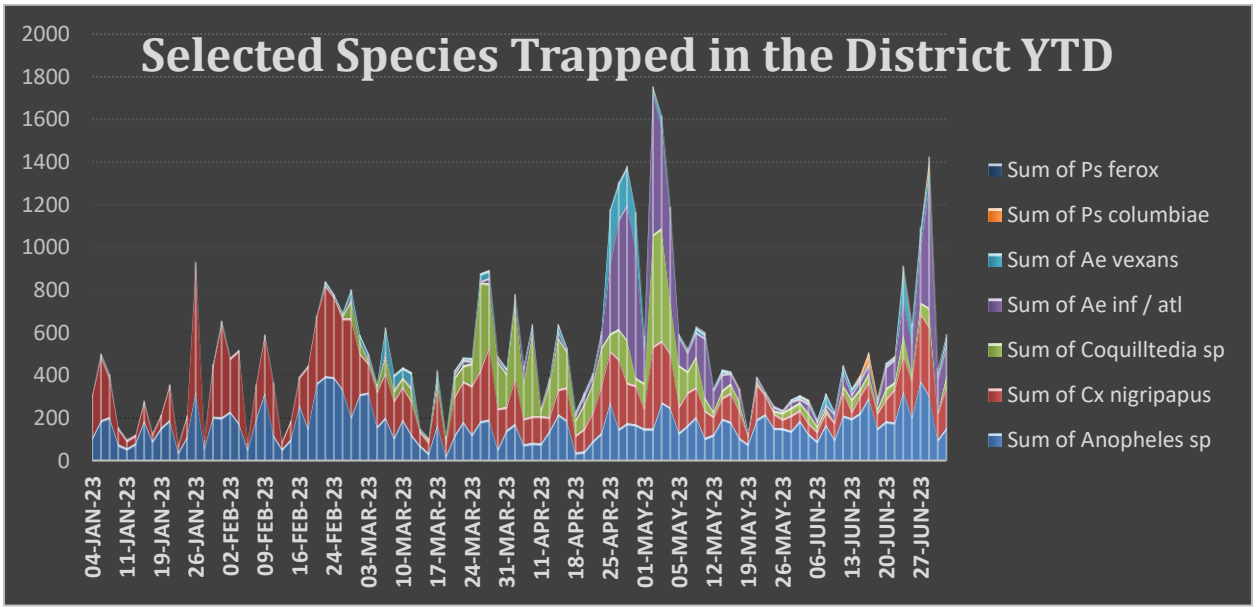


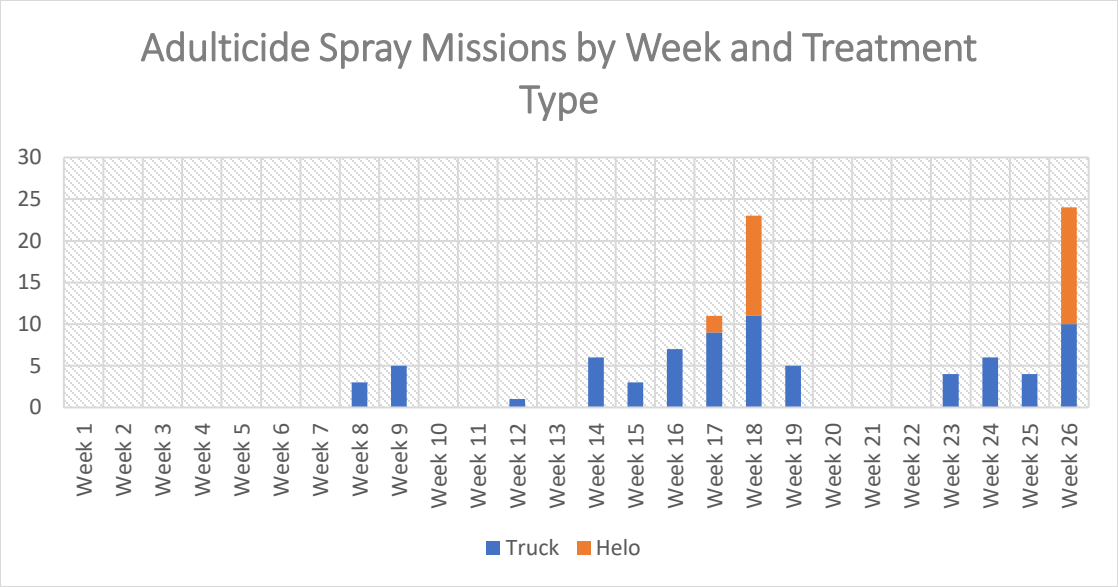
Week of 6/26/2023 Operations Update (26)

This week saw a big spike in floodwater mosquito activity with aerial adulticiding in response. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).



What began last week with a modest increase floodwater mosquito activity intensified this week. Typically spikes in floodwater mosquitoes are more abrupt.



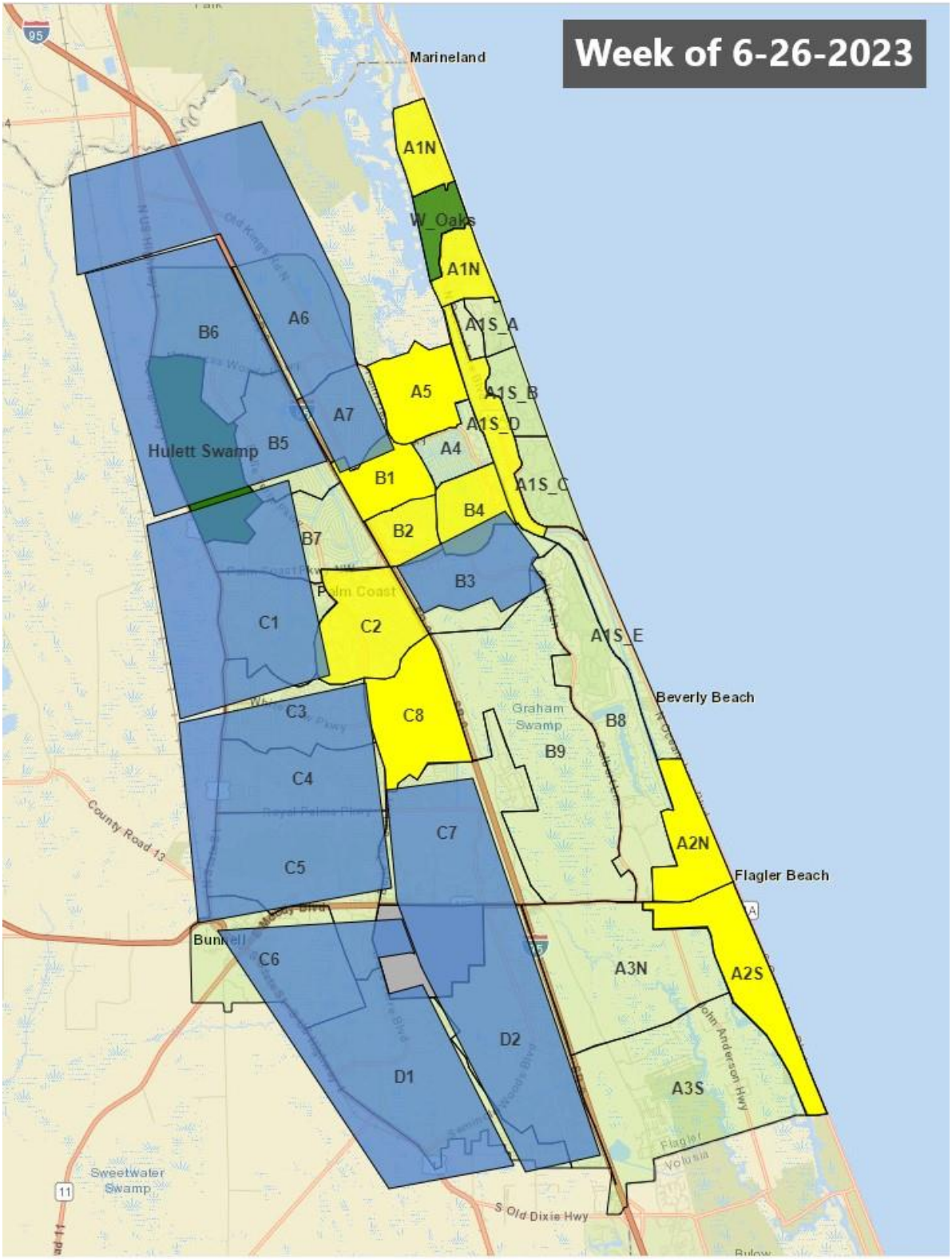


Malaria Cases Acquired in Florida: Two cases of locally acquired malaria were reported this week in Sarasota County. In 2023, six cases of locally acquired malaria have been reported, all in Sarasota County.

You can read the report here

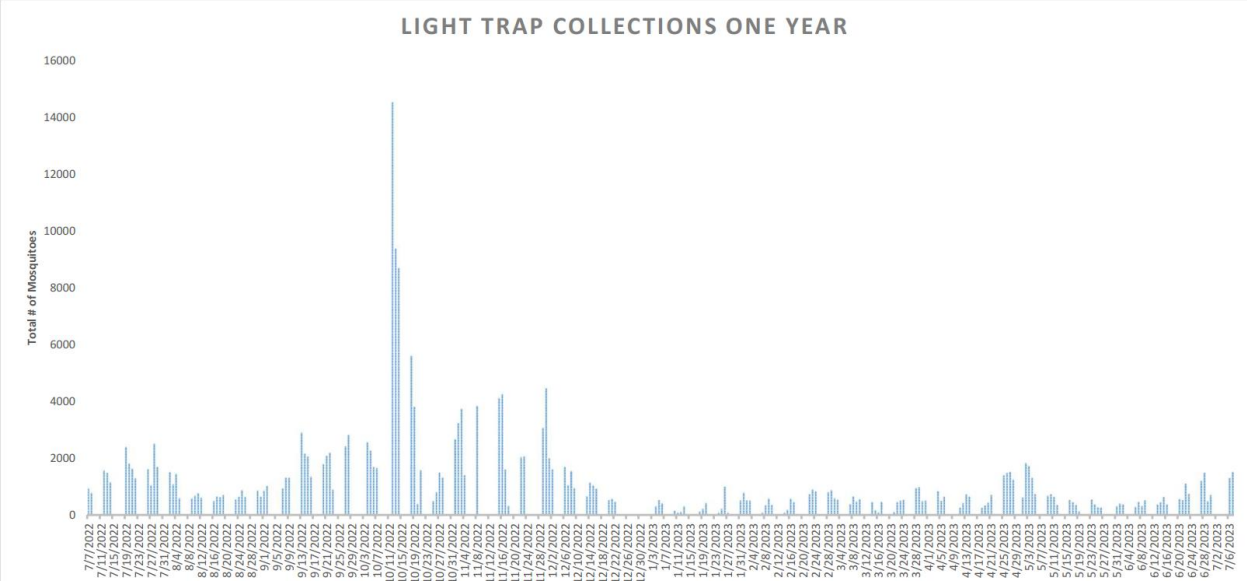
The District issued a statement on June 30 and can be found here

Zones highlighted in yellow were treated by trucks, blocks in blue were treated by helicopter this week.

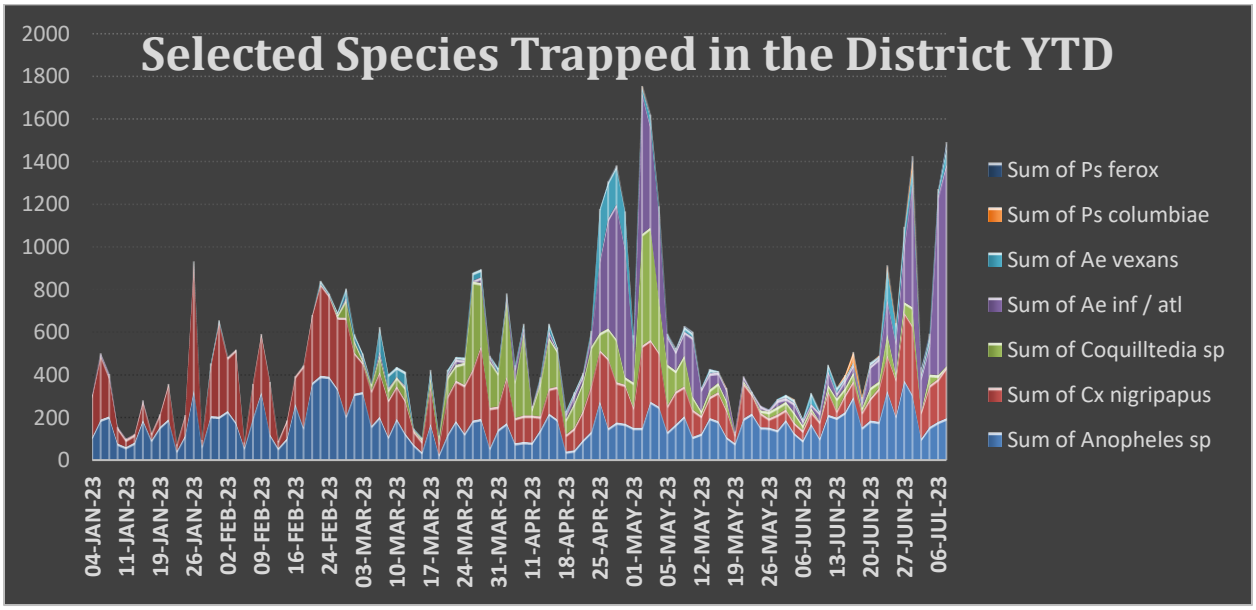


Week of 7/5/2023 Operations Update (27)

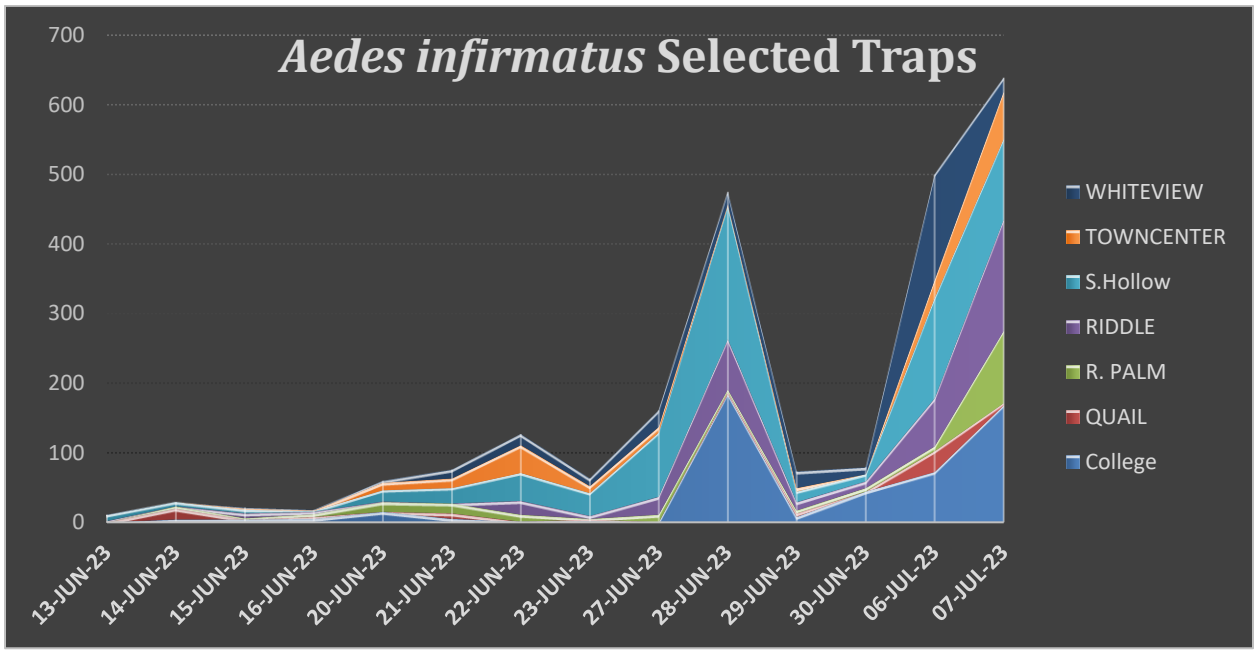
This was the second week of elevated floodwater mosquito activity. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).

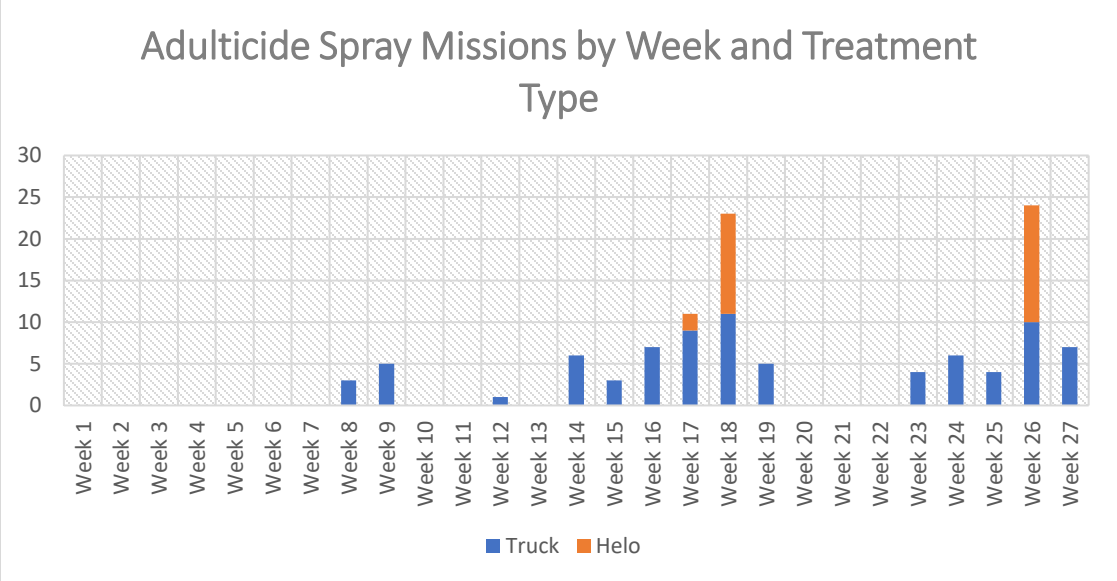


While the population of floodwater mosquitoes was resurgent this week, two permanent water species declined subsequent adulticiding. The species of mosquito, of *Aedes infirmatus*, that was most abundant was more widespread but reduced in each of the two previous locations, suggesting separate emergences.

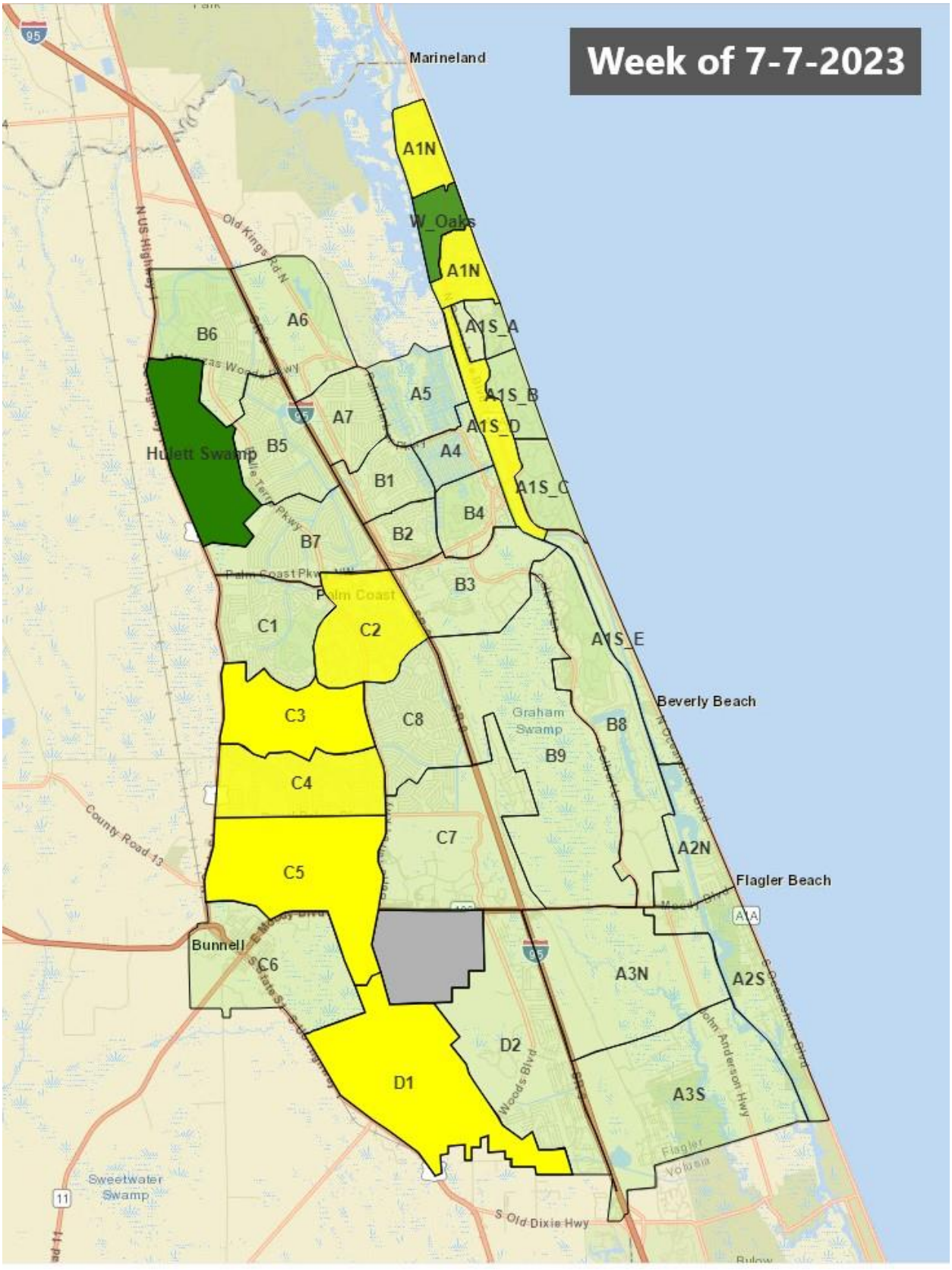


The distribution of *Aedes infirmatus* was much broader this week as compared to last week with further emergence at the end of the week (chart below). Usually, populations of floodwater species spike very quickly, whereas over the past few weeks it has been a slow-motion process. A possible contributing factor is the coinciding extreme heat.



