



CITY OF CORPUS CHRISTI  
**MOSQUITO**  
ABATEMENT PLAN 2016



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## **Executive Summary**

Heavy rain events create pools of standing water that may increase adult mosquito populations to the point where our quality of life is impacted. Our mosquito abatement plan was designed after performing a survey of multiple jurisdictions along the Gulf Coast from Texas to Florida, from interviewing city, county, and school district employees, and from asking for advice from various experts. We will plan to use larvacide before, during and after rain events in locations where we identify increased levels of standing water. We will work with other city and government employees to detect and treat these areas as soon as possible during and after the rain event. We will coordinate with Parks employees to monitor major outdoor events and other venues where activities such as sports are planned and to use aerial spraying when possible to reduce the adult mosquito population before the event occurs. We will pay particular attention to elementary school areas where children are most susceptible to being bitten while walking to and from school or while doing outdoor activities. We established a hotline service where citizens can report high weeds and standing water on vacant properties so we can identify standing water in containers and have long grass mowed to reduce nesting grounds more effectively. We will respond to neighborhoods where mosquitos have been identified to carry viruses with a combination of public outreach, aerial spraying and larvaciding, and through persistent code enforcement to reduce mosquito nesting areas. Stormwater personnel will help identify drainage ditches and pipes where standing water occurs especially where mosquitos are identified as carrying viruses such as West Nile. We will seek cooperation from private land owners to larvacide large pools of standing water that may contain mosquito eggs that hatch after a rain event.



# STAFF REPORT

## MEMORANDUM

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**To:** Margie Rose, Interim City Manager

**Via:** Mike Markle, Chief of Police

**From:** Capt. James McCarty, Capt. Chris White and Asst. Chief Mark Schauer

**Date:** August 19<sup>th</sup>, 2016

**Subject:** Mosquito Abatement Plan

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During the first five months of 2016, our city received above average rainfall during several significant rain events which resulted in sizable mosquito infestations. Citizens voiced concerns about control practices and suggestions concentrated on wanting more aerial spraying. Although the mosquito population usually subsides as it did this summer when it dries out, this plan seeks to remedy those periods where natural factors and mosquito predators cannot significantly reduce the population and we are exposed to all the associated negative impacts. In addition, the Zika virus is causing world-wide concerns as it causes birth defects and mosquitos that carry it (*Aedes aegypti* and *Aedes albopictus*) live in our area. One local expert commented that it is not a question of *if* we will have Zika diseases here like the Miami area is experiencing, it is a question of *when*. Our plan to reduce virus-carrying mosquitos applies to the *Aedes* species as well.

The Mosquito Abatement Plan was designed after interviewing personnel from fourteen jurisdictions along the Gulf of Mexico from Brownsville to Tampa Bay. This report contains the survey results along with a list of people interviewed including employees from our city, Nueces County, local school districts, and from mosquito experts. We included an appendix containing facts about mosquitos because "best practices" should be based on facts about how mosquitos breed and survive, not on antidotal reactions. We plan to post this report on our Animal Care Services and Vector Control website to inform our citizens so that we can make informed choices about prevention and abatement. Our plan utilizes a community-wide multi-jurisdictional effort by shared communications about what we are doing and by identifying problem locations, by using aerial spraying treatment in the most effective manner, by maximizing our ability to larvacide before, during, and after rain events, and by continually providing public education about mosquito abatement.

We currently use larvacide to control excess mosquito larvae populations and aerial spraying for adults when conditions make it effective (low wind speed, low humidity, and not

raining). We aerial spray locations where mosquitos test positive for carrying viruses and when more than twenty female mosquitos are detected in any one trap.

Traps are routinely checked for the total number of mosquitos and for the presence of certain species of disease-carrying mosquitos such as *Culex quinquefasciatus*, *Culex tarsalis*, *Aedes aegypti* and *Aedes albopictus*. The *Culex* species transmits West Nile and St. Louis encephalitis and samples of live catches are mailed every Tuesday to Austin for virus testing. We own approximately (28) Gravid traps for live catches and (11) New Jersey traps for dead mosquitos. We also have (8) BG-Sentinel traps available should we need to survey a neighborhood if a Zika virus notification is received from the health department.

