

Mansfield Mosquito Surveillance & Control Policy



As adopted by City Council
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1.0 INTRODUCTION

Arboviral and other arthropod-borne diseases are those in which the disease-causing agent is spread by the bite of an infected arthropod. As there are many arboviral diseases that have the potential to show up in any area, at any time, we will be focusing this document on five viruses of concern in north Texas. The agents of concern currently include West Nile virus (WNV), St. Louis encephalitis virus (SLEV), Chikungunya virus (CHIKV), Dengue virus (DENV) and Zika virus (ZIKV). Due to the nature of these diseases WNV and SLEV can be discussed together as zoonotic diseases, shared between animals and humans, whereas CHIKV, DENV and ZIKV can be discussed together as epidemic diseases, shared among humans. The contents of this document are subject to change dependent on the most current information and future, unforeseen situations. In participation with Tarrant County Public Health, and surrounding communities, the City of Mansfield conducts surveillance for the presence of WNV and SLEV by studying, surveying, sampling and testing local *Culex* populations in the city. The presence of CHIKV, DENV and ZIKV on the other hand will be dominantly determined by the presence of these viruses in the human population; however, the presence and abundance of *Aedes aegypti* and *Aedes albopictus* may be surveyed to help determine high risk areas.

1.1 West Nile Virus (WNV) and other *Culex*-borne pathogens

West Nile virus and St. Louis encephalitis virus are endemic mosquito-borne viruses that have the potential to cause febrile disease, myelitis, encephalitis and/or meningitis in humans and other animals. Approximately 80 percent of people who acquire these viruses will not experience symptoms. Of the 20 percent who do, roughly one percent will develop serious symptoms, up to and including death. WNV was first isolated in a febrile patient in the African country of Uganda circa 1937. After first appearing in the U.S. in New York City in the summer of 1999, it spread west eventually reaching north Texas in 2002. (AAM, 2013). Both West Nile virus and St. Louis encephalitis virus are predominantly carried by the genus of mosquito, *Culex*. The primary vector of these diseases in north Texas is known to be *Culex quinquefasciatus* (Ward, 2002). *Culex restuans* and *Culex nigripalpus* have also tested positive for WNV and will be considered secondary vectors. Therefore, much of this program will target surveillance and control of these disease carrying mosquitoes. Other species of *Culex* that may be vectors for these diseases will also be tested when sampled in abundance.

Culex surveillance may be conducted year-round. Regular season testing will begin the first full week of April and end in mid-November when cooler temperatures are most likely.

Off-season surveillance will be conducted to monitor the mosquito populations in cooler winter months. Female *Culex* mosquitoes overwinter as adults which are virtually inactive at times of cold temperatures (Strickman, 1988). Minimal surveillance will be conducted when temperatures remain consistently low (below 8°C). Being nocturnal, these mosquitoes are most active between dusk and dawn.

WNV and SLEV have a bird-mosquito-bird transmission cycle that includes humans, horses and other animals as dead-end hosts (incapable of spreading virus to uninfected mosquitoes). This means that a mosquito can only acquire the virus from a bird and cannot acquire the virus from a human or horse (that is infected with WNV or SLEV) because of the low number of viral particles in our bloodstream. After a period of time the infected mosquito can pass these viruses on to other animals. Data pertaining to information about WNV/SLEV in human, horse and bird populations will also be considered as important information in decision-making and recommendations for the City as a whole. As available, Tarrant County Public Health (TCPH) may provide thresholds to the City to further determine mosquito control activities. These may include mosquito infection rates, vector indices, abundance of mosquitoes, weather patterns, and timing/rate of increase of mosquito positivity.

1.2 CHIKV, ZIKV, DENV and other *Aedes*-borne pathogens

Chikungunya virus (CHIKV), Zika virus (ZIKV), and Dengue virus (DENV) are three arboviruses that are a potential threat to people living in North America. All three viruses share the primary vector *Aedes aegypti* and a potential secondary vector *Aedes albopictus*, which are present and abundant in many areas of Tarrant County. These mosquitoes behave differently than *Culex* mosquitoes, so surveillance for these viruses will be different than that of WNV/SLEV.