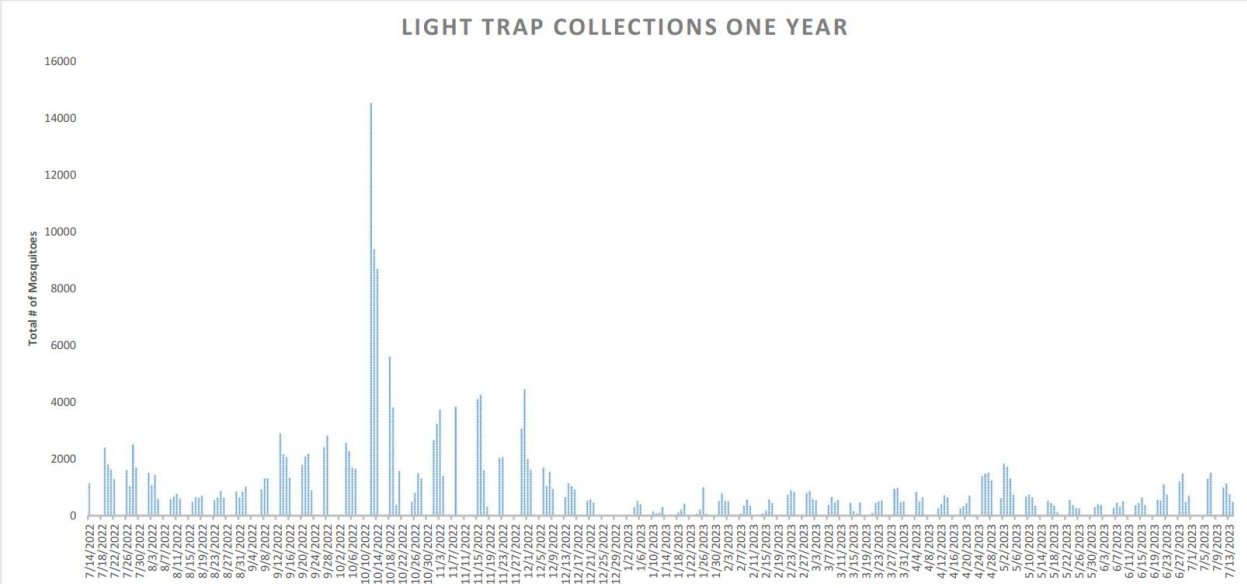


Zones highlighted in yellow were treated by truck this week.

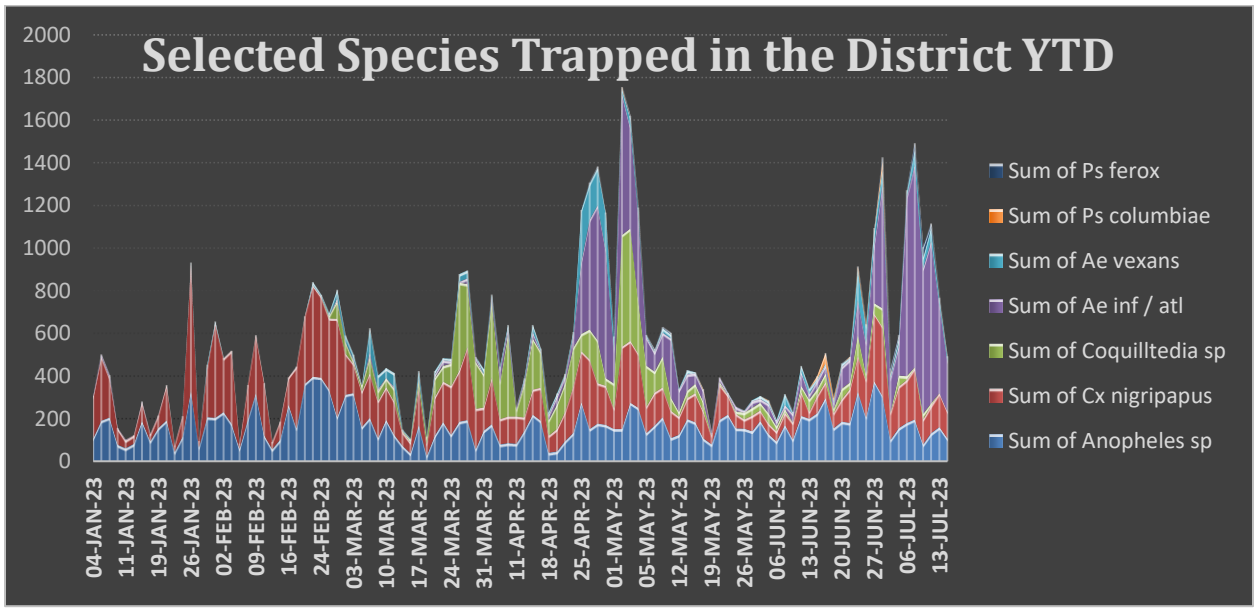


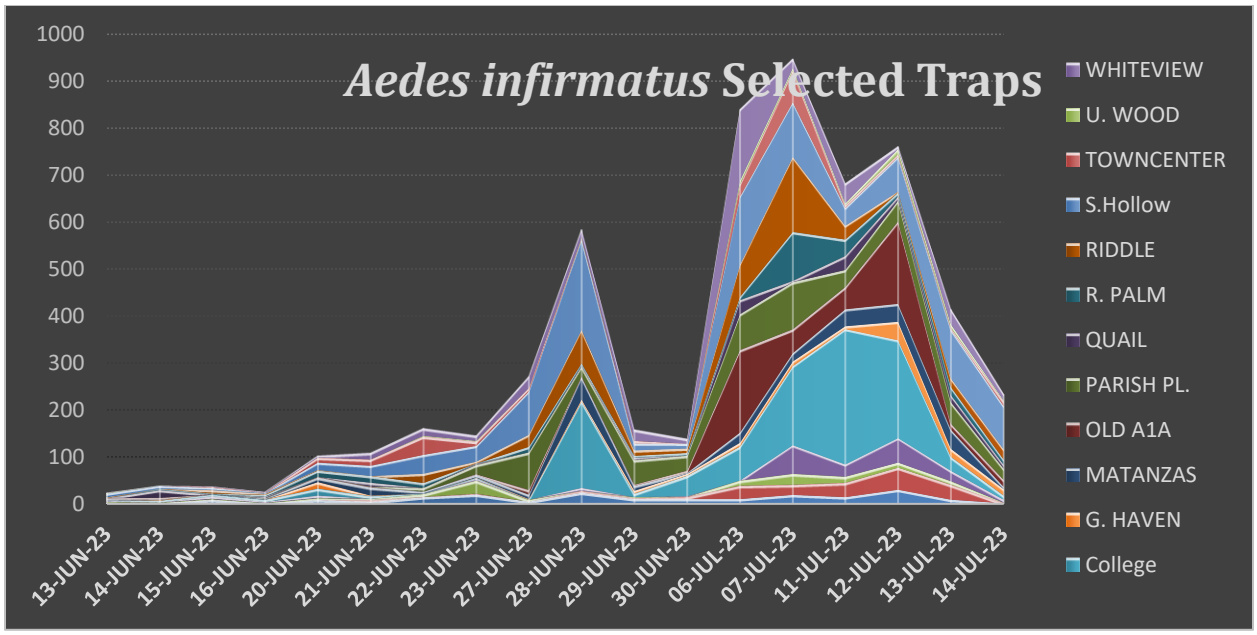
Week of 7/12/2023 Operations Update (28)

Third week of elevated floodwater mosquito activity and another round of aerial adulticiding. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).



While the presence of *Aedes infirmatus* has been sustained for several weeks, this week ended with this population in particular and the overall mosquito population much reduced (chart below).





EEEV activity: One human case of EEEV infection was reported this week in St. Johns County.

Malaria Cases Acquired in Florida: One case of locally acquired malaria was reported this week in Sarasota County. In 2023, seven cases of locally acquired malaria have been reported, all in Sarasota County

Read the report here

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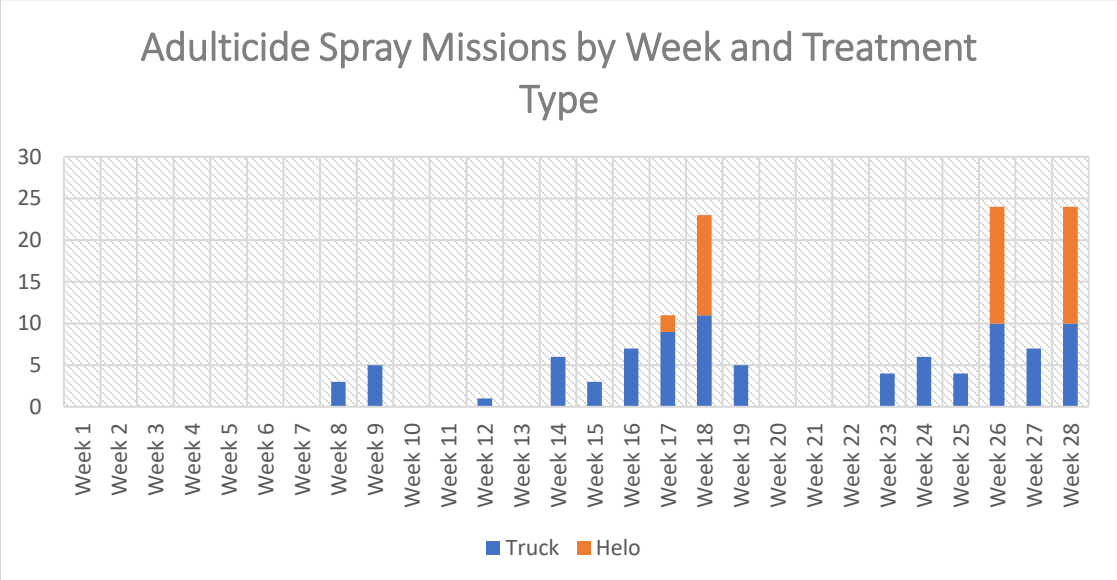
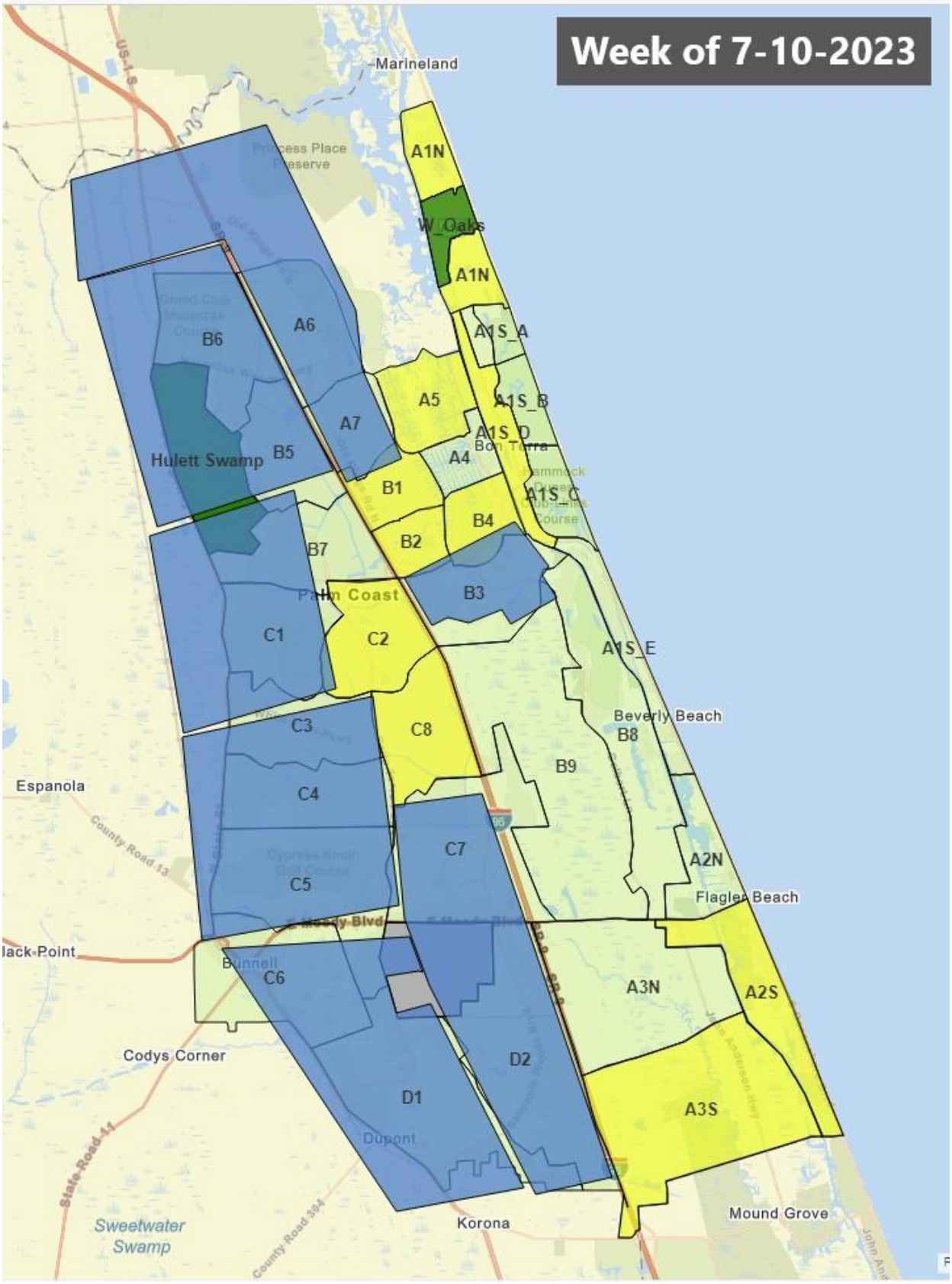
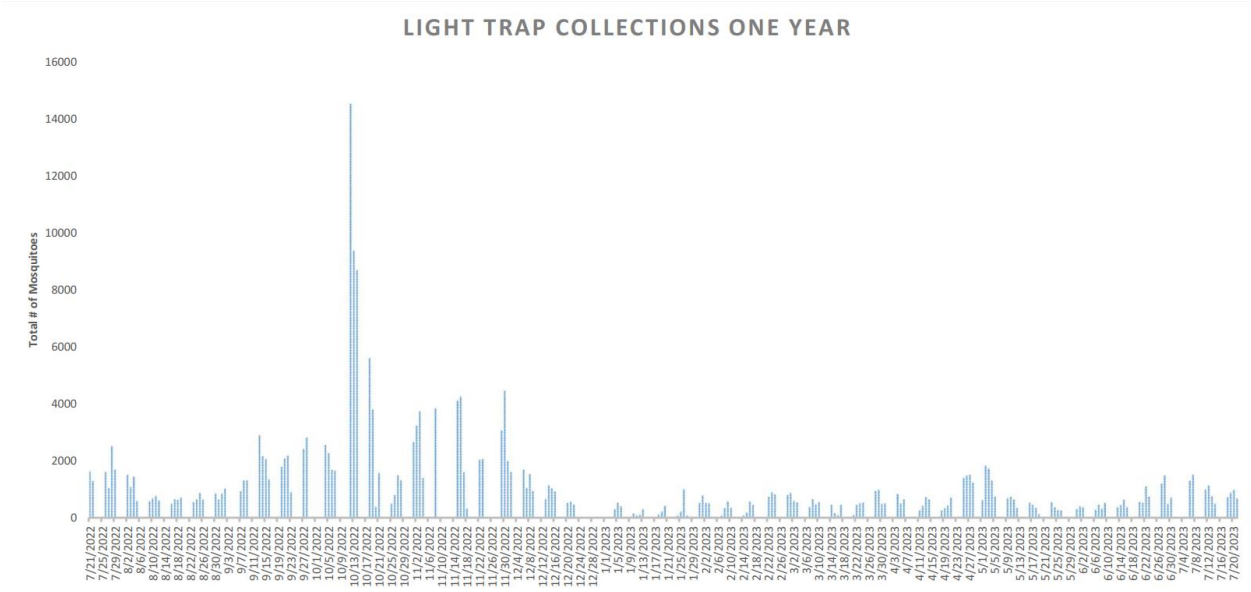


Zones highlighted in yellow were treated by truck this week.

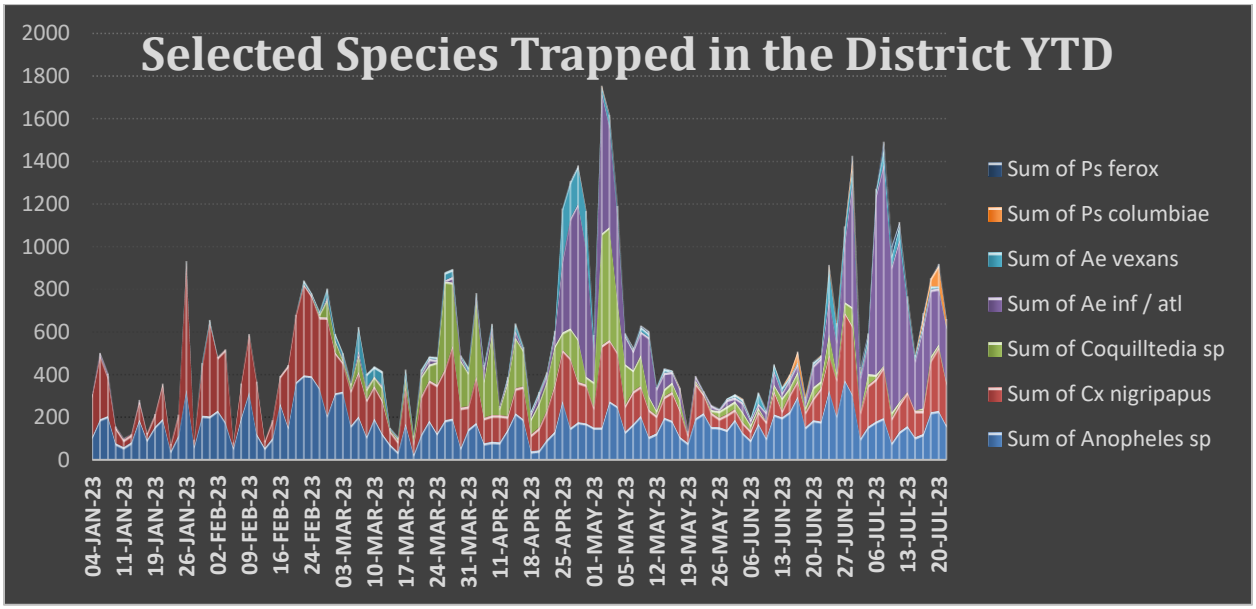


Week of 7/17/2023 Operations Update (29)

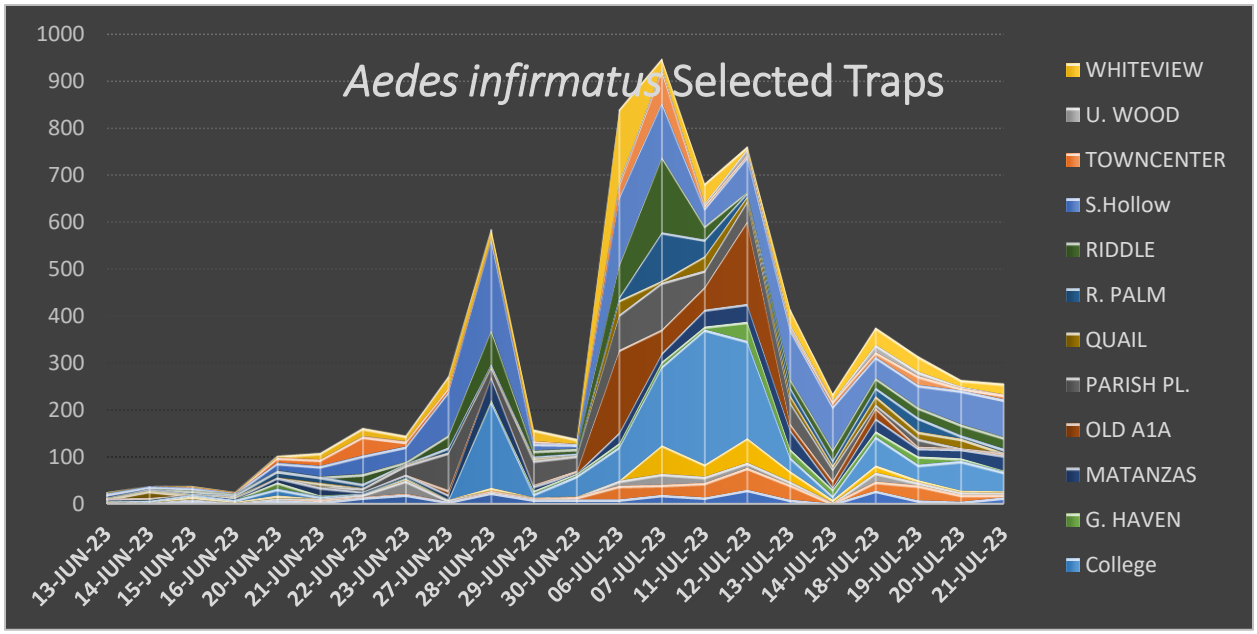
This week saw a persistent residual of *Aedes infirmatus*, increased *Culex spp.* and the addition of *Psorophora columbiae*. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).