Captain McCarty was assigned the task of researching what other cities do regarding mosquito control and prevention practices. Twelve out of fourteen jurisdictions situated along the Gulf Coast from Brownsville to Tamp Bay exclusively use county government for vector control. Most used the same basic treatment options and some used the same vendors as we do. Adulticiding (aerial spraying) is usually based on the threat of spreading disease or on citizen complaints. Calcasieu Parish in Louisiana has a separate taxing district just for mosquito control. Several jurisdictions have airplanes including Galveston County which can treat 22,000 acres in one morning. Several use "sentinel chickens" to monitor infectious diseases as symptoms appear faster than in humans.

The mosquito abatement plan is designed to keep reinforcing partnerships and communications between city and county governments, private businesses, and citizens for prevention and control. The plan is to:

1. Identify locations in parks, public properties and private properties where standing water remains for days and weeks so they can be treated with larvacide before, during or after it rains. Larvacides include "dunks" and/or granules that poison mosquito larvae when imbibed, and spray that is applied to the water surface using a pump. The spray coats the water surface with a thin layer of oil that prevents the larvae from breathing air and suffocates them. We recently purchased more pumps that are specially made for spraying oil as oil tends to clog up the equipment.
2. Coordinate with the Parks Department and the school districts to identify when outdoor events occur so we can treat those areas when appropriate with aerial spraying (by a pump attached to a truck or trailer) and with larvaciding. Use an existing Animal Control e-mail loop ([animal@cctexas.com](mailto:animal@cctexas.com)) to allow various government entities to report mosquito outbreaks.
3. Establish a hotline (phone calls or on-line) where citizens can report vacant properties with standing water or high grass. Old tires and various containers hold dirty water that are favorite places for some mosquito species to lay eggs.
4. Train more city employees to apply larvacide and adulticide. We already have employees in the Parks Department, in Stormwater, and at the airport who have received certification training and can assist.
5. Enhance public outreach to educate citizens about the effective control of mosquitos and about disease control. Different mosquitos carry different viruses with some being

active at night and others during the day. "One size will not fit all" for effective reduction. Parents are responsible for applying repellent on their kids and we need to keep reinforcing that message. Texas Medicaid recently began providing free mosquito repellent to all expectant mothers and to women between the ages of 10 and 45. We need to keep repeating the "Four D's" message of mosquito control which is:

- A. Use insect repellent containing **DEET**.
  - B. **D**ress in long sleeves and long pants when you are outside during a heavy infestation.
  - C. Stay indoors at **dusk** and **dawn** when most mosquito species are active.
  - D. **D**rain standing water in containers like old tires, flower pots, and clogged rain gutters.
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6. Work with officials of the Corpus Christi International Airport to identify standing water locations and to use aerial spraying in the parking lot and terminal loading areas. The airport is a hub where people congregate after having visited countries where some mosquito-borne viruses are prevalent. It's important to drastically reduce large mosquito populations near the airport since it is surrounded by large tracts of agricultural land. We will place mosquito traps at the airport for disease monitoring.
  7. Purchase more larvacide pumps and more insecticide chemicals and use these chemicals responsibly and effectively so they are not destroying other types of wildlife, including mosquito predators.
  8. Work with Stormwater personnel to identify and treat canals that breed mosquitos and to identify those canals owned by private property associations so the owners can be educated about mosquito abatement. Identify and resolve issues with standing water in pipes and ditches where virus carrying mosquitos have been identified by state labs.
  9. Continue to use various kinds of traps so mosquitos can be identified and submitted to the state lab for disease control, and so we can understand the mosquito population we are dealing with.
  10. Discontinue the use of a specific number of mosquitos being counted in any one trap before that neighborhood is sprayed.
  11. We need to use hand held larvacide machines and ATV's or comparable vehicles to treat those areas difficult to reach but close to population centers.
  12. When mosquitos are determined to carry an actual virus that causes human illness, we will use a multidisciplinary approach to reduce the mosquito population. This includes public outreach to identify standing water sources, aerial spraying and larvaciding, and using Neighborhood Service employees and directed patrol officers to identify substandard locations near the traps with high weeds or standing water.
  13. Coordinate with the Corpus Christi-Nueces County Public Health District to identify the locations where infected humans with a confirmed status of viral infection could have acquired the virus and treat that area in the same manner as if a positive result was obtained for a trapped mosquito hosting a virus.