Chikungunya virus is an alphavirus in the family *Togaviridae*. Disease manifested by this virus, known as Chikungunya fever (CHIK), can result in high fever, headaches, intense joint pain and sometimes a rash. It was first isolated in 1952 on the Makonde plateau in Tanzania, Eastern Africa. The word “Chikungunya” roughly translates to “that which bends up” in the Makonde dialect which describes the actions of those experiencing symptoms of the disease. Since 2004, the distribution of the virus has been spreading from the African islands, to Asia and Europe, and has most recently made a stronghold in the Caribbean and other popular North American island destinations (PAHO, 2011). Chikungunya may be severely debilitating, but is rarely fatal. Symptoms typically last less than two weeks, but may persist for months and in rare cases, even years.

Dengue virus (*Flaviviridae: flavivirus*) continues to spread around tropical and subtropical regions. Disease resulting from DENV can range from febrile to hemorrhagic and it exists in four different serotypes, 1, 2, 3 and 4. The symptoms of Dengue fever can be similar to CHIK, however the onset of fever is more gradual, there is more commonly a rash, and it is more likely to be fatal (PAHO, 2011). Once an infected person overcomes illness from one serotype of DENV, they become susceptible to develop more severe Dengue fever symptoms upon reinfection with another serotype (WHO, 2009). Recently, local transmission has been documented in the Florida Keys (Richards et al. 2012) and happens periodically on the Texas-Mexico border (Rodrigues-Tan and Weir, 1998).

Like Dengue virus, Zika virus is in the family *Flaviviridae*. Symptoms from acquisition of this virus are also similar to CHIKV and DENV. Most cases result in a maculopapular rash (flattened raised red patches) on the torso, joint pain and conjunctivitis. Symptoms are believed to be less severe than that of CHIKV and speculated to be manifested by roughly 20 percent of people who acquire the virus. Guillain-Barre Syndrome and encephalitis-like diseases have been associated with Zika in a very small percentage of the people who have developed Zika-related illness. Deaths associated with Zika virus are rare. The cause of major concern with the spread of Zika is the effects it has on fetuses if women are infected during pregnancy. In April of 2016, CDC scientists announced that Zika can cause microcephaly and other severe fetal brain defects (Rasmussen *et al* 2016). Microcephaly can be defined as a condition where a baby is born with an abnormally small head, likely due to the under-development of the brain. Pregnant women should avoid travel to places where Zika is being transmitted. Most cases of Zika illness in the United States are related to international travel. In 2016, two outbreaks of Zika occurred in the intercontinental U.S. in Miami, Florida and Brownsville, Texas. There were an additional four cases of Zika in Hidalgo and Cameron Counties in 2017. Though most cases of Zika are transmitted through the bite of an infected mosquito, it may also be transmitted sexually.

All three of these viruses are transmitted by mosquitoes in the genus *Aedes*, subgenus *Stegomyia*. These mosquitoes are unlike *Culex* mosquitoes in the fact that they are diurnal (active during the day), overwinter as eggs, and feed predominantly on humans. Surveillance for these mosquitoes will take place during our in-season WNV/SLEV surveillance utilizing BG Sentinel traps. Surveillance for these mosquitoes will only be utilized to find potential problem areas and not for surveillance of these viruses since there is no domestic transmission and humans are the current preferred sentinel.

2.0 Mansfield Surveillance Program

The risk of mosquito-borne diseases depends on the size of mosquito populations and the incidence rate of the disease. Collecting information on adult mosquito populations is thus important for both targeting control measures and gauging the potential for disease outbreak. An adult mosquito surveillance program for Mansfield has been developed and implemented since 2005.

2.1 West Nile virus and St. Louis encephalitis virus surveillance in mosquitoes

The City has prepared a total of 12 trap sites located throughout the city limits so that a one-mile buffer from all trap sites combined covers the majority of existing and future populated areas. However, the North Texas Regional Laboratory (NTRL) only has capacity to allow up to six sites from Mansfield to be tested per week. Therefore, the City's Environmental Services Department will perform, or coordinate, trapping of adult *Culex* mosquitoes at the 12 trap sites rotated so six sites are collected every week. Changes can be made to this trap rotation at any time related to previous trap data, adjacent community information, or other related indicators. Lab dates and times are controlled through the NTRL and are subject to change at any time with little to no notice to the City.