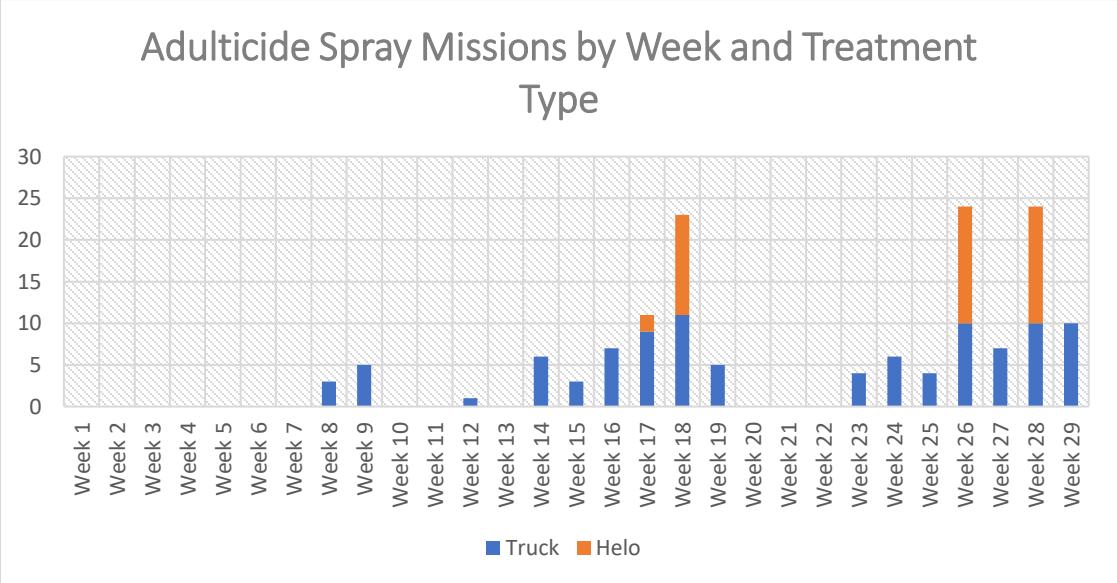


This week saw a widespread presence of *Aedes infirmatus* but at lower numbers compared to the previous week (chart below). A marked increase in *Culex nigripalpus* indicates the persistence of standing water.

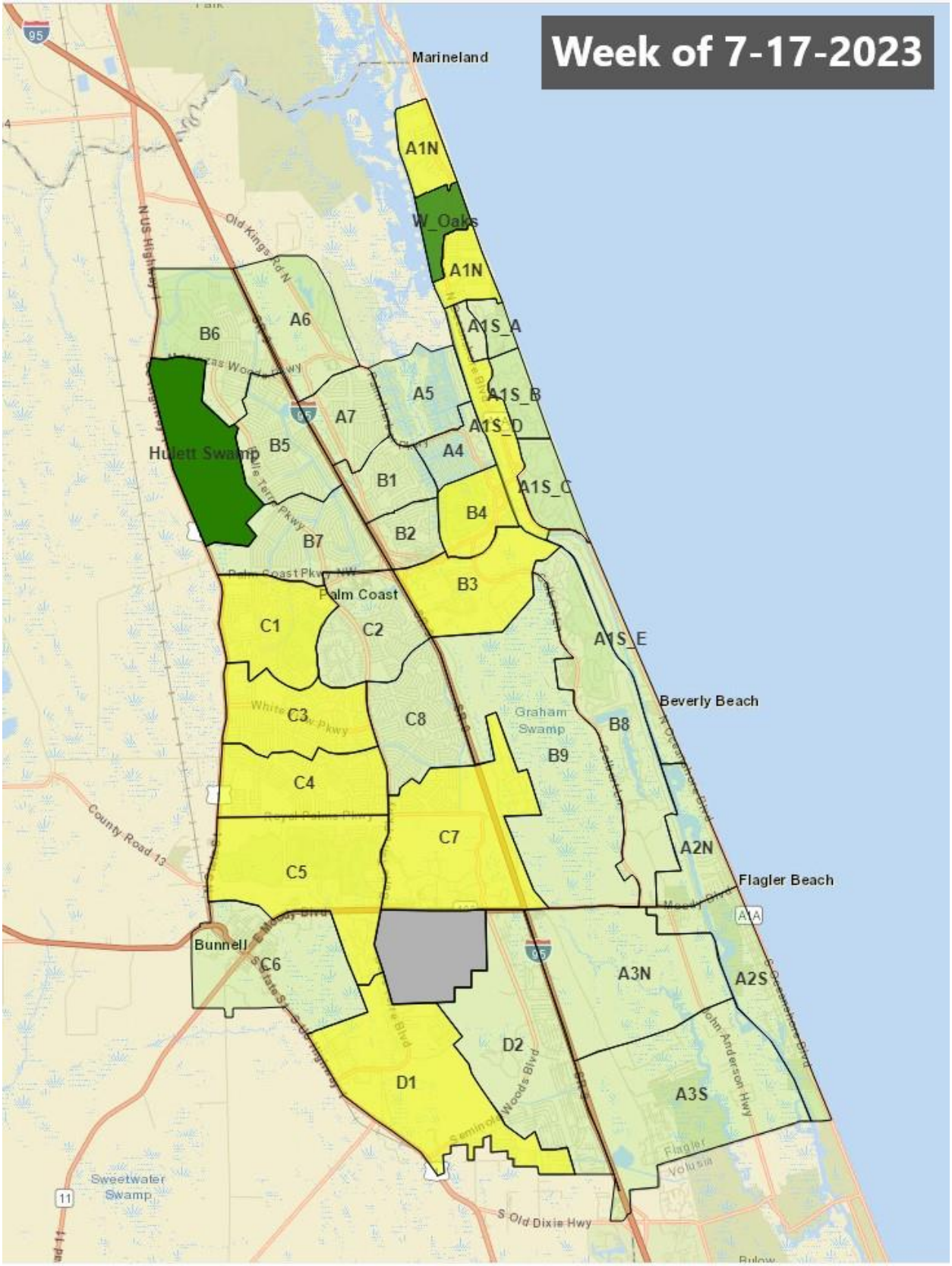


While much reduced in most zones, the population of *Aedes infirmatus* remains elevated overall.



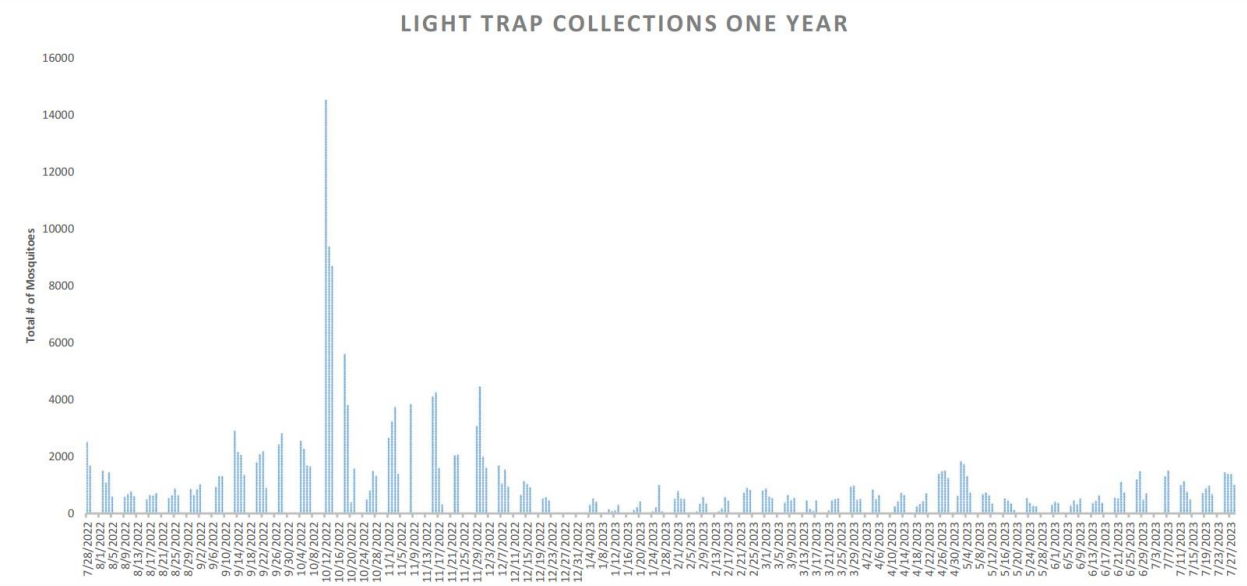


Zones highlighted in yellow were treated by truck this week.

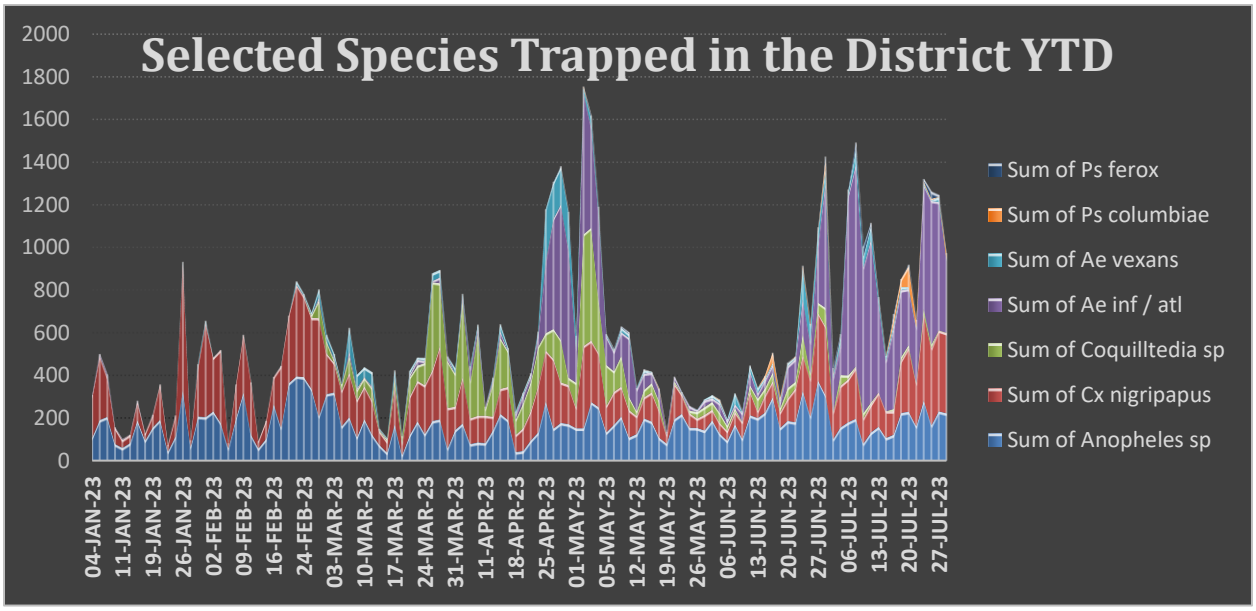


Week of 7/24/2023 Operations Update (30)

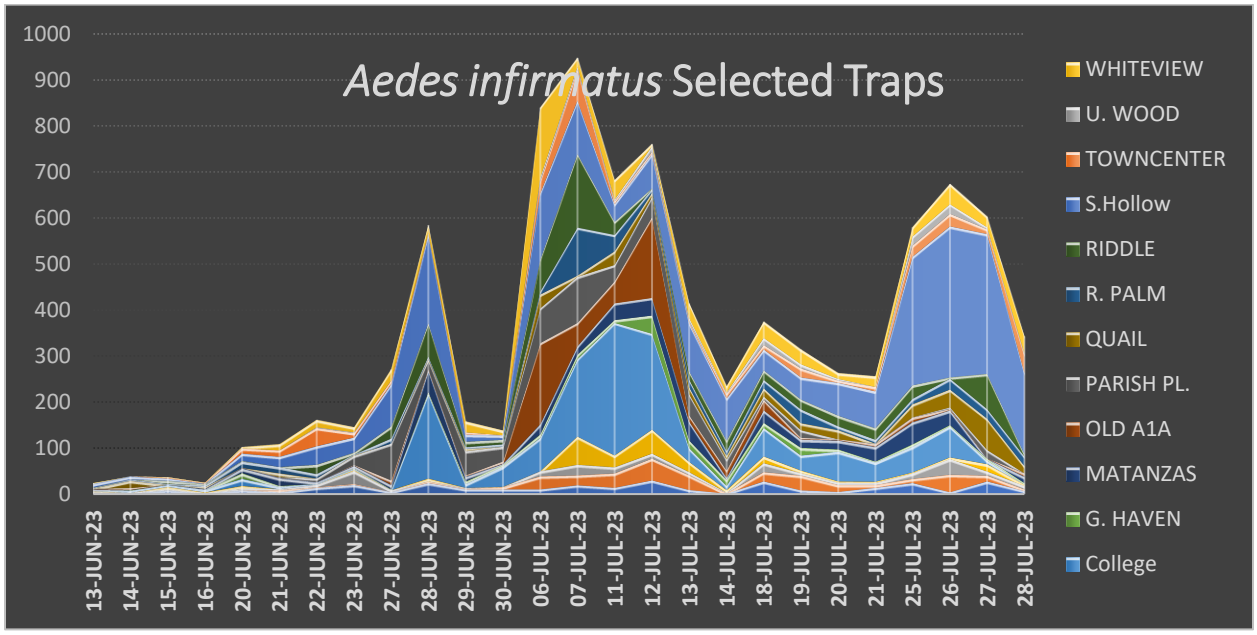
This week saw another surge of *Aedes infirmatus*, but this time highly localized. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).



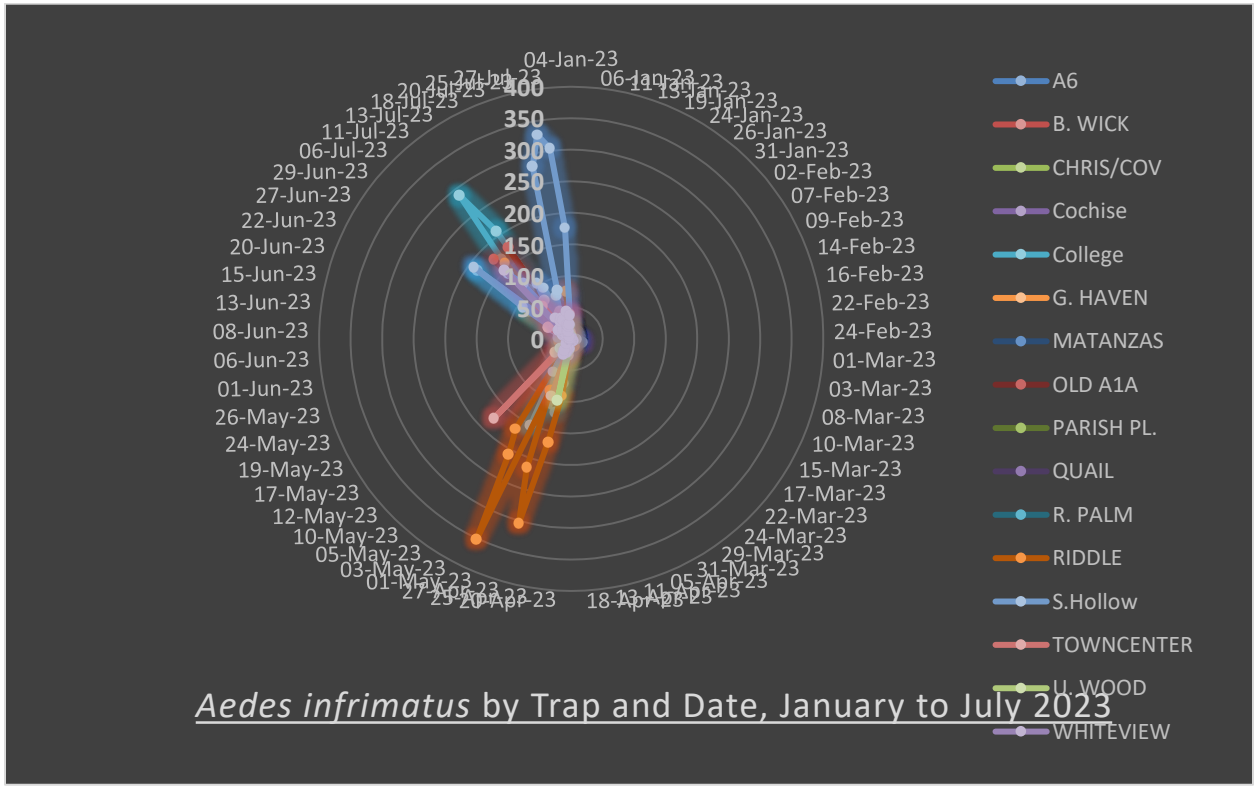
The month of July has been plagued with repeated spikes in floodwater mosquitoes reflecting the frequent and intense, but localized rainfall.

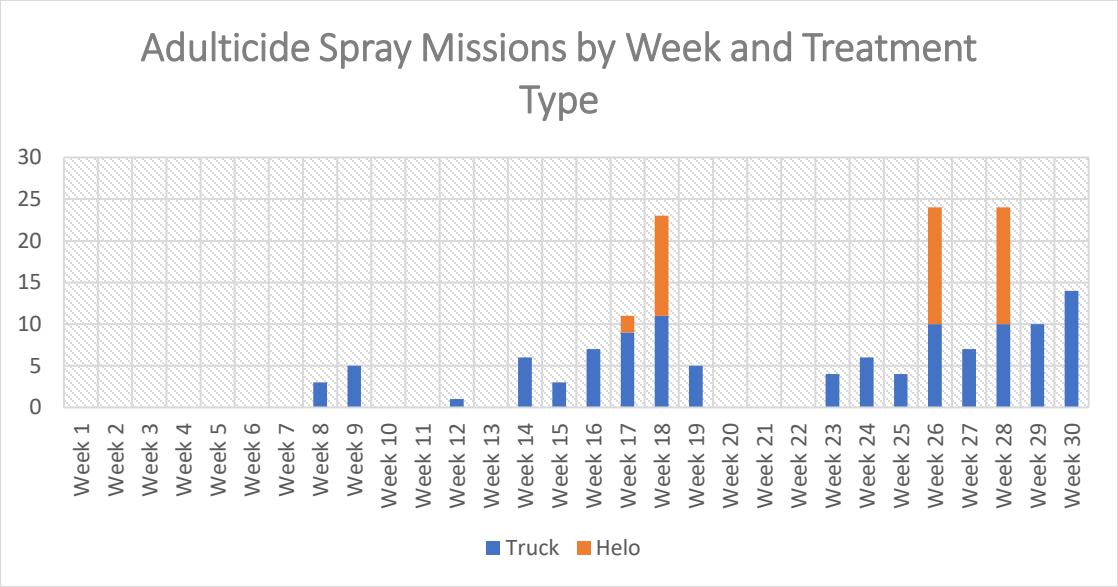


Unlike in previous weeks, *Aedes infirmatus* was most abundant in just one location, that being the most southern portion of the District.

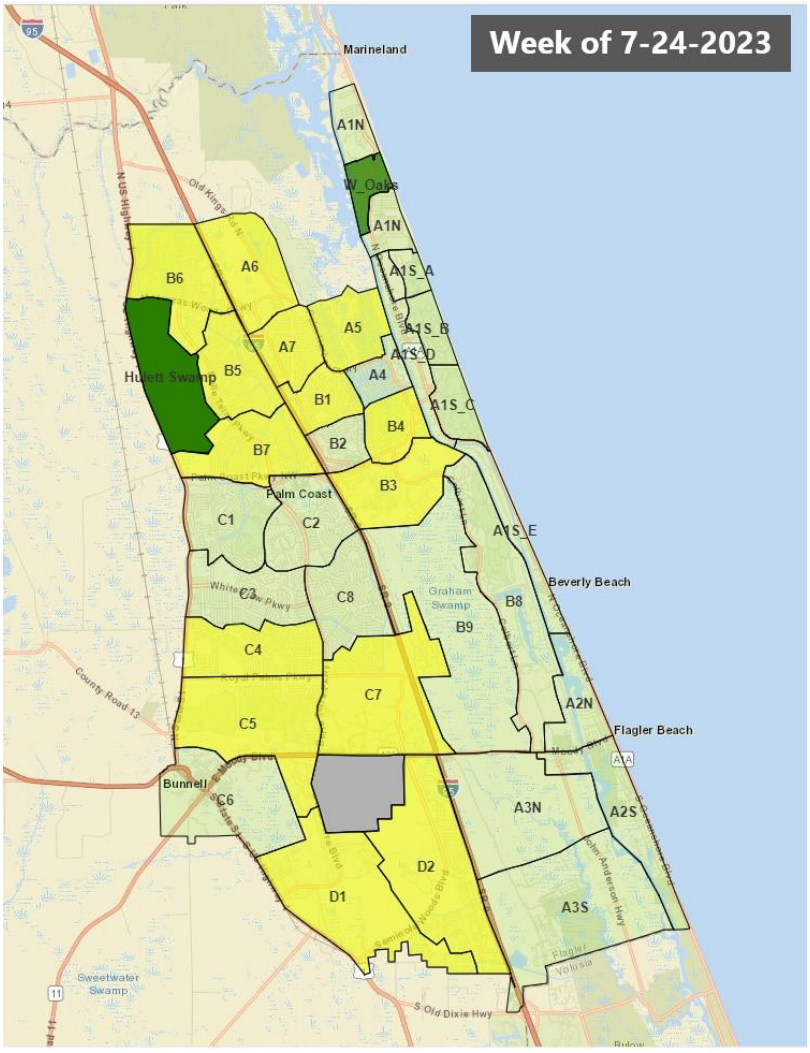


Because rain events can be highly localized, the emergence of floodwater mosquitoes can be extreme but also highly focused in location as this week's trap data reflects. We can more clearly see this in the radar chart below showing the different peaks in *Aedes infirmatus* population throughout the year occurring in different locations.



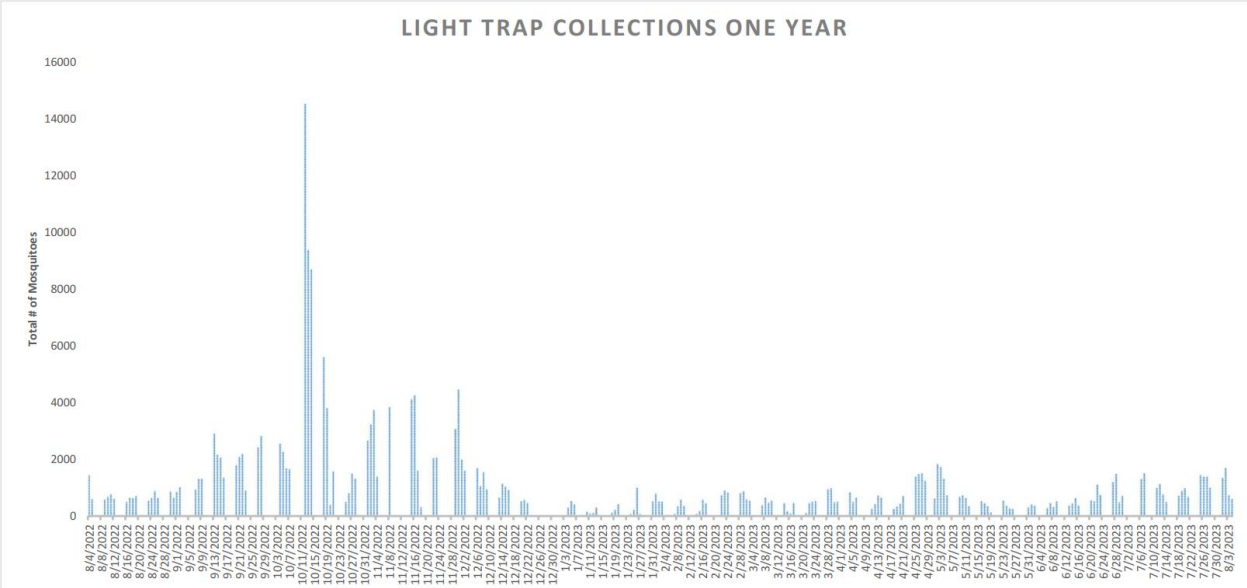


Zones highlighted in yellow were treated by truck this week.