14. Try to identify additional revenue sources for disease control.
15. Expand a city ordinance that addresses standing water (currently Sec. 23-68) as we have issues with old tires and open containers.
16. Although we have an inventory of equipment and chemical supplies, we need to keep an adequate supply available at all times during warm weather in anticipation of major rain events. There is no way to predict how much rain we will receive for the upcoming budget year and Vector Control does not have its own budget separate from Animal Care.
17. Consider creating a city/multi-county task force that will focus on a comprehensive government response plan should Zika be discovered in mosquitos locally. There is tremendous concern about birth defects that could trigger public behavior that significantly reduces tourism and public events. We share some commonalities with the Miami area that is experiencing Zika-related issues and the mosquitos that host the virus are common here.
18. We will continue to communicate with the National Weather Service as they advise us which parts of the city received significant rain that might result in standing water so those areas can be treated.

Appendix A – Persons Interviewed

|                       |  |
|-----------------------|--|
| Benny Alaniz          | Corpus Christi Vector Control                          |
| Jim Bennett           | PHD, Entomologist Harris County                        |
| Dr. Dante Gonzalez    | Corpus Christi- Nueces County Public Health District   |
| Carl Gross            | Corpus Christi International Airport                   |
| Scott Harrington      | Asst. Director Calcasieu Parish, La. (Lake Charles)    |
| Hector Hernandez      | Corpus Christi ISD                                     |
| Larry Hernandez       | Project manager Brownsville, TX                        |
| John Hyland           | Corpus Christi International Airport                   |
| Laura Jasso           | Corpus Christi Parks and Recreation                    |
| John Marshall         | Entomologist Mobile, Al.                               |
| Mathew Milo           | Escambia Co. Fl. (Pensacola)                           |
| Jose Pantoja (Tony)   | Corpus Christi Vector Control                          |
| Walter Poole          | Night Foreman Jefferson Co. TX. (Port Arthur/Beaumont) |
| Claudia Riegal        | PHD, Director New Orleans, La.                         |
| Blas Sanchez Jr.      | Corpus Christi Vector Control                          |
| Albert Smith          | Flour Bluff ISD  |
| Glen Sullivan         | Nueces County Vector                                   |
| Trent Wagner          | Corpus Christi ISD                                     |
| Fred Wakefield        | Director Bay County, Fl. (Panama City)                 |
| Joshua Wentworth      | Corpus Christi Parks and Recreation                    |
| Ashley Wilson         | Entomologist Galveston Co. TX.                         |
| Chris White           | Corpus Christi Vector Control                          |
| Dr. Christopher Vitek | University of Texas Rio Grande Valley                  |

Appendix A – Persons Interviewed

|              |   |
|--------------|---|
| Neil Fritsch | Pct. 3, Calhoun County, TX. (Port Lavaca) |
|              |   |

## Appendix B:

## Mosquito Facts for Public Education

01. The life cycle of a mosquito is:

- A. An adult female lays eggs after being inseminated by a male. Each clutch may contain 200-300 eggs and she can lay multiple clutches after a single insemination.
- B. The eggs can live for months in dry conditions but need a water supply to hatch.
- C. The eggs hatch into larvae (wigglers) in water and they eat plant and animal debris in the water. They take 4-10 days to mature into larvae.
- D. The larvae transform into pupae. Pupae live on the water surface for 1-10 days and don't eat. They are transitioning from being aquatic to developing wings to fly.
- E. The pupae hatch and the males usually hatch first and feed on plant juices and nectar for carbohydrates. They stay near and wait for females to hatch and then die shortly after mating. The females need a blood supply to nourish the eggs to repeat the life cycle. Blood supplies come from whatever animal source the mosquito evolved to attack. Mosquitos will dehydrate and die if they do not have access to water.

02. There are about 85 species of mosquito in South Texas as per Texas A&M Agrilife Extension documentation. Some species have evolved to attack only certain types of animals. Some are active at night and others during the day. They also vary on how far they fly away from their breeding place.

03. Only female mosquitos bite as they need a blood meal to nourish their eggs. Once they are inseminated, a female will lay a clutch of eggs. The same batch of sperm can continue to produce many clutches over the female's life span because the sperm is stored internally.

04. The life spans differ between species, but after males mate, they usually die. Females can live days or weeks longer. The length of time for a mosquito to complete its life cycle also depends on availability of food, weather, and the availability of water. Some can complete the entire cycle in 8-10 days.

05. Some species can lay eggs that will not hatch for months until water is available again. If a ditch is filled with water after a rain, the eggs might be deposited at the highest level of where the water reached. It would take another event to fill that ditch to the same level to allow all the eggs to hatch.