Seasonal surveillance:

- Brew gravid water with grass clippings, set traps overnight to be collected the following morning (once/week), and deliver mosquitoes in appropriate containers to TCPH.
- TCPH will identify, enumerate, and place up to 50 mosquitoes of the appropriate vector species into each tube.
- TCPH NTRL will store frozen samples until ready for processing, run a real-time reverse-transcriptase polymerase chain reaction (RT-PCR) assay for detection of WNV and SLEV, determine positive/negative results, and report results to TCPH vector control the morning of the day following laboratory submission.
- Notification of any mosquito pools that test positive for WNV or SLEV will generally occur Friday afternoon via telephone and email. All lab results will be received via email. Locations and results of WNV/SLEV trap sites will be added to the Tarrant County website by vector control personnel or designee.
- TCPH will report positive mosquito pool results to the Texas Department of State Health Services (DSHS) once/week on Fridays.

Off-season surveillance:

- Brew gravid water with grass clippings, set traps overnight to be collected the following morning (once every other week, weather and conditions permitting), and

deliver mosquitoes in appropriate containers to TCPH. An electronic calendar will be used with trapping periods and testing dates.

- Off-season trapping should follow the same procedures as the in-season trapping.

2.2 Dengue virus, Zika virus, and Chikungunya virus surveillance in mosquitoes and surveillance for *Aedes* mosquitoes

Surveillance for CHIKV, ZIKV and DENV in mosquitoes will only happen on a case-by-case basis where one of these viruses would be most likely to occur. This would be strictly for data collection purposes and would not determine a response for mosquito treatment. Due to the nature of the way these viruses cycle in the environment, strictly between humans and mosquitoes, it is highly unlikely that these viruses will be found in mosquito populations before human cases appear. Therefore, the dominant form of surveillance for the virus itself will be through recording confirmed human cases. The City may deploy any of the current three BG Sentinel traps to monitor the populations of *Aedes aegypti* and *Aedes albopictus*, or contract with a private provider to conduct surveillance. Static trap locations should be chosen based on human population density and breeding habitat availability. BG Sentinel traps with the addition of dry ice should also be placed at suspect case addresses during warmer seasons (during the WNV in-season period). Results of BG Sentinel traps will be turned in with gravid trap samples and results will be returned with gravid trap results. It is important to keep these traps in static locations to monitor these mosquito populations over time.

2.2.1 Mosquito surveillance and control near imported cases

Suspected imported cases of CHIK, Zika or Dengue fever will be determined by the Division of Epidemiology at TCPH. Suspect imported cases must have a travel history that includes a country in which CHIKV, ZIKV and/or DENV are endemic, epidemic, or currently circulating. Upon notification of a suspected human case from the Division of Epidemiology, a member of the vector control team will work collaboratively with the appropriate City Environmental Services Department personnel to inspect the property of the patient for sources of *Aedes* breeding and to determine subsequent mosquito control activities. Permission forms should be utilized to enter private residences. Personnel conducting the inspection will record observations on the backyard mosquito checklist. It should be noted here that risk is determined by, but not limited to, a number of factors including: the viremia of the patient while they were present in the county, the number of vector mosquitoes found on or near the property, the use of and type of repellents utilized during the viremic period and/or reports of patient outdoor activity/reports of being bitten by vector mosquitoes. BG Sentinel traps should be deployed with the addition of dry ice for