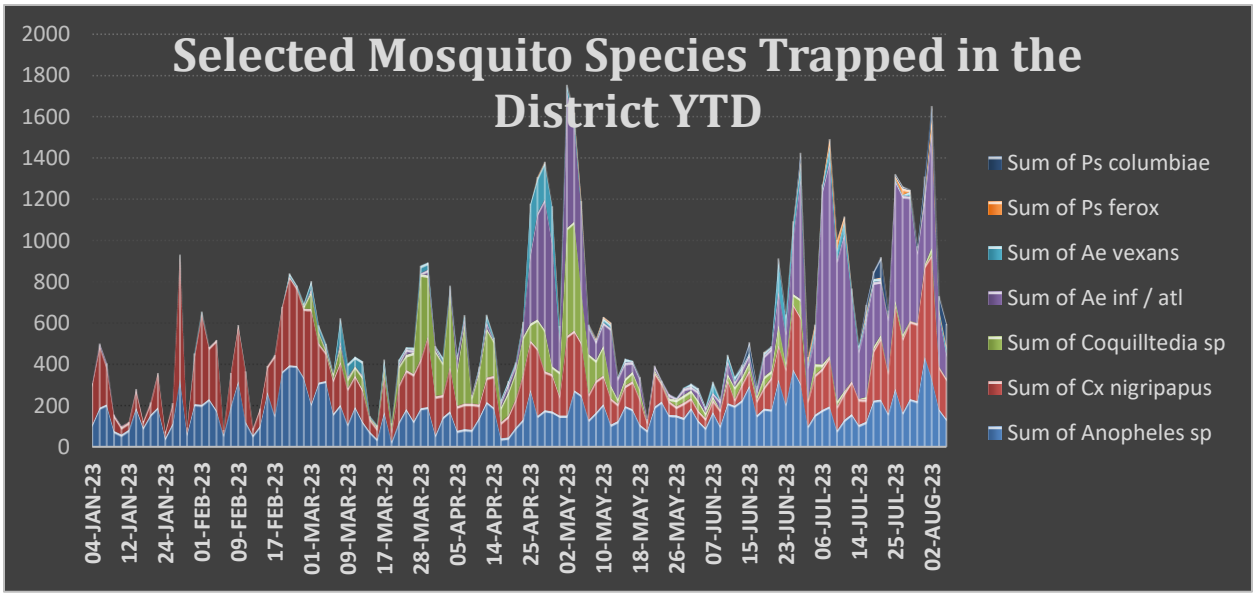


Week of 7/31/2023 Operations Update (31)

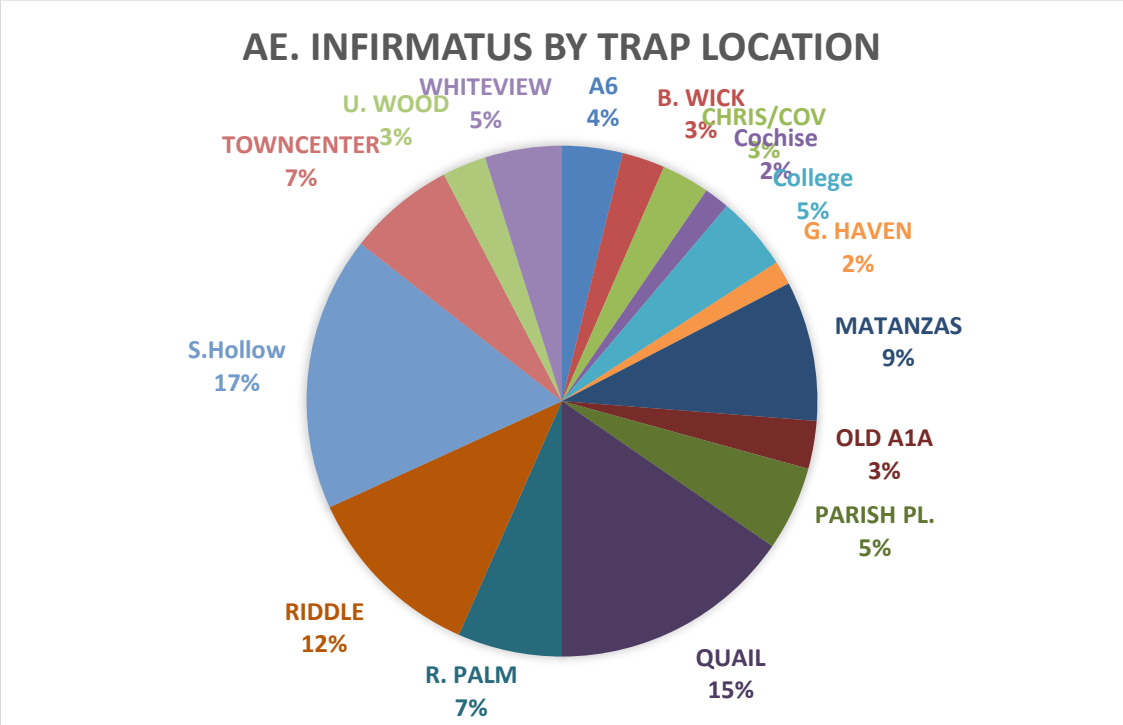
Another week *Aedes infirmatus* abundance in the District. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).

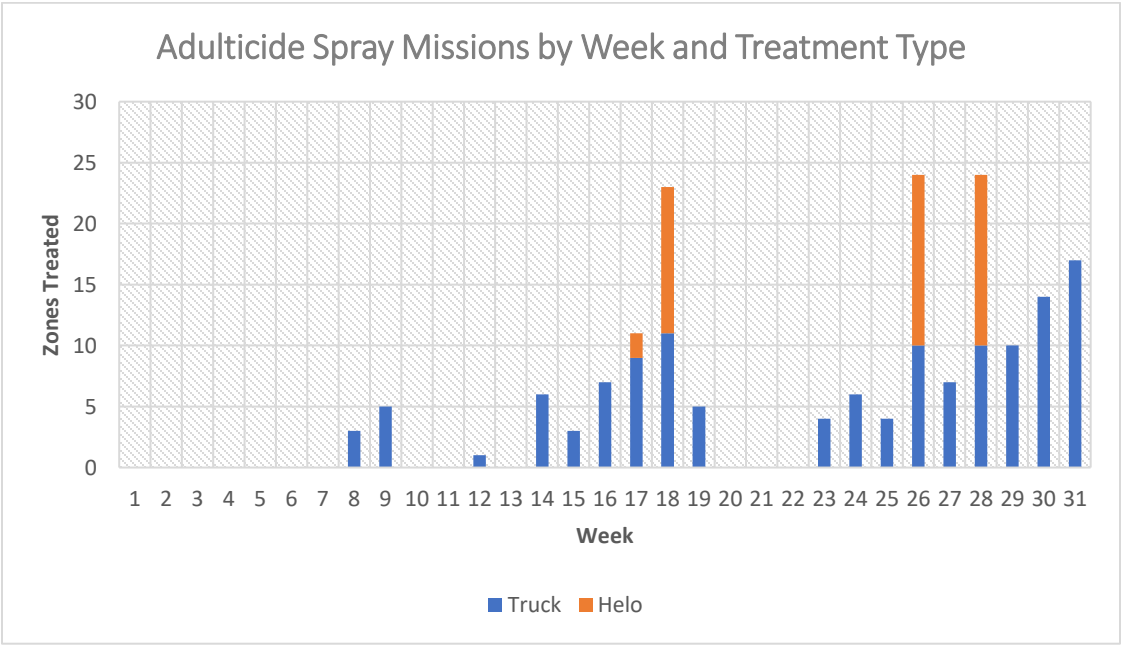


The flood water species *Aedes infirmatus* has been prevalent in traps since the end of June. Repeated spikes in floodwater mosquitoes reflects the frequent and intense rainfall.

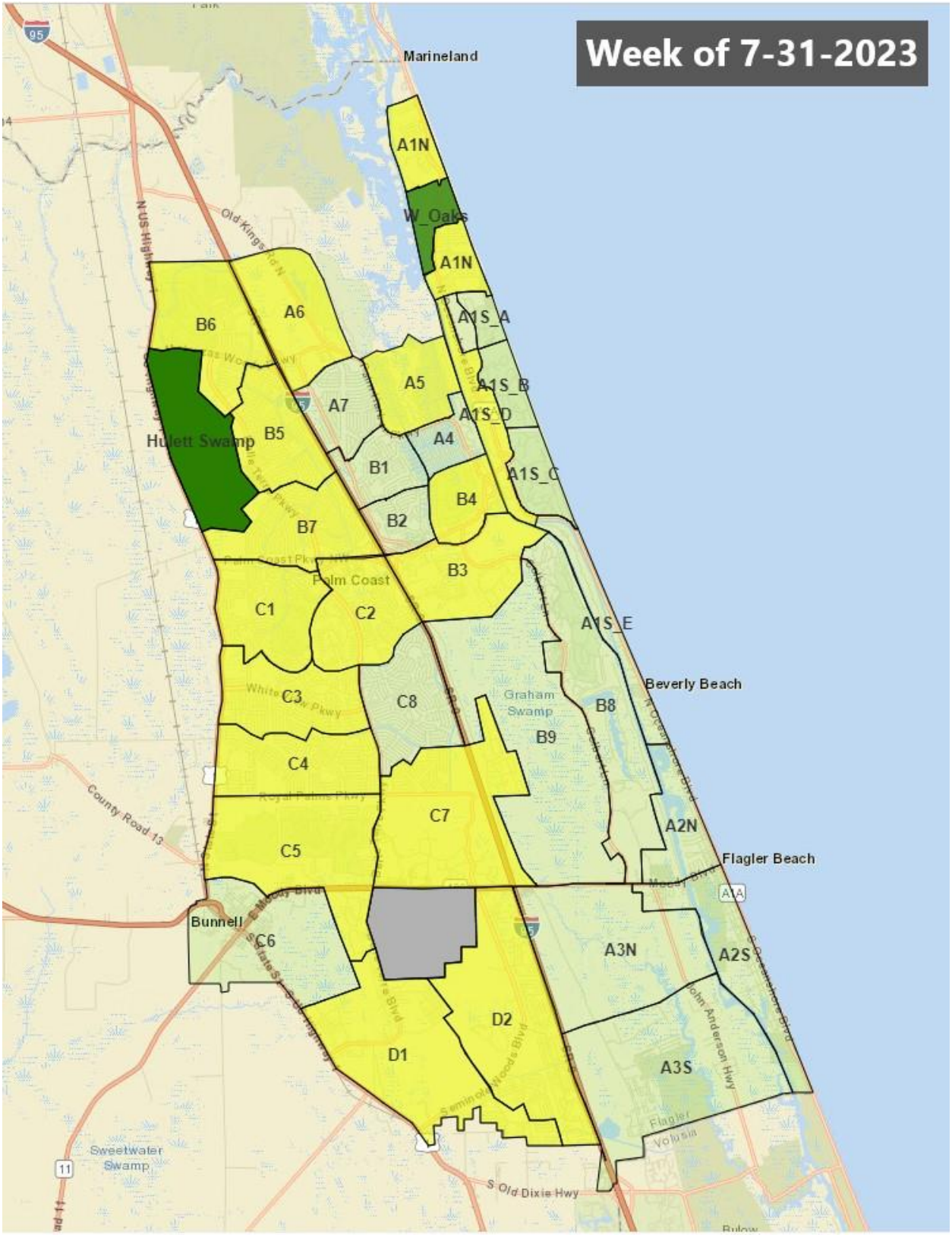


The flood water species *Aedes infirmatus* was well distributed this week after being highly localized the previous week.



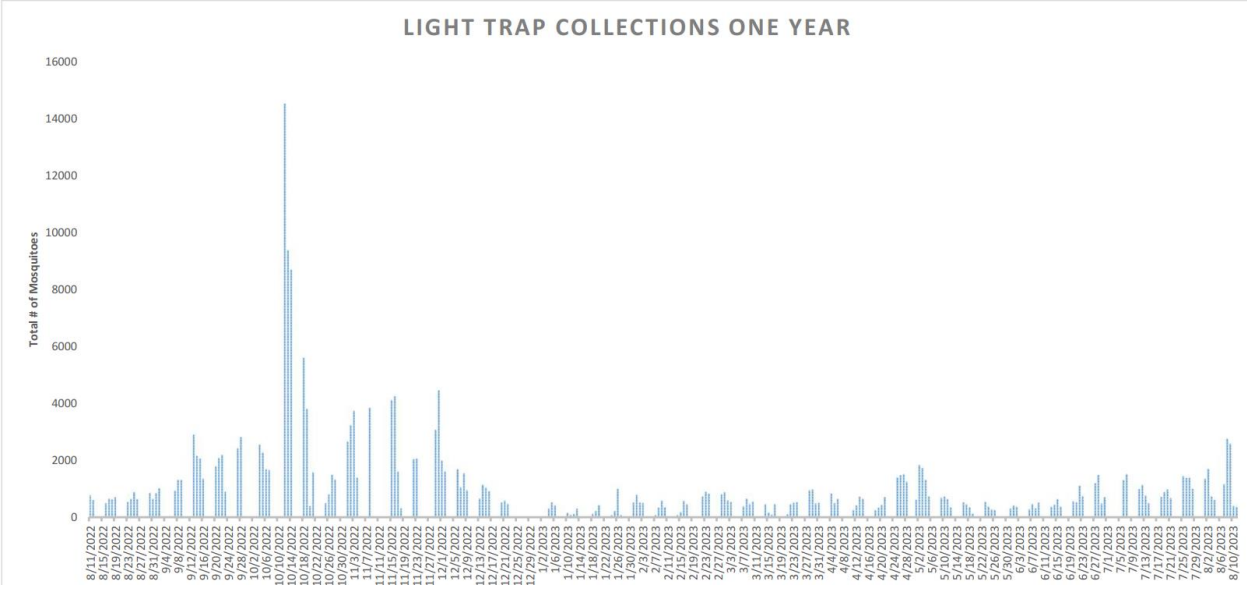


Zones highlighted in yellow were treated by truck this week.

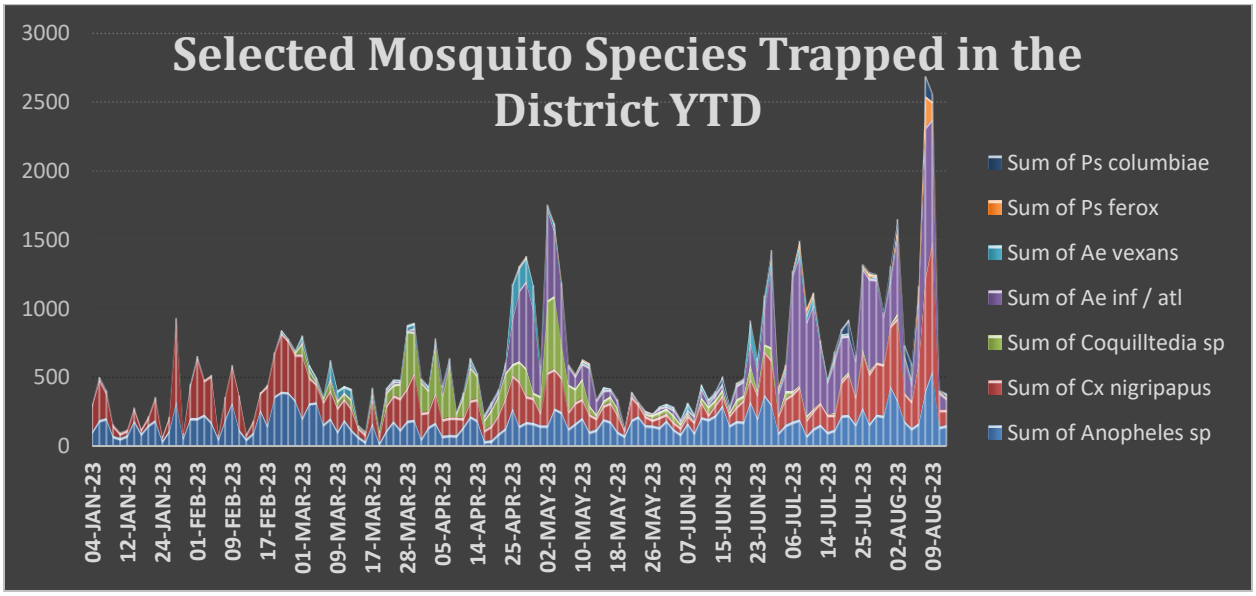


Week of 8/7/2023 Operations Update (32)

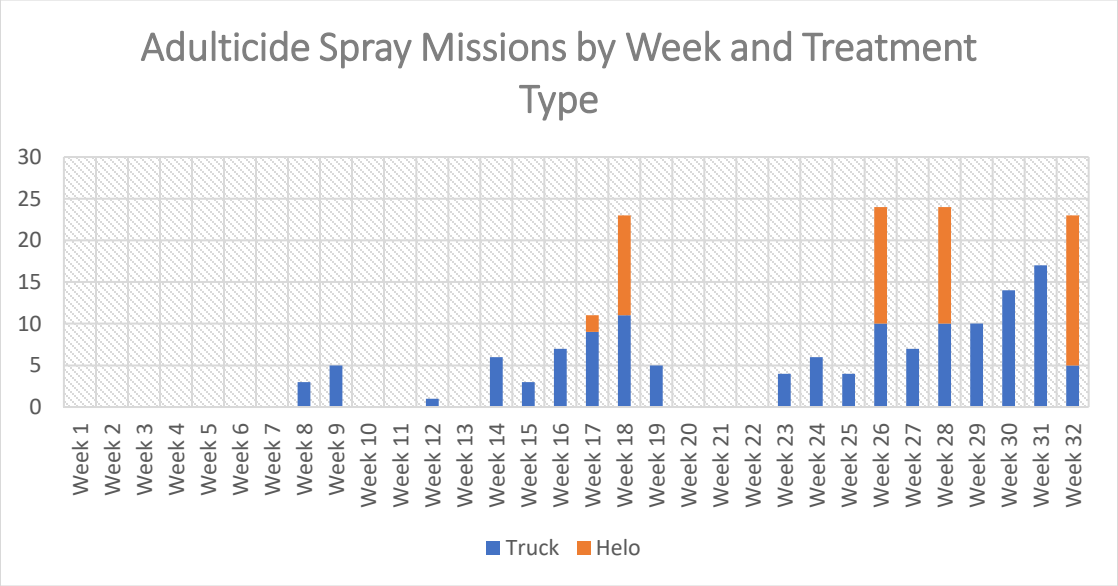
After finishing last week with a precipitous drop in mosquito activity another surge occurred this week with additional species. We responded with District-wide aerial adulticiding to again bring the population of mosquitoes back down. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).



After registering a drop in the overall mosquito population by the end of last week with two species in the majority, this week saw a large spike in mosquito activity with additional flood-water species.

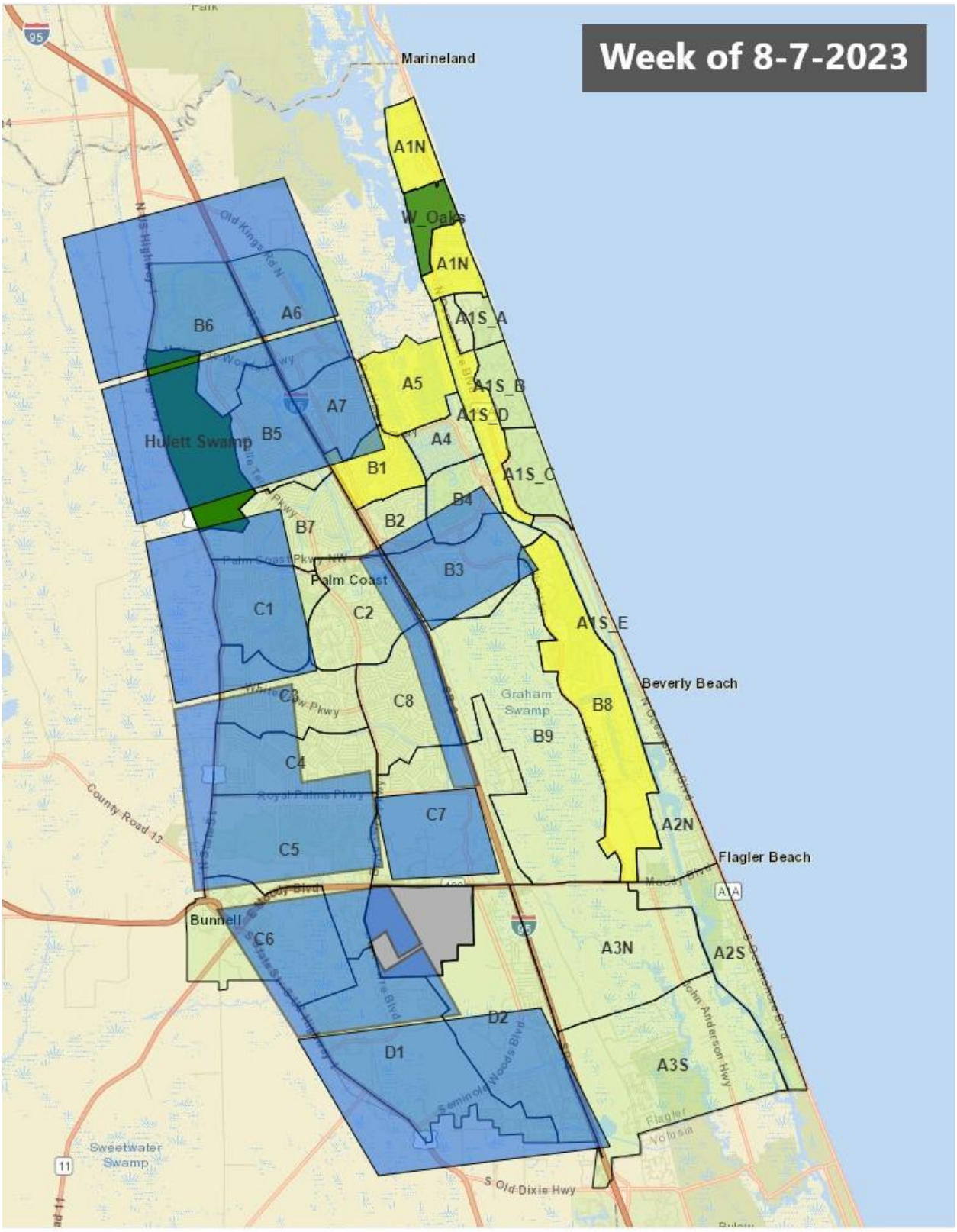


This week was hot and dry. Flagler County was issued Excessive Heat Warnings consecutively through that period (8/7 thru 8/14). Excessive Heat Warnings are issued when the heat index numbers are expected to approach and be greater than 113 degrees. According to the NWS our first excessive heat warning ever issued for Flagler County was in July this year. Excessive heat warnings were issued for 7 days in a row in August.