06. Some of the more common biting mosquitos for this area are the Aedes, Culex, and Salt Marsh species.

07. The Aedes aegypti (yellow fever mosquito) and Aedes-related species carry yellow dengue, chikungunya and Zika viruses. It has white marks on its legs and prefers stagnant water to lay eggs. They are most active during daylight hours and breed near where humans live. They usually fly no farther than 200 yards away from hatch sites as adults.

08. The Culex species (common house mosquito) carries viruses that include arbovirus, West Nile, and St. Louis encephalitis. The female lives from 10-14 days in which she requires a

blood meal (humans and birds) to nourish her eggs. She lays 100-300 eggs on standing water such as in used tires, pots and pools where rain water collects. The eggs hatch two days later and the larva will live for one to two weeks coming to the water surface for oxygen. Larvacide is effective at this stage as they cannot penetrate the surface tension of the mineral oil it contains and they will suffocate without impacting other forms of animals. They change into pupae and remain on the water's surface for one to four days when they transform into adults. They can also be effectively killed while lying on the water surface. They are most active during nighttime hours.

09. The City has 28 gravid mosquito traps for live catches and 11 New Jersey traps placed out throughout the city. The adult mosquitos are counted and those species that carry disease may be sent to a lab for testing.

10. BVA2 is the larvacide we use and it is 97% highly refined petroleum distillate and 3% inert ingredients. It covers water with a sheen of mineral oil and suffocates mosquito larvae and it has a 100% kill rate for the areas treated. It costs about \$400 per 55 gallon barrel. Mosquito "dunks" are affordable and can be purchased by the public from stores or on-line and it poisons larvae when eaten.

11. Envion is used for adulticiding (adult spraying) and is most effective in low humidity weather with low winds. It has a 30% kill rate, however it must directly make contact with the mosquito. Adulticide products will kill other flying insects as well including dragon flies, bees and mosquito hawks. Back yards are difficult to reach and open areas will have more success. Envion costs about \$5,000 per 30 gallon barrel and it requires about 3 ½ barrels to spray the entire city (\$17,500).

12. The city has a June 2013 MOU with Nueces County regarding aerial spraying for combatting the spread of the West Nile virus, but it is limited to agreeing to work in unison. Using airplanes to spray the entire city/county is expensive and we will contact commercial businesses that offer this service to obtain an estimate. Although cost prohibitive, it is plausible to use this service should we have mosquitos test positive for Zika at some point.

13. One jurisdiction we interviewed used samples of a sentinel chicken's blood to detect mosquito-borne viruses since it shows up faster and can be detected sooner in chickens than in humans.

14. Dog heartworm (*Dirofilaria immitis*) is transmitted by mosquitos from an infected dog to other dogs. Owners should seek guidance from their veterinarian about heartworm prevention via appropriate medication, but mosquitos are also dangerous to animals and house pets need protection.

Appendix C: Location of Mosquito Traps



Appendix D: Mosquito Reduction Products

| ITEM                              | PRICE RANGE    | PURCHASED FROM                  | DURATION OF EFFECTIVENESS                  |
|-----------------------------------|----------------|---------------------------------|--|
| Mosquito Dunks (6 pack) for Larva | 8.97 - 12.97   | Home Depot, Lowe's, Wal-Mart    | Very effective, but must use every 30 days |
| Yard Guard, Cutter, Foggers       | 6.09 – 12.97   | Home Depot, Lowe's, Wal-Mart    | Effective for approximately 8 hours        |
| Propane Foggers (machine only)    | 59.00 – 76.99  | Home Depot, Wal-Mart            | Effective for approximately 6 hours        |
| Repellants                        | 3.55 – 9.97    | Home Depot, Lowe's, Wal-Mart    | Various effectiveness                      |
| Backyard Pretreat                 | 8.78 – 10.98   | Home Depot, Lowe's              | Lasts up to 8 weeks                        |
| Dynatrap                          | 99.99 – 150.00 | Home Depot, Wal-Mart, Bed, Bath | Extremely effective                        |
| Dynatrap Replacement Bulb         | 9.99           | Home Depot, Bed, Bath & Beyond  |  |
| Thermacell Patio Lantern          | 18.88 - 21.97  | Home Depot, Lowe's, Wal-Mart    | Effective for approximately 12 hours       |
| Thermacell Repellant Refills      | 19.99 - 20.99  | Lowe's, Bed, Bath & Beyond      |  |