a 24-hour period during times where *Ae aegypti* and *Ae albopictus* are known to be active (typically from May to November) to monitor risk from adult mosquitoes. BG Sentinel trap samples should be brought to Tarrant County vector control staff the day following trap placement where vector control staff may be able to make risk assessments on a case-by-case basis. Adulticiding the patient residence and all adjoining properties may be recommended where high risk is determined to be present along with larviciding and educating all residences within a 150-meter radius. Handing out repellents including N, N, N diethyl-meta-toluamide (DEET) and properly labeled larvicides within the neighborhood may also be encouraged. All larval source containers should be overturned or treated with the appropriate larvicide. Upon observation of adult mosquitoes, adulticiding should be considered. Adulticiding may include thermal fogging or residual spray to surrounding resting areas (low-lying non-flowering plant life and eaves). Treatment of flowering plants should be avoided to minimize exposure to non-target insects. Ultra-low Volume (ULV) targeted backpack application is not recommended in the daytime due to a lack of an inversion layer causing the chemical to evaporate and be ineffective. The placement of a post-treatment BG Sentinel trap is recommended to monitor effectiveness of treatment. This data should be reported to TCPH for data collection purposes. If the patient is no longer viremic and therefore cannot spread the virus to a local mosquito population, the patient will be educated about the use of repellent and encouraged to treat larval sources found on their property.

Surveillance of locally acquired cases of CHIK/DENV/ZIKV will follow guidelines and be coordinated with TCPH, Texas Department of State Health Services, and/or the Centers for Disease Control.

2.2.2 Human surveillance

Arboviral diseases and exotic diseases are nationally-notifiable conditions and reportable in Texas. Most disease cases, including suspected cases, are reported to the Division of Epidemiology at TCPH. They are responsible for ensuring that reported human disease cases meet the Council of State & Territorial Epidemiologists (CSTE) case definitions and are investigated promptly. Upon confirmation of a human WNV or SLEV case, the Division of Epidemiology will notify a designee in TCPH Vector Control. In compliance with the Health Insurance Portability and Accountability Act (HIPAA), information regarding human cases will not be released on the interactive mapping website. TCPH Vector Control staff will report an intersection near the human case to the City and additional gravid traps may be placed near this area to test additional pools of mosquitoes for WNV/SLEV. This is recommended due to the nature of acquisition not being isolated to the patient's home and also to help protect HIPAA information in reasons to treat.

3 Prevention and Control

The functional goal of the mosquito surveillance program is the use data on mosquito populations and mosquito virus infections rates to:

- Assess the threat of human disease.
- Determine the geographical areas of highest risk.
- Assess the need for and timing of intervention events.
- Identify larval habitats that are in need of targeted control.
- Monitor the effectiveness of control measures.
- Communicate risk to the public.

The primary objective of mosquito control is to decrease the risk of mosquito-borne human diseases. This objective should be accomplished by:

- Continuing to stress source reduction the primary means of control.
- Larviciding where such activities are feasible, practical, and likely to be effective.
- Using personal mosquito protection measures, especially for the elderly and those individuals with compromised immune systems.
- Use of adulticide campaigns as a means of last resort to respond to public health concerns.

The principles of Integrated Pest Management for mosquito control are:

- Knowledge of mosquito biology and the epidemiology of the mosquito-borne diseases.
- Surveillance and monitoring efforts for the detection and status assessment of mosquito populations and/or mosquito-borne diseases.
- A multifaceted prevention and control program comprised of a system of control tactics which are compatible with each other and which are proven effective.
- Continued program evaluations and updates to ensure that the best methods are being used to meet the prevention and control objectives of the program.
- Continued education of the public to create awareness, understanding, and support.

3.1 Larviciding

Larviciding practices are a pivotal part of mosquito control. Larvicide is best implemented when eliminating known mosquito breeding spots. This is the main focus of localized

community mosquito surveys, which are carried out when mosquito pools test positive for WNV or SLEV. The concept behind this involves removing mosquito populations when they are vulnerable to effective control methods and cannot actively serve as a disease vector. Larvicide activities may be performed by staff, a contractor, or property owner. A list of larvicide methods the City of Mansfield may use includes:

- *Bacillus thurengiensis israelensis* or Bti.
- *Saccharopolyphora spinosa* or Spinosad
- Insect growth regulators (Methoprene)
- Cocobear Mosquito Larvicidal oil
- Elimination of standing water and breeding habitat
- *Gambusia affinis*

Reducing, eliminating, and treating mosquito breeding sites are some of the most important aspects of a mosquito control program. It controls mosquitoes before they emerge as host-seeking adults (only adult female mosquitoes are vectors for arboviral diseases). Additionally, pin-pointing sources that need to be treated are more efficient, effective, and safer than treating large areas with adulticide. Humans and terrestrial wildlife are less likely to be exposed to treated aquatic habitat of larval mosquitoes than that of terrestrial airborne adults.