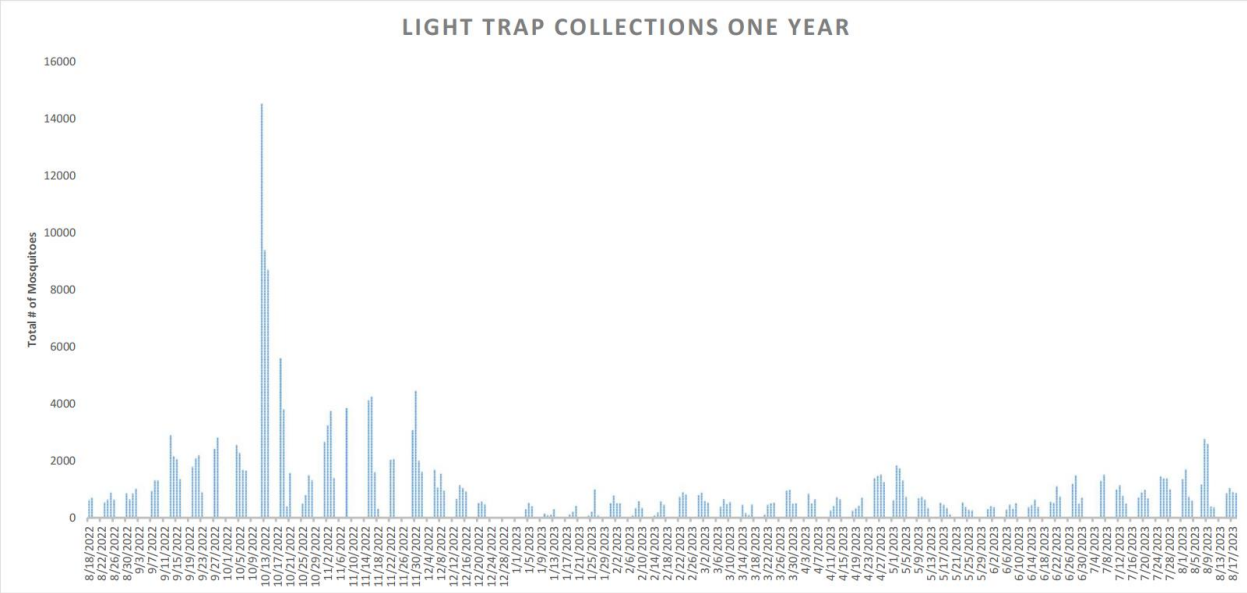
One case of locally acquired dengue was reported this week in Miami Dade County. In 2023, 11 cases of locally acquired dengue have been reported in Broward (2) and Miami-Dade (9) with onsets in January, March, June (3), and July (6). See the full DOH report

Zones highlighted in yellow were treated by truck this week.

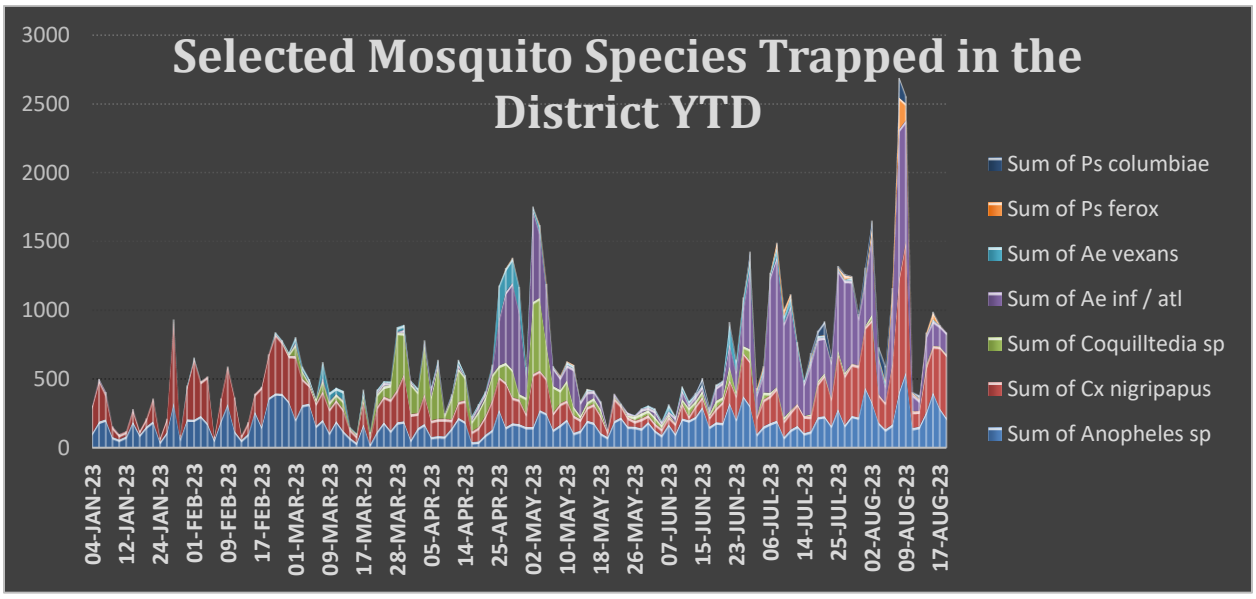


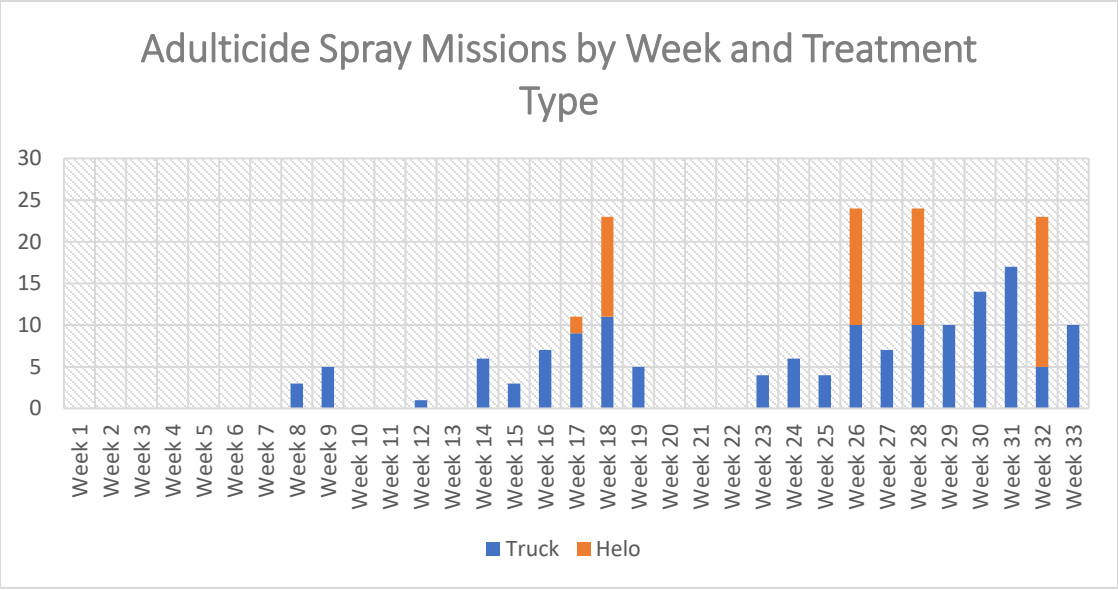
Week of 8/14/2023 Operations Update (33)

Mosquito activity was much reduced this week with *Culex nigripalpus* being the most prevalent species in the traps. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).



This week there were less mosquitoes in both total numbers and different species than last week.



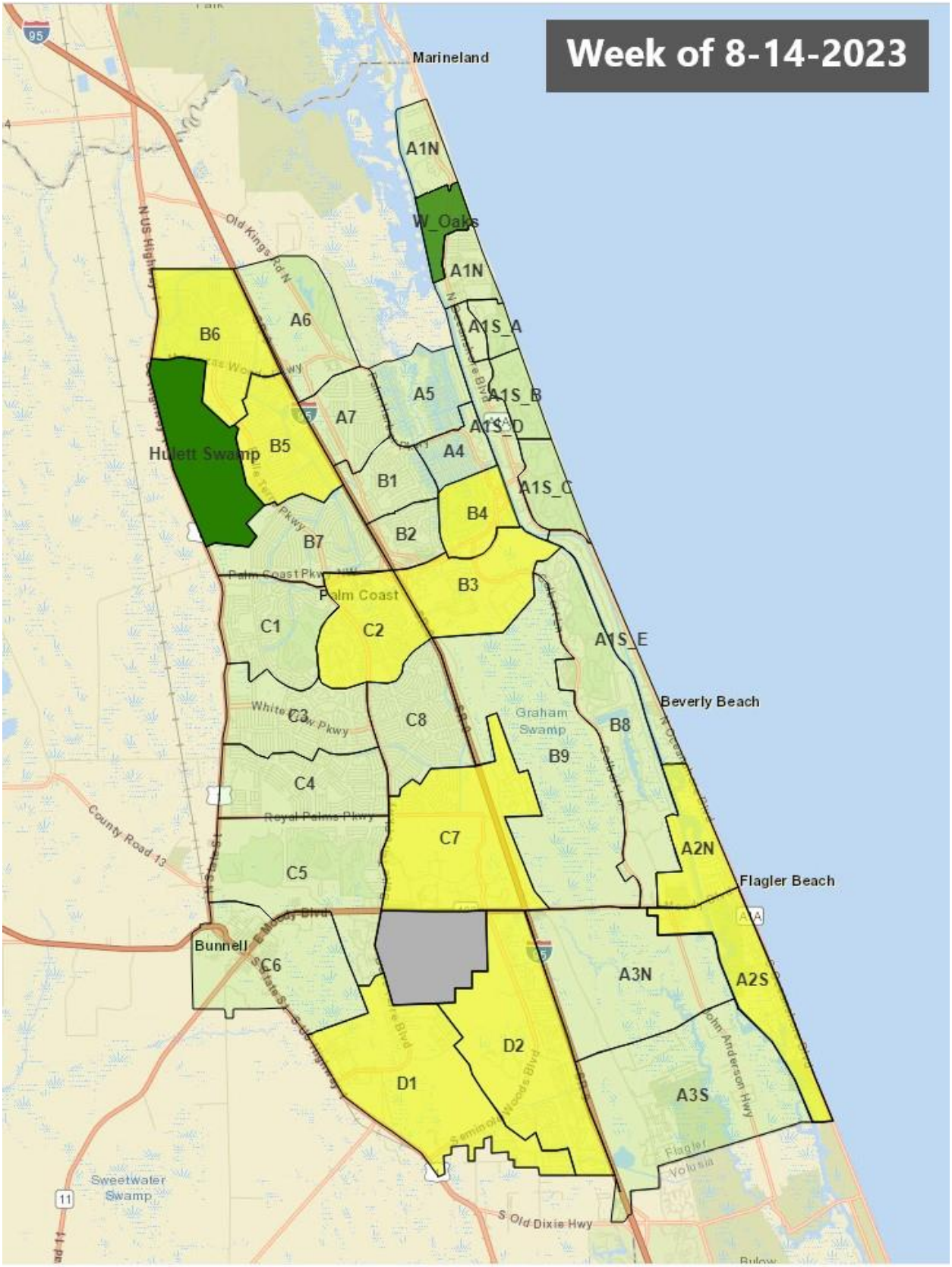


Two human cases of WNV infection were reported this week in Bay and Escambia counties. In 2023, Three cases of WNV illness acquired in Florida have been reported in Escambia County with onset in July (2) and August. One asymptomatic positive blood donor has been reported in Bay County (August).

Four cases of locally acquired dengue were reported this week in Hardee, Miami-Dade, and Polk counties. In 2023, 15 cases of locally acquired dengue have been reported in Broward (2), Hardee, Miami-Dade (11) and Polk counties with onsets in January, March, June (3), and July (10).

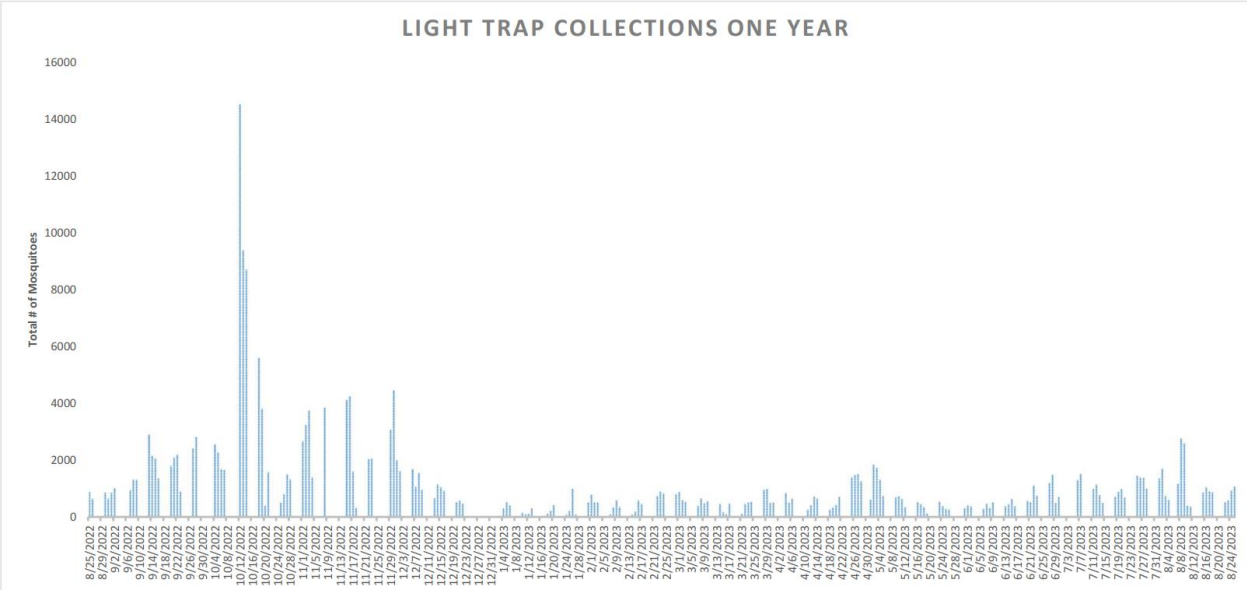
Advisories/Alerts: Bay, Hardee, Jefferson, Nassau, Orange, Polk, St. Johns, and Walton counties are currently under a mosquito-borne illness advisory. Broward, Escambia, Manatee, Miami-Dade, and Sarasota counties are currently under a mosquito-borne illness alert. See the full DOH Report

Zones highlighted in yellow were treated by truck this week.

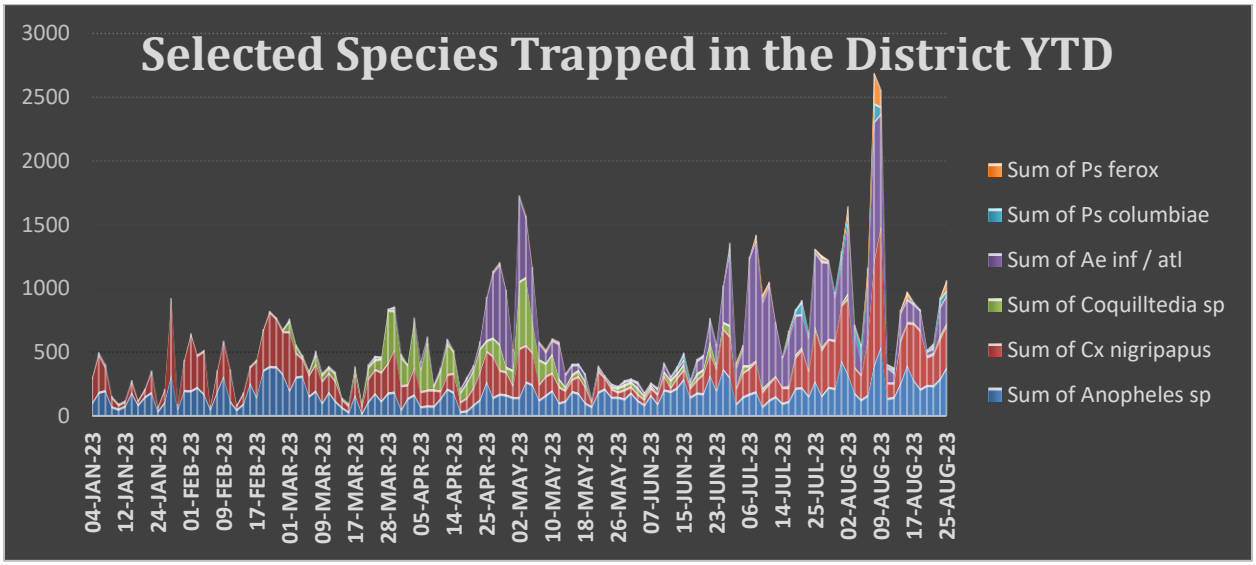


Week of 8/21/2023 Operations Update (34)

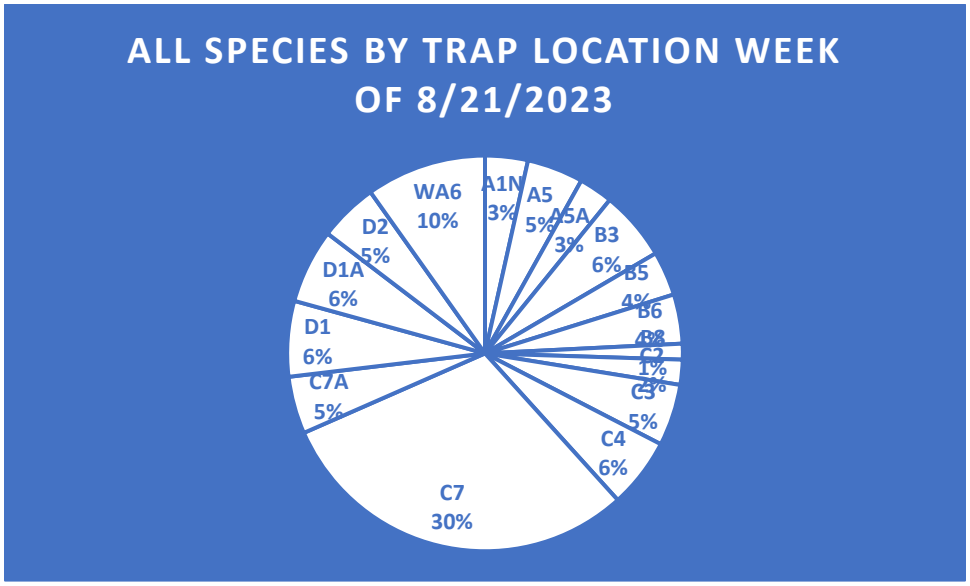
Mosquito activity was primarily in one zone this week. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).

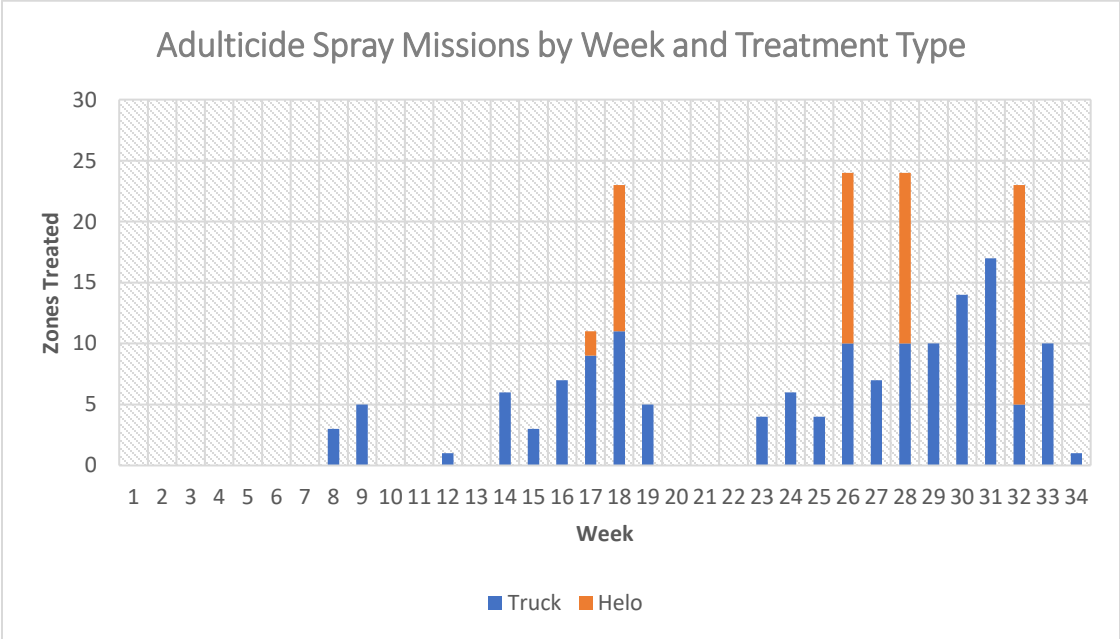


Several floodwater species were in abundance and *Culex nigripalpus* was prevalent in one zone with adulticiding performed in just that zone.



Town Center, Zone C7, has multiple developement projects ongoing and this may have been the causal factor for the focused abundance in just one location this week.





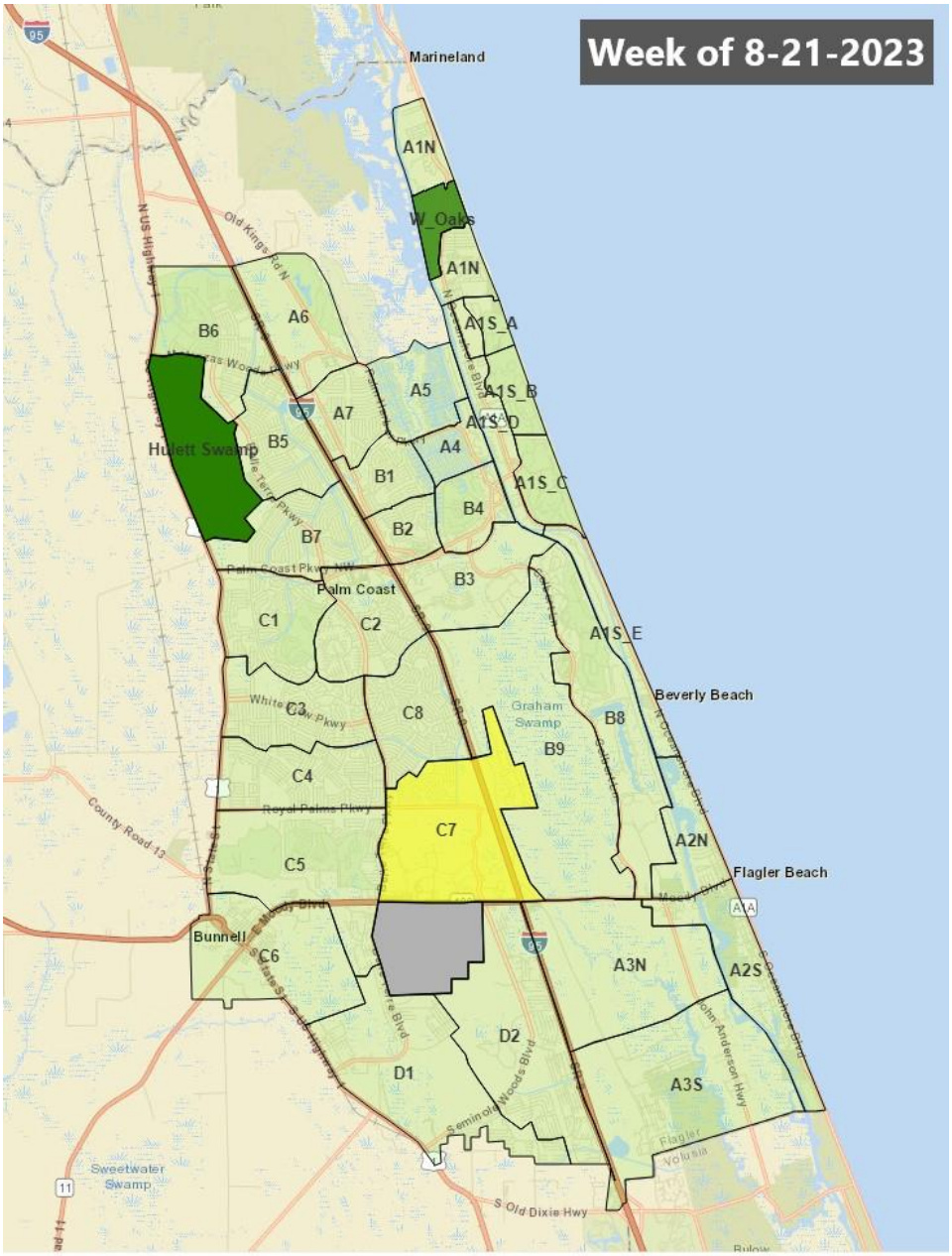
One human case of EEEV infection was reported this week in Suwannee County.

One case of locally acquired Dengue was reported this week in Miami-Dade County. In 2023, 16 cases of locally acquired dengue have been reported.

Advisories/Alerts: Bay, Hardee, Jefferson, Nassau, Orange, Polk, St. Johns, Suwannee, and Walton counties are currently under a mosquito-borne illness advisory. Broward, Escambia, Manatee, Miami-Dade, and Sarasota counties are currently under a mosquito-borne illness alert. No other counties are currently under a mosquito-borne illness advisory or alert.

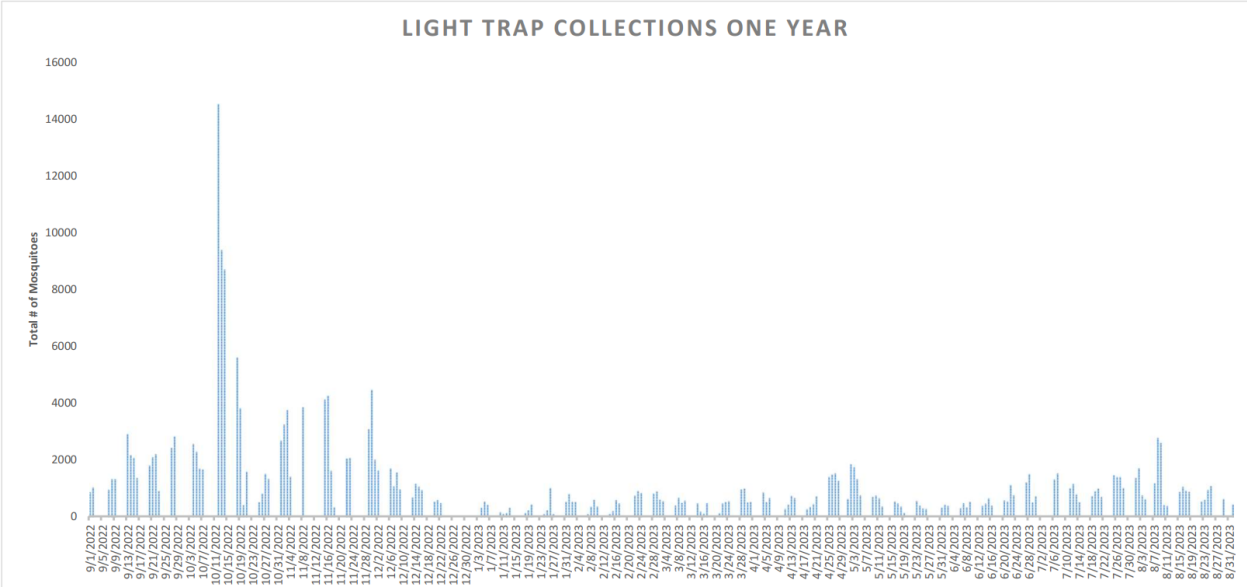
See the full DOH Report

Zones highlighted in yellow were treated by truck this week.

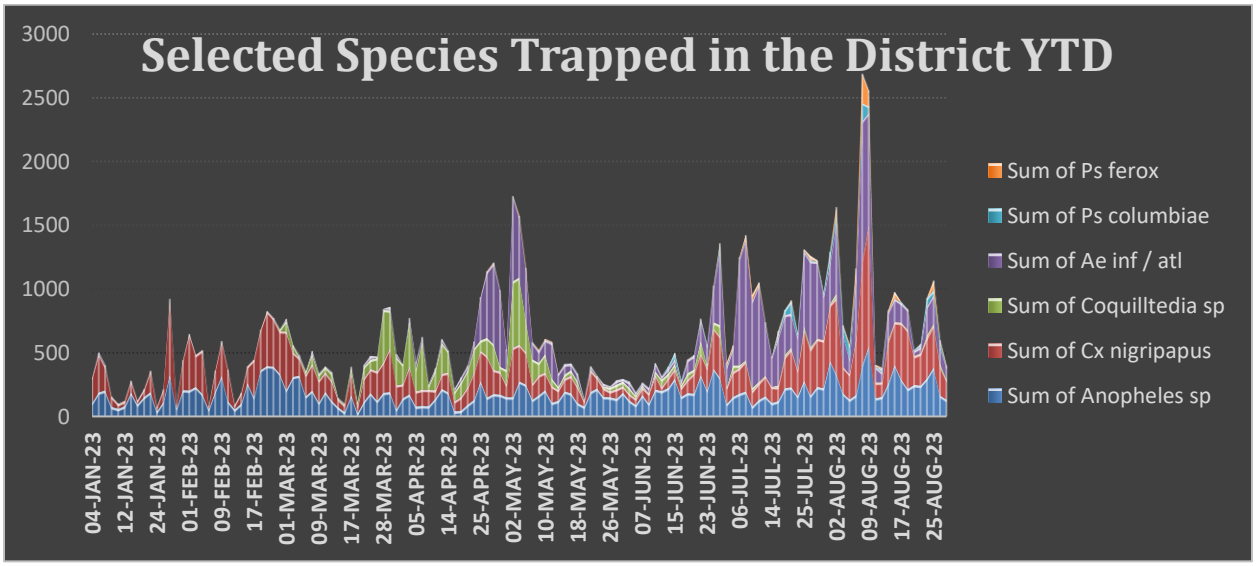


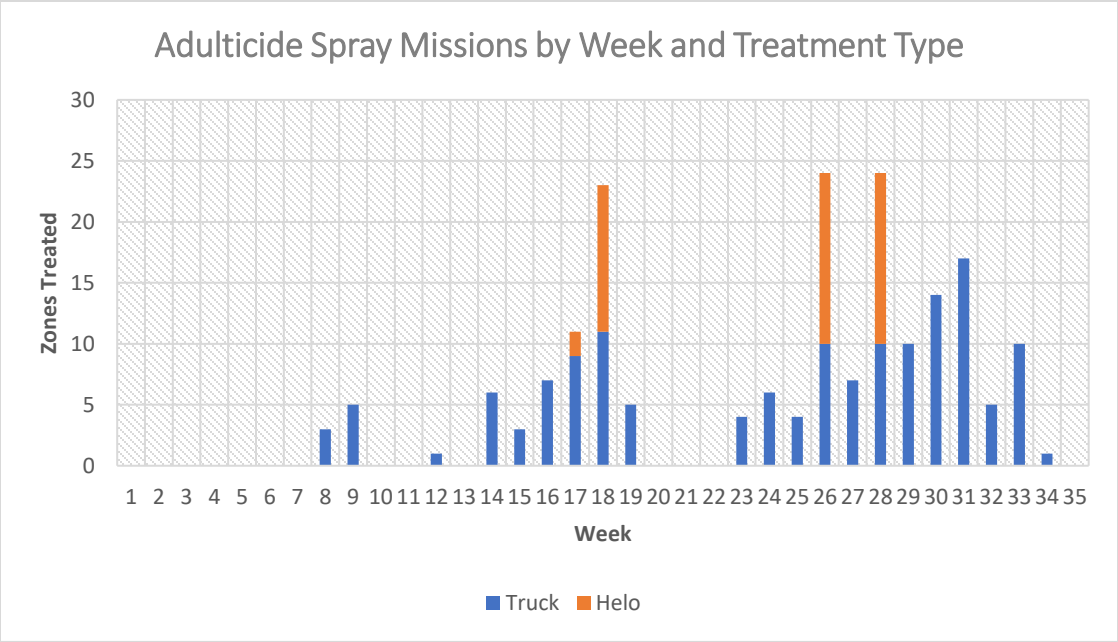
Week of 8/28/2023 Operations Update (35)

Mosquito activity was much reduced this week. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).

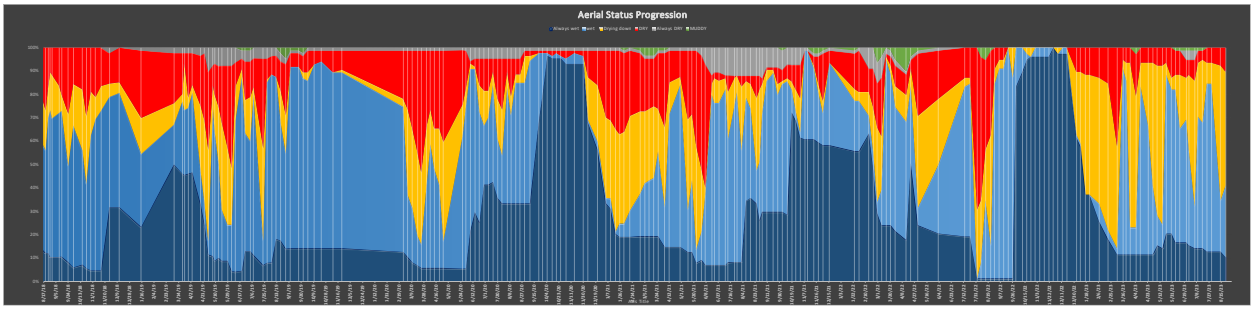


All species were trending lower and no adulticiding was done.





Mosquito breeding sites monitored by helicopter were mostly drying down indicating reduced saltmarsh mosquito production.



Three cases of locally acquired dengue were reported this week in Broward and Miami-Dade counties.

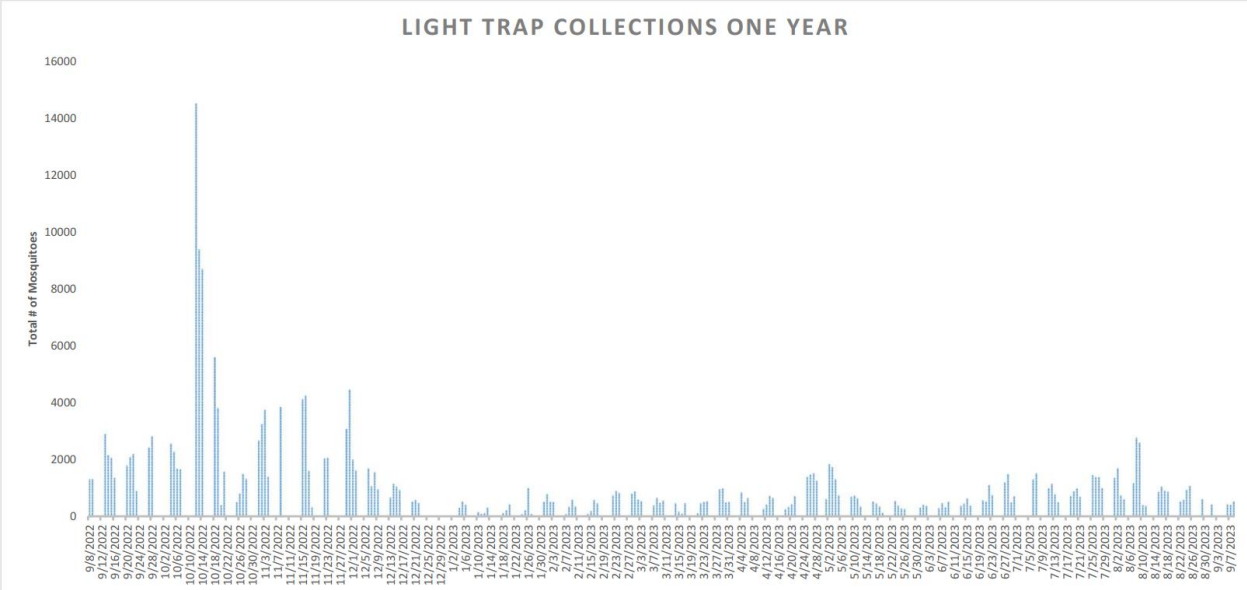
In 2023, 19 cases of locally acquired dengue have been reported.

Advisories/Alerts: Bay, Hardee, Jefferson, Nassau, Orange, Polk, St. Johns, Suwannee, and Walton counties are currently under a mosquito-borne illness advisory. Broward, Escambia, Manatee, Miami-Dade, and Sarasota counties are currently under a mosquito-borne illness alert. No other counties are currently under a mosquito-borne illness advisory or alert.

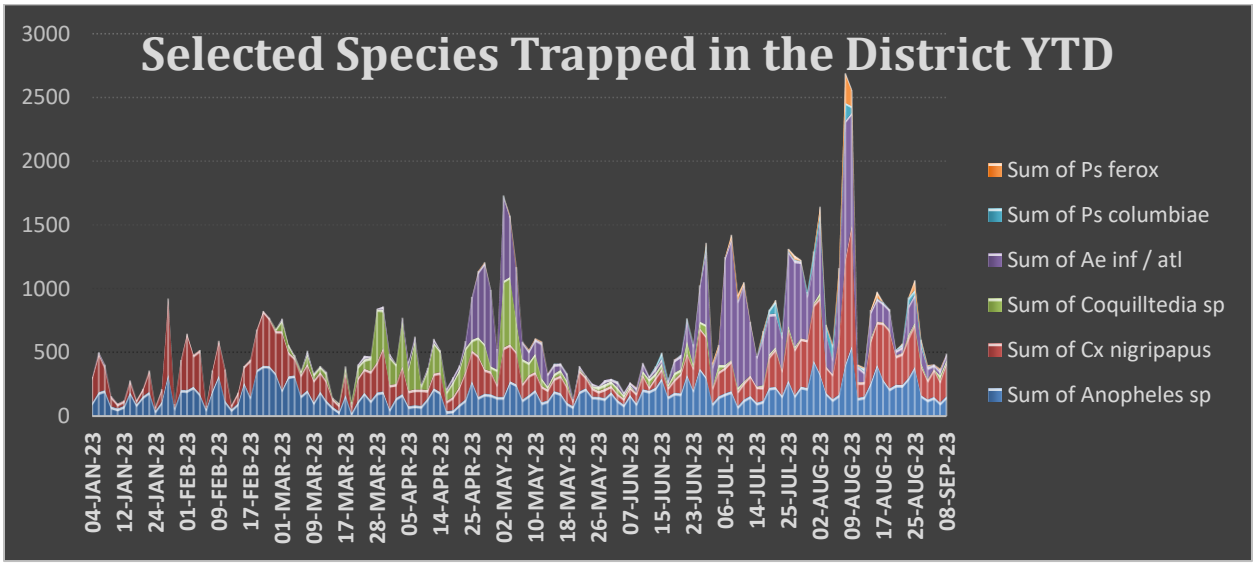
See the full DOH Report

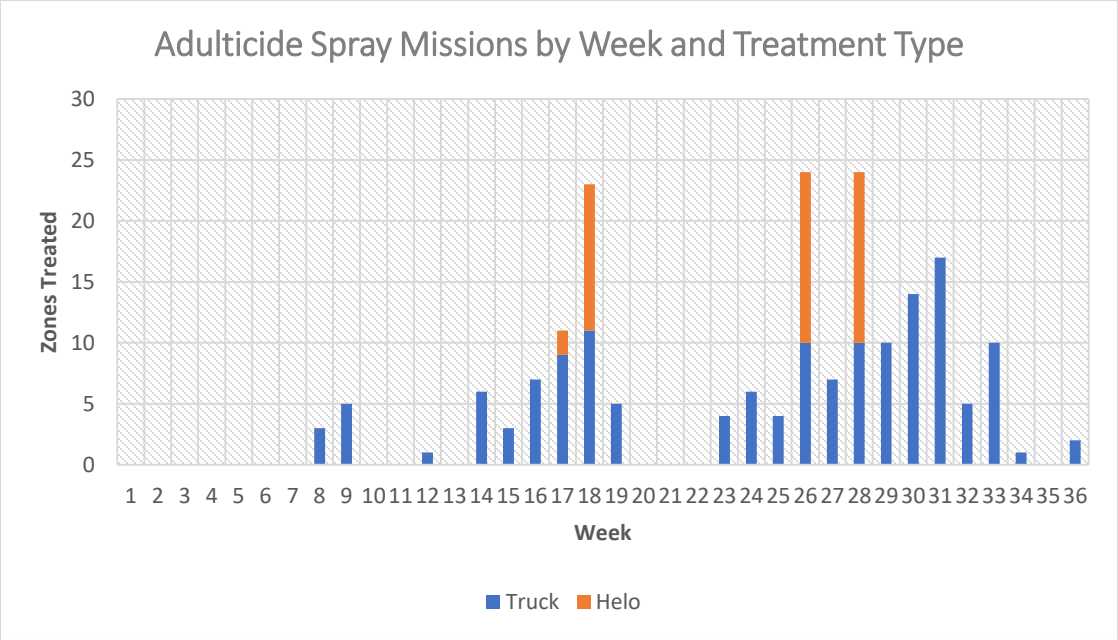
Week of 9/5/2023 Operations Update (36)

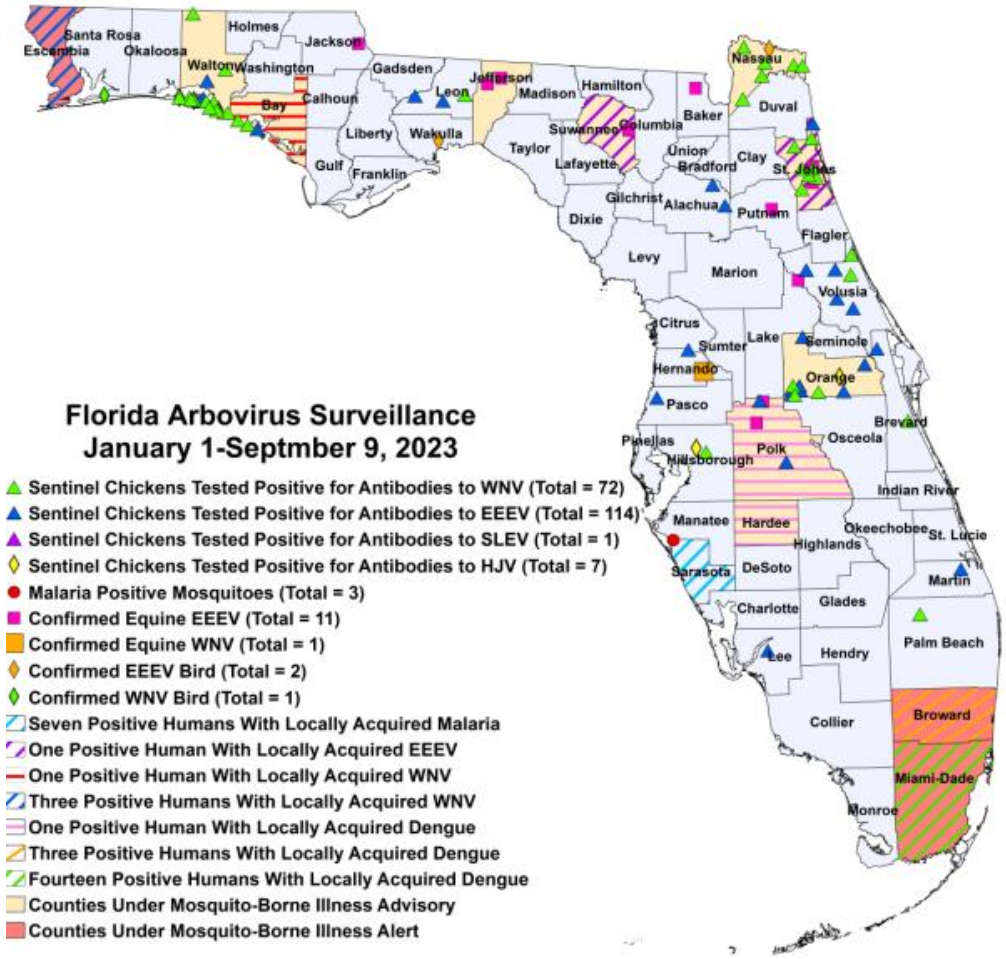
Mosquito activity remained low for a second week. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).