Physical elimination and/or larviciding of mosquito breeding sites will be conducted by Environmental Services staff upon observation when possible. If sources are known to exist on private property, Environmental Services staff will notify the property owner of mosquito breeding activity and request elimination and/or treatment of the breeding sources where possible. If the property owner does not eliminate/treat sources, the City may use applicable laws to seek legal remedy (Texas Health and Safety Code Chapters 341 and 343).

Gambusia affinis, also known as mosquito fish, are natural endemic predators of aquatic stages of mosquitoes. They have the ability to continuously control mosquito larvae in a single source, are fairly easy to maintain, and are typically environmentally friendly. TCPH personnel will keep a stock tank of *Gambusia* at Tarrant County Public Health. The City may request *Gambusia* at any time during business hours to be able to use for purposes of larval mosquito control within their municipalities. A record of the quantity of fish used to treat a given area, date, and time of treatment will be recorded.

3.2 Adulticiding

Though larval elimination will be the main focus of mosquito control, it is impossible to know and eliminate every source of mosquito breeding. Mosquito-borne illness can only be transmitted in the adult life stage of the mosquito vectors. The City may use contractors to apply adulticide via a ground-based truck mounted with Ultra Low Volume (ULV) sprayers in response to a mosquito sample that tests positive for WNV and/or SLEV, and in areas where a confirmed human case notification has been provided.

Once a confirmed positive trap for West Nile Virus or other mosquito-borne pathogens has been discovered, or a confirmed human case has been reported, the Public Works Director, or a designated representative, shall determine the need to consider targeted adult mosquito controls, such as ground-based Ultra-Low Volume (ULV) applications of pyrethroids, such as permethrins (preferred), or other suitable pesticides and methods based on the conditions present at the time and the Adult Mosquito Intervention Table in Appendix A. The decision to spray should be based on the effectiveness of spraying adulticides and risks to the health of residents. The decision shall not be made based upon complaints from residents. Spraying efforts should be implemented only in the vicinity (approximately 1/2 mile or more) of areas where mosquito traps indicate a dense pathogen-bearing mosquito population or where positive tests are located near dense human populations. If an area continues to test positive for WNV and/or SLEV after it has been treated, the City will consider elevating this response to adulticiding by increasing the concentration of product used, or expanding the area to be treated by up to a nominal one mile buffer to the trap location, or increasing the number of consecutive treatment days. Environmental Services staff will develop buffer maps for spray areas every mosquito season.

When a positive trap result is reported to the City, Environmental Services staff shall consult the *Culex* Adult Mosquito Intervention Table to determine if a spraying event is warranted, where it be conducted, and for how many nights. Public notification shall be posted through the City's social media and other public notice channels and include the area proposed to be sprayed, and a summary of additional steps that residents may take to reduce risks to public health. For treatments to be effective as a means to reduce disease transmission, it is important to implement as quickly as possible. Weather permitting, treatments should commence the evening of a positive result notification.

When human cases of WNV infection have been reported to the City, a trap may be placed near the location to test for presence of WNV in the local mosquito population. A decision to treat the area utilizing adulticide treatment options may be based on the results of the collected mosquitoes, or other relevant information. Typically, the area treated will be within a nominal buffer of 1/2 mile.

In extreme cases of public health emergency, TCPH maintains an aerial spray contract the City may participate with.

The CDC and EPA have determined that ultra-low volume, ULV, based spraying of pesticides, whether applied by ground or aerial methods, is not harmful to the environment or people, and can be an effective means of control for adult mosquito populations capable of transmitting disease to humans.

As mentioned in the CHIKV/SLEV surveillance portion of this document, when large populations of adult *Aedes* are determined to be present on a suspected CHIKV/DENV patient's property, ULV or thermal fogging via backpack mounted/all-terrain vehicle (ATV) mounted sprayer will commence when appropriate.