Breeding sites were trending drier which contributes to a reduction in permanent water species of mosquitoes. Limited truck adulticiding was conducted in the south of the District.

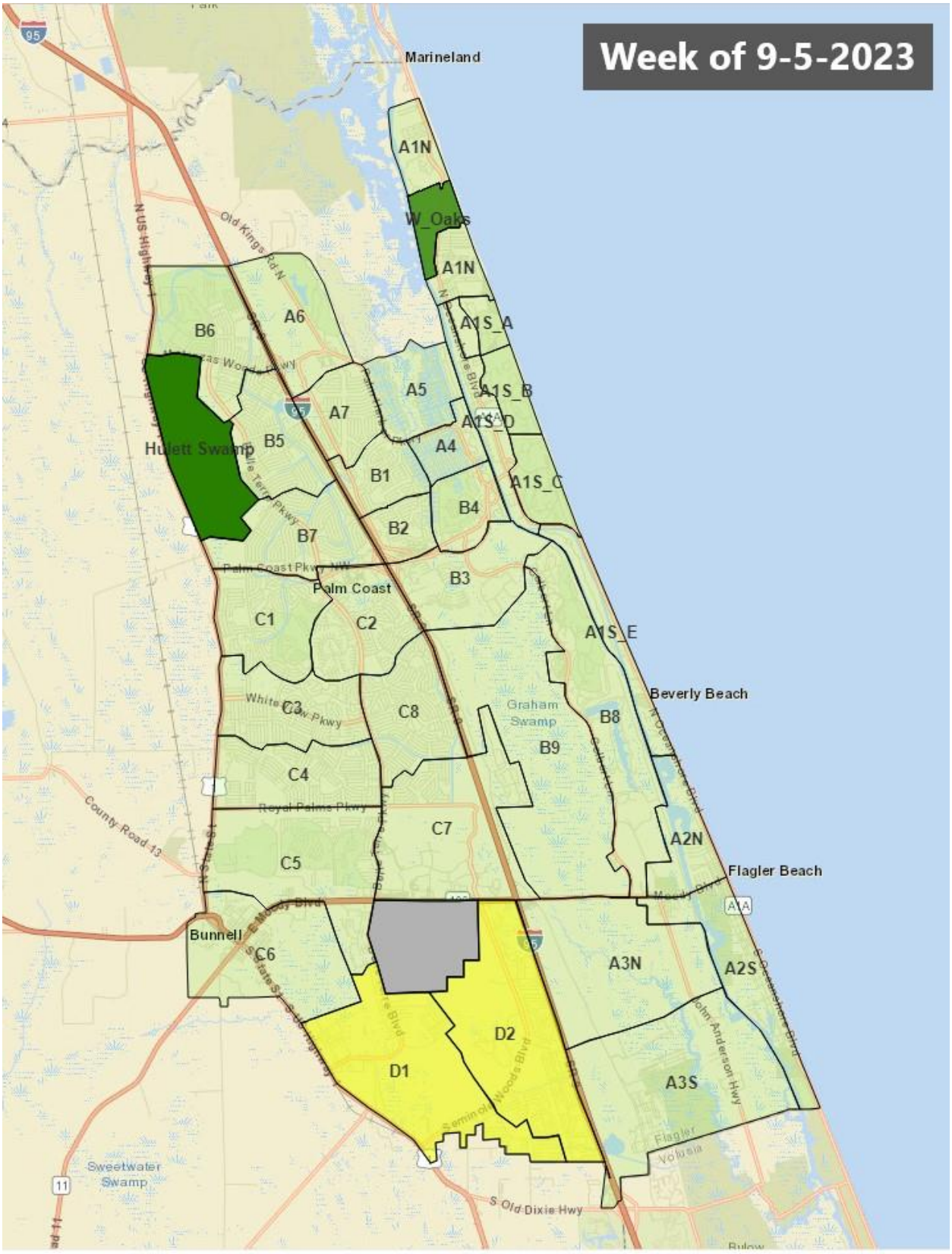






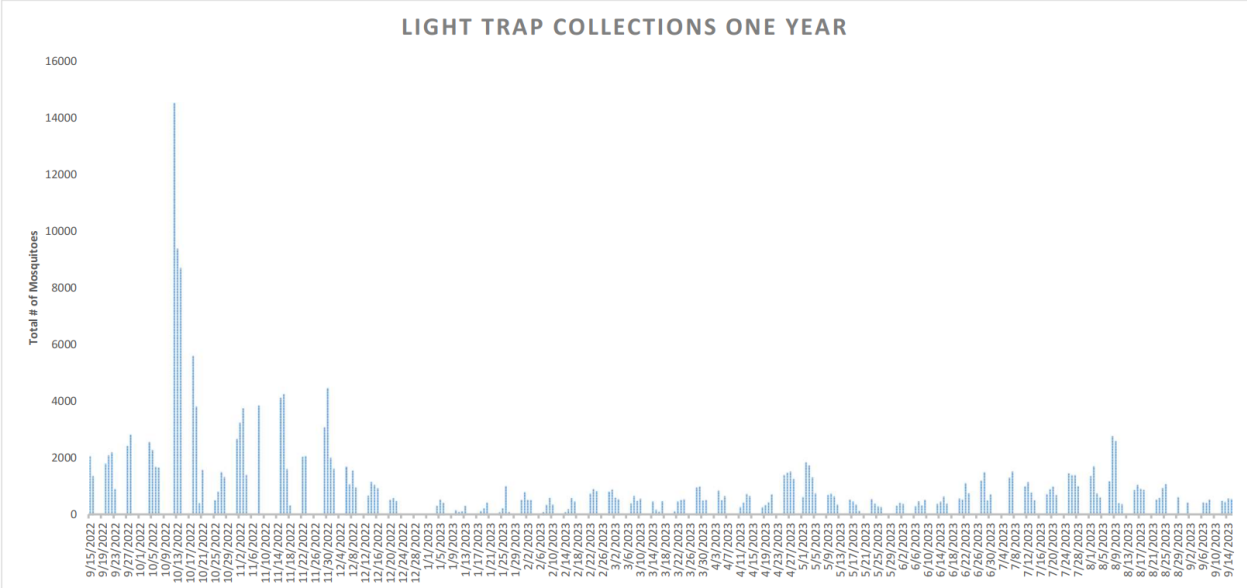
See the full [DOH Report]

Zones highlighted in yellow were sprayed by truck this week.

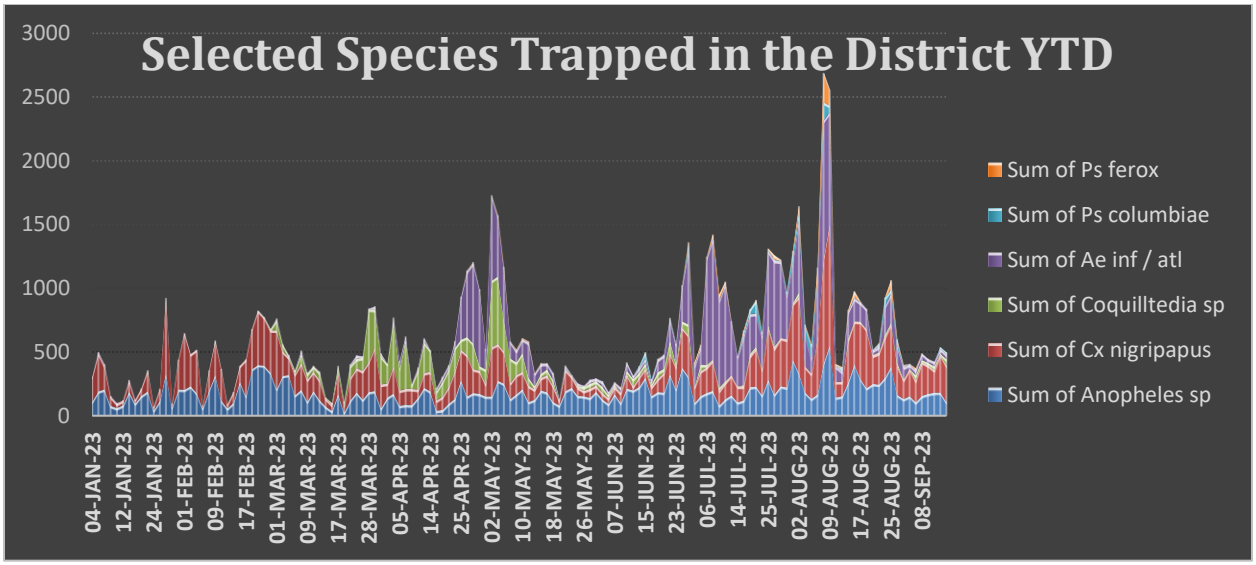


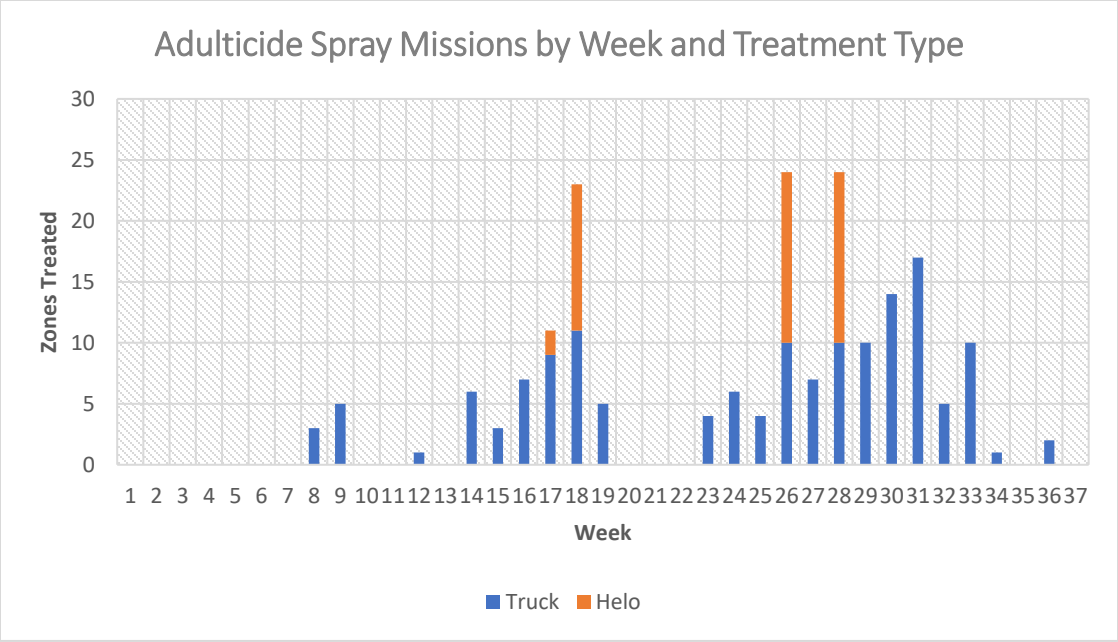
Week of 9/11/2023 Operations Update (37)

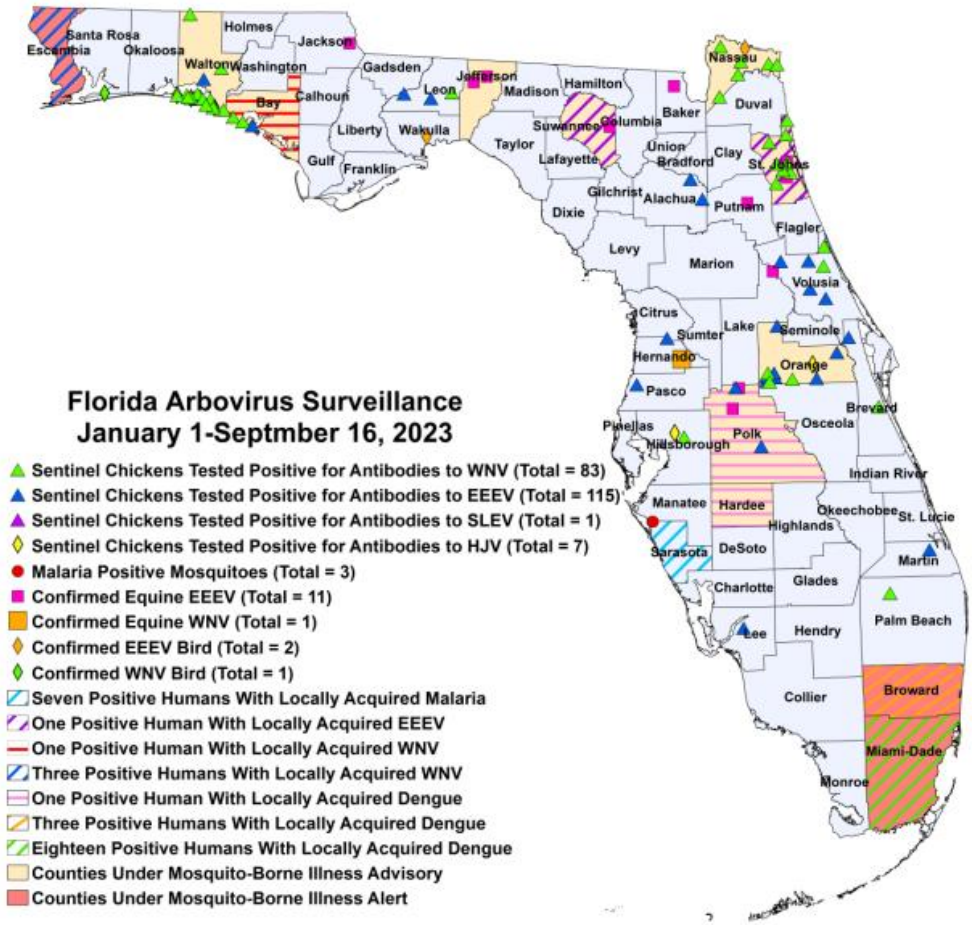
Mosquito activity remained low for a third week. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).



Mosquito activity was below baseline for third straight week. No spraying this week.



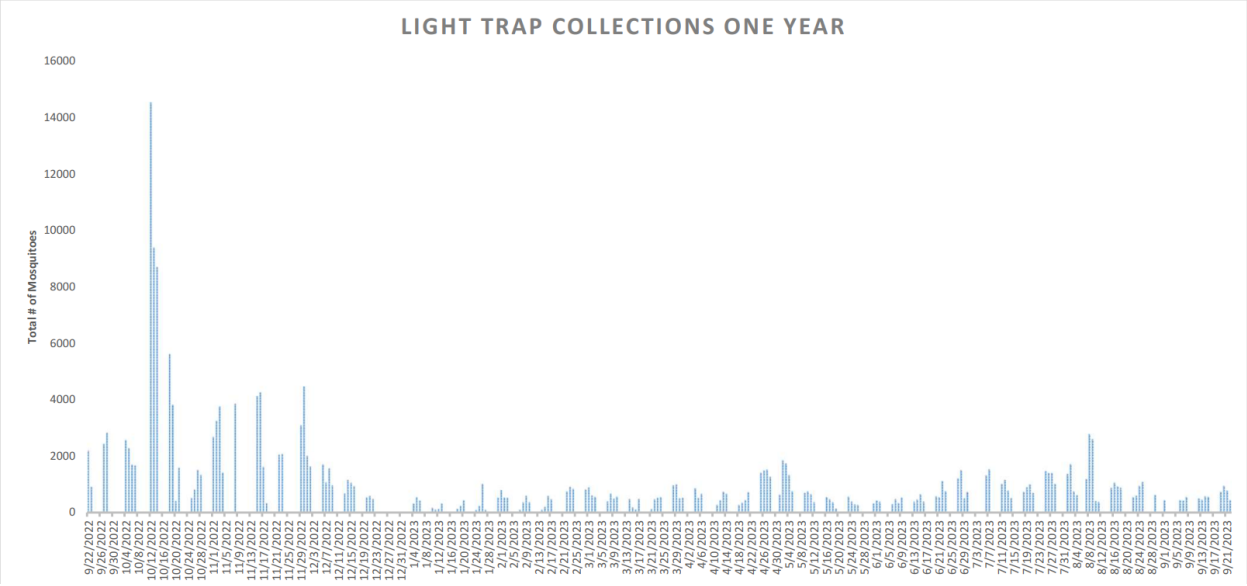




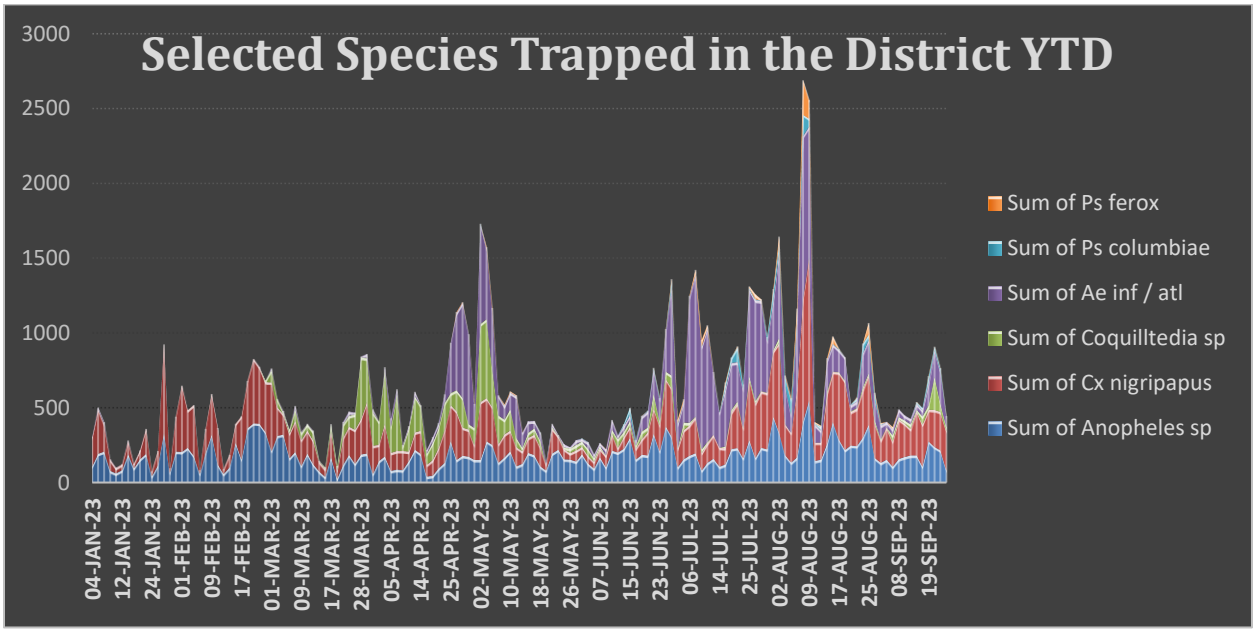
See the full [DOH Report]

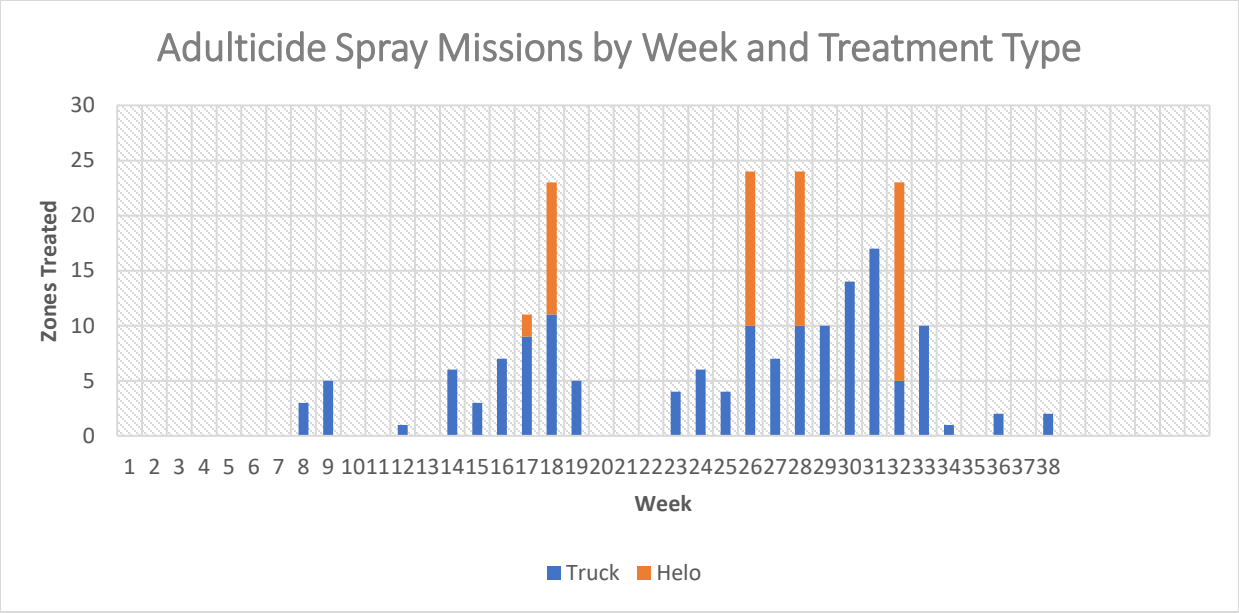
Week of 9/18/2023 Operations Update (38)

Mosquito activity increased in isolated areas after remaining low for three weeks. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).



Two species increased in prevalence in two disparate locations in the District. Very unusual for *Coquilletidia perturbans* to make as strong showing late in the season.



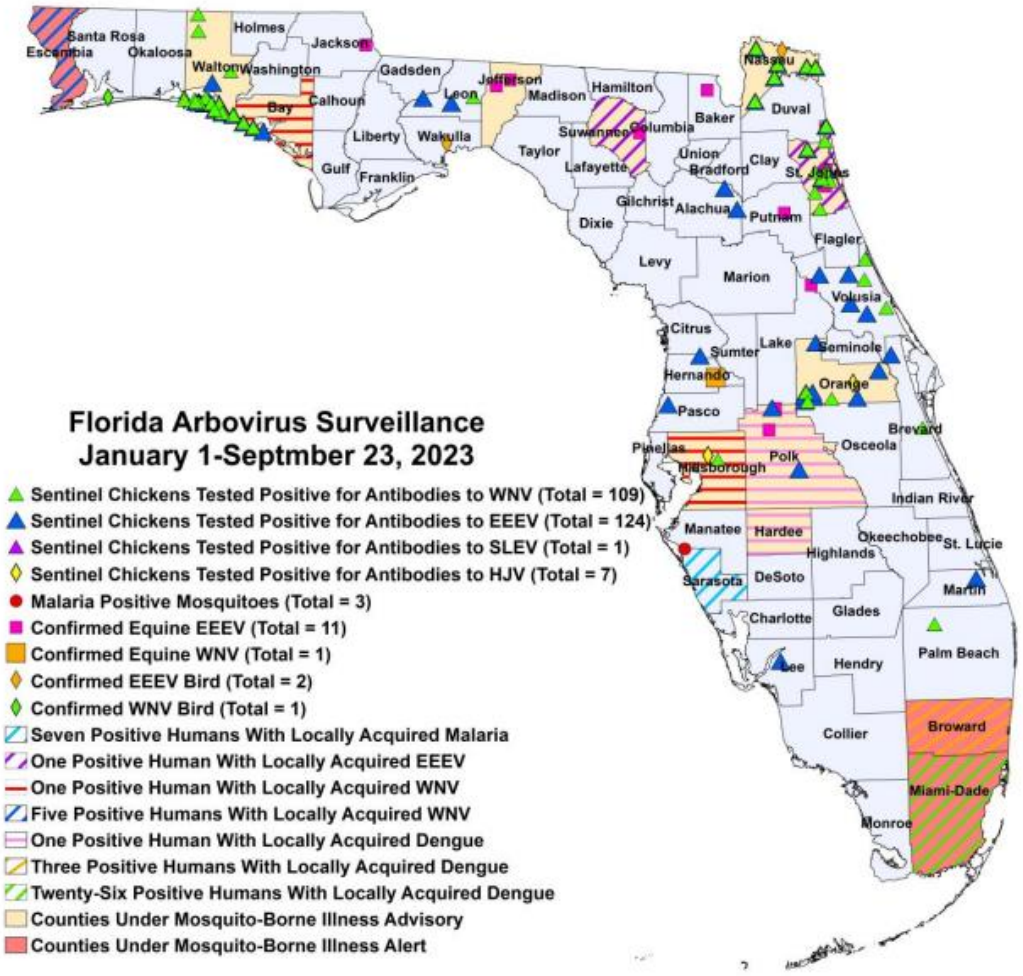


WNV activity: Three human cases of WNV infection were reported this week in Escambia and Hillsborough County

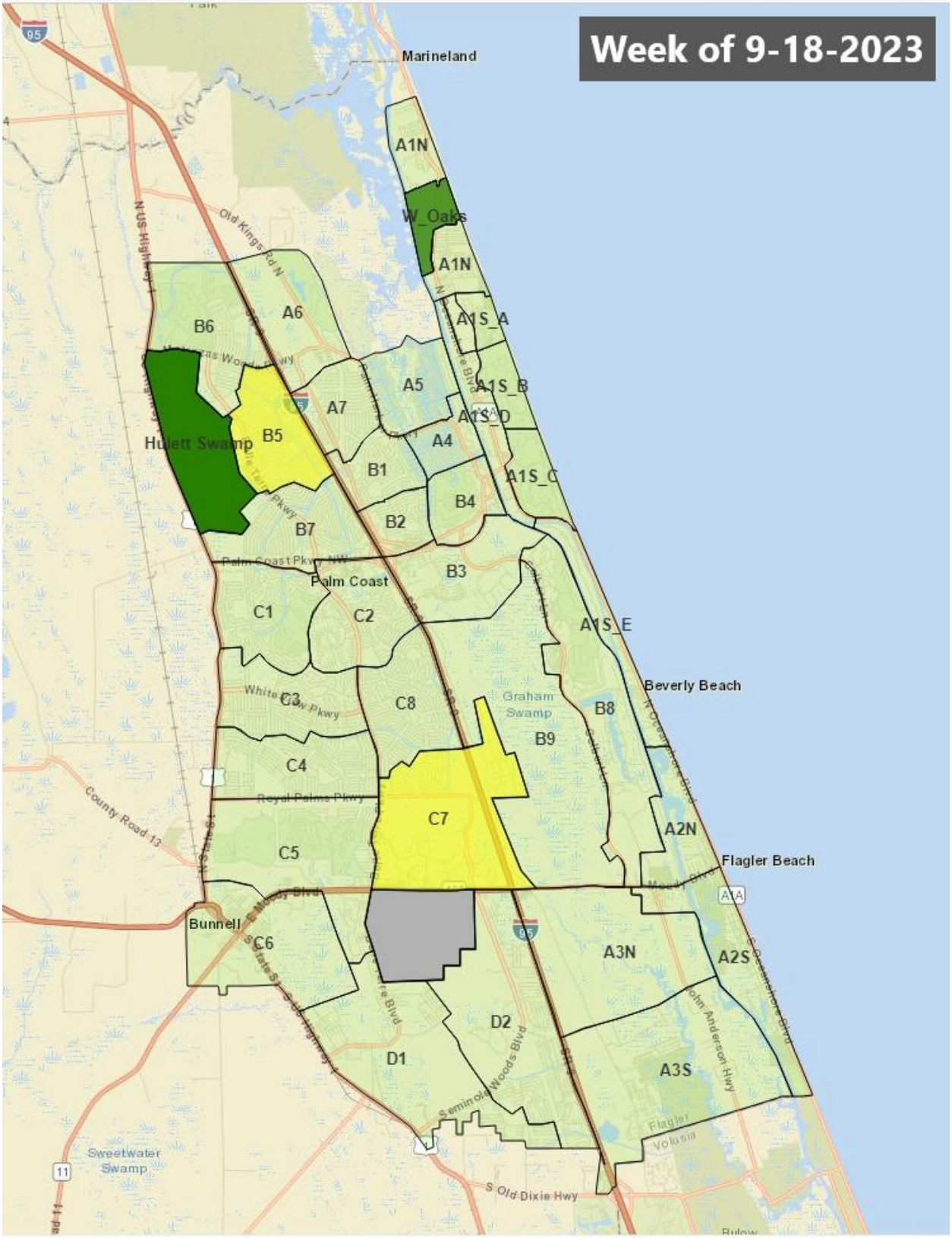
Dengue Cases Acquired in Florida: Eight cases of locally acquired dengue were reported this week.

Advisories/Alerts: Bay, Hardee, Hillsborough, Jefferson, Nassau, Orange, Polk, St. Johns, Suwannee, and Walton counties are currently under a mosquito-borne illness advisory. Broward, Escambia, and Miami-Dade counties are currently under a mosquito-borne illness alert.

See the full DOH Report

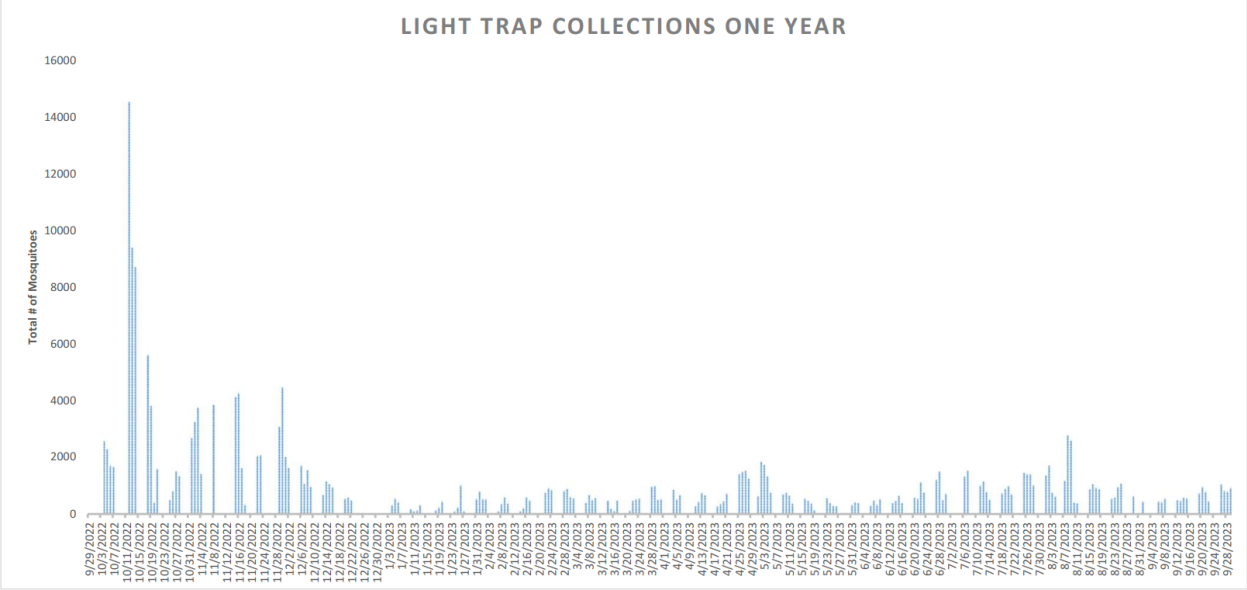

Florida Arbovirus Surveillance
January 1-Septmber 23, 2023
Sentinel Chickens Tested Positive for Antibodies to WNV (Total = 109)
Sentinel Chickens Tested Positive for Antibodies to EEEV (Total = 124)
Sentinel Chickens Tested Positive for Antibodies to SLEV (Total = 1)
Sentinel Chickens Tested Positive for Antibodies to HJV (Total = 7)
Malaria Positive Mosquitoes (Total = 3)
Confirmed Equine EEEV (Total = 11)
Confirmed Equine WNV (Total = 1)
Confirmed EEEV Bird (Total = 2)
Confirmed WNV Bird (Total = 1)
Seven Positive Humans With Locally Acquired Malaria
One Positive Human With Locally Acquired EEEV
One Positive Human With Locally Acquired WNV
Five Positive Humans With Locally Acquired WNV
One Positive Human With Locally Acquired Dengue
Three Positive Humans With Locally Acquired Dengue
Twenty-Six Positive Humans With Locally Acquired Dengue
Counties Under Mosquito-Borne Illness Advisory
Counties Under Mosquito-Borne Illness Alert
Escambia
Santa Rosa
Okaloosa
Walton
Holmes
Washington
Jackson
Bay
Calhoun
Gulf
Franklin
Liberty
Gadsden
Wakulla
Leon
Jefferson
Madison
Taylor
Lafayette
Suwannee
Hamilton
Columbia
Baker
Nassau
Duval
Union
Bradford
Clay
St. Johns
Gilchrist
Alachua
Putnam
Dixie
Levy
Marion
Flagler
Volusia
Citrus
Sumter
Lake
Seminole
Hernando
Orange
Pasco
Brevard
Pinellas
Osceola
Polk
Hillsborough
Indian River
Manatee
Hardee
Okeechobee
St. Lucie
Highlands
Sarasota
DeSoto
Martin
Charlotte
Glades
Palm Beach
Lee
Hendry
Collier
Broward
Miami-Dade
Monroe

Zones highlighted in yellow were treated by truck this week.

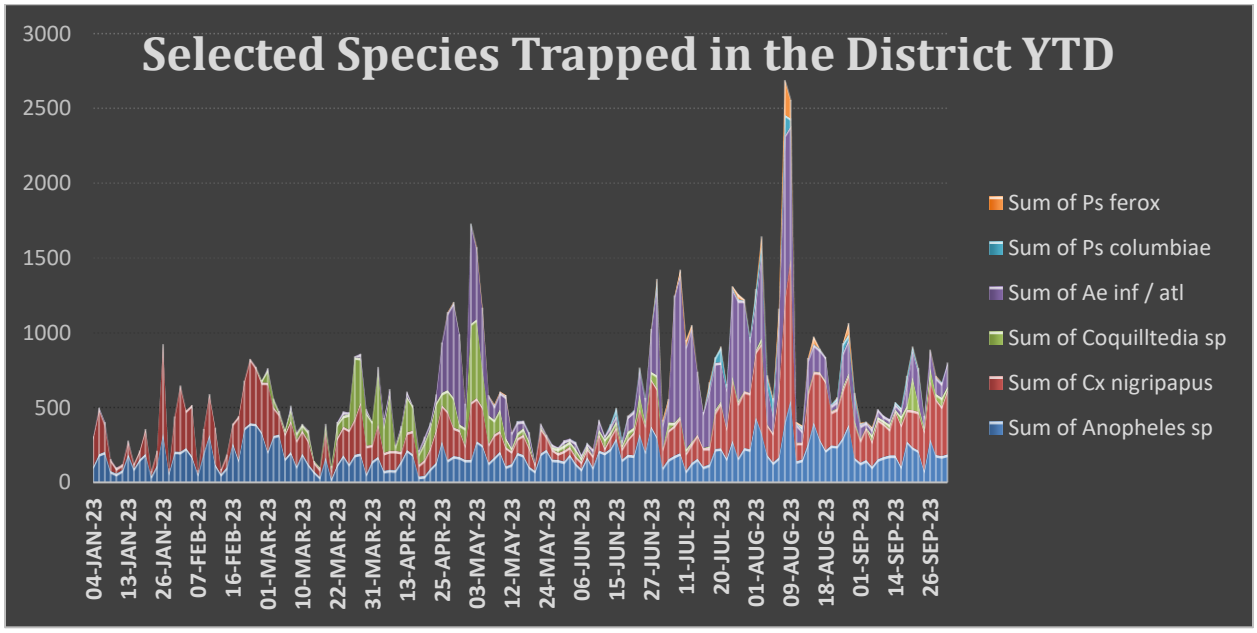


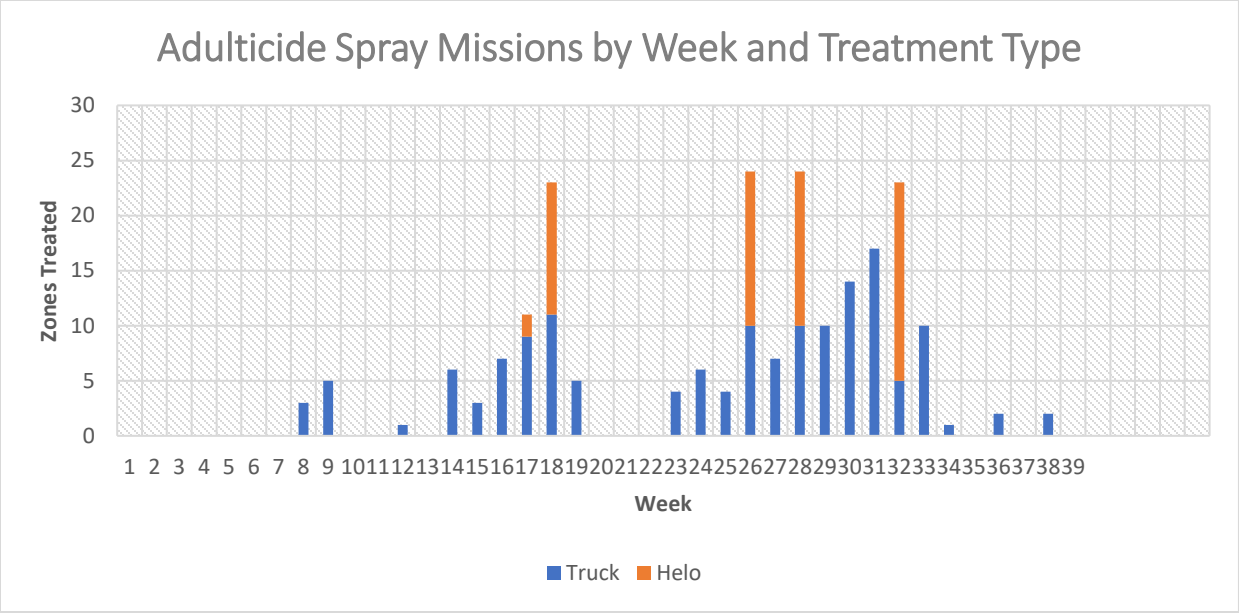
Week of 9/25/2023 Operations Update (39)

Mosquito activity was elevated for the second week. The bar graph below shows the total number of adult mosquitoes from all traps in the District for the past year (TTM).



Mosquito activity remained elevated for a second week, but spray operations were postponed due to rain.





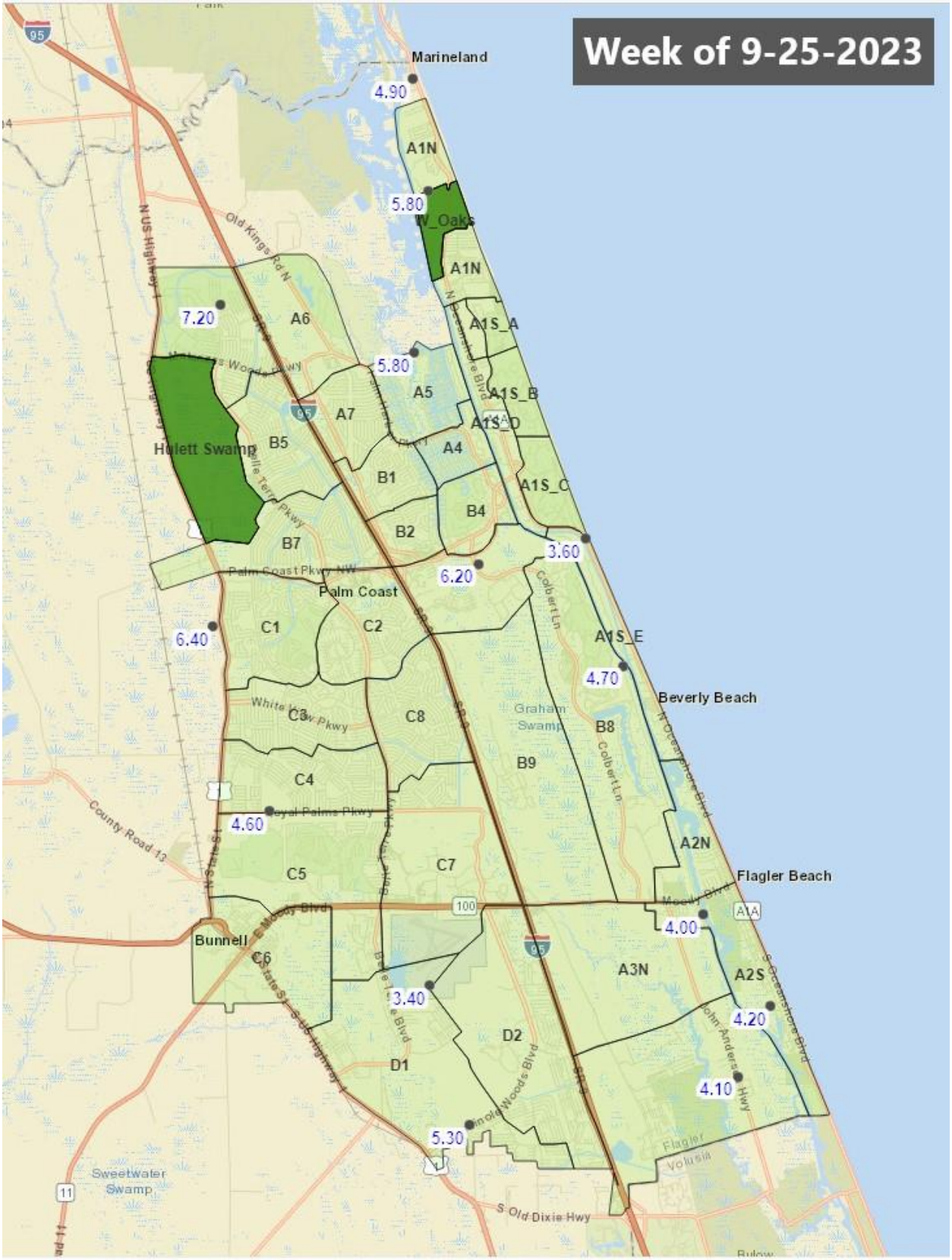
Dengue Cases Acquired in Florida: Seven cases of locally acquired dengue were reported this week. In 2023, 38 cases of locally acquired dengue have been reported.

Advisories/Alerts: Bay, Hardee, Hillsborough, Jefferson, Nassau, Orange, Polk, St. Johns, Suwannee, and Walton counties are currently under a mosquito-borne illness advisory. Broward, Escambia, and Miami-Dade counties are currently under a mosquito-borne illness alert.

See the full DOH Report

Significant rainfall was recorded throughout the District and will lead to corresponding significant increases in the mosquito population in the coming weeks.

See rain fall totals on the map below.


Week of 9-25-2023
Marineland
4.90
A1N
5.80
W_Oaks
A1N
7.20
A6
A1S_A
5.80
A5
A1S_B
A7
A1S_D
Hulett Swamp
B5
A4
B1
A1S_C
B4
B2
B7
3.60
6.20
Palm Coast
6.40
C1
C2
A1S_E
4.70
Beverly Beach
C3
C8
Graham Swamp
B8
B9
C4
4.60
A2N
C5
C7
Flagler Beach
4.00
Bunnell
C6
A3N
A2S
3.40
4.20
D2
D1
4.10
5.30
Sweetwater Swamp
S Old Dixie Hwy
Flagler
Volusia