3.3 Complaints

Reports of potential breeding habitat, increased adult activity, or significant adult population on any property within the City of Mansfield shall be investigated by Environmental Services personnel through a thorough investigation of the suspect property, as well as surrounding properties. If mosquito breeding sources are found, notification, treatment and corrective action of the problem will be communicated to the responsible party. Complaints are filed and tracked to ensure follow-up visits and continuous mosquito control over time. Time permitting, complainants will be contacted with follow-up information.

4.0 Public Education Concerning Mosquito Control

Educating the public is an essential aspect of the City's arboviral control program. This includes giving the public tips on how to control mosquitoes in their homes and backyards, stating the risks and symptoms of these arboviral diseases, and informing people on how to protect themselves from host-seeking female mosquitoes. To help educate the public, Environmental Services personnel attend local events with displays of larvae and adult mosquitoes, pamphlets and fliers that include information about mosquitoes, and WNV/SLEV/CHIKV/DENV protection from mosquitoes, and answer general questions about these subjects. Environmental Services personnel are also available for classes upon request to educate homeowners associations (HOAs), school classes, and community outreach programs throughout the city. Appropriate staff also attend an Arboviral Surveillance Program kick-off meeting before the start of the WNV/SLEV season where TCPH vector control personnel review the past year, review cumulative progress of the program, and assess the program.

Environmental Services personnel attend Texas Mosquito Control Association (TMCA) and American Mosquito Control Association (AMCA) meetings to be educated and to network with other vector control professionals. Environmental Services personnel work with public education and information staff to create pamphlets, fliers, and other educational materials, and/or use those developed by TCPH. The Environmental Services Department handles official press releases, ground spray notifications, social media posts, online articles, and other communication vehicles. Notifications of spraying activity will be posted on the City’s social media accounts (geo-fenced to the spray location when possible), the City’s website, and other online venues the day when spraying activities are scheduled to begin. This will generally be done the afternoon when results are received from the TCPH NTRL of positive mosquito trap results, or notification from TCPH Epidemiology of confirmed human cases. Other general program information will be available through brochures, the City’s website, and other appropriate communication channels.

5 WNV/SLEV and Other Culex-borne disease response summary table

This response plan is in line with the Tarrant County Public Health guidelines for a phased response to mosquito surveillance. It should be noted the City of Mansfield retains the right to implement measures as it sees best for the residents based on health risks within the city limits, or other related information.

The plan is divided into six categories based on the risk of human disease transmission. Each risk category is described below, along with specific recommended responses in accordance with the principles of Integrated Pest Management Control measures recommended for each category.

Risk Category	Condition	Action
0 – No Risk	No evidence of mosquito	<ul style="list-style-type: none"> ● In/off season surveillance

	populations or viral presence in past 6 weeks	<ul style="list-style-type: none"> ● Continue education program ● Review/update communication plan ● Standard larvicide, source reduction and education
1 – Normal Response	Normal seasonal mosquito populations with little or no evidence of viral presence	<ul style="list-style-type: none"> ● Response as in Risk Level 0, plus: ● Routine surveillance ● Property site assessments
2 – Enhanced Response	Normal seasonal mosquito populations without evidence of viral activity but typical historical viral presence	<ul style="list-style-type: none"> ● Response as in Risk Level 1, plus: ● Enhanced larvicide, source reduction and education
3 – Public Health Concern	Elevated mosquito populations or viral presence in adjacent communities and/or probable human case	<ul style="list-style-type: none"> ● Response as in Risk Level 2, plus: ● Enhanced site assessments near traps with increased activity ● Consult Adult Mosquito Intervention Table in Appendix A for adulticide response ● Re-emphasize need to remove standing water ● Emphasize urgency of personal protection, including use of repellents
4 – Public Health Advisory	Virus detected in mosquito sample(s) and/or probable human case	<ul style="list-style-type: none"> ● Response as in Risk Level 3, plus: ● Alert medical professionals, veterinarians, and others ● Public health warning considered
5 – Public Health Alert	Multiple trap locations and/or human cases confirmed by laboratory testing and continued viral mosquito activity	<ul style="list-style-type: none"> ● Response as in Risk Level 4, plus: ● Public health emergency considered* ● Possible aerial adulticide treatment consideration

***If conditions exist to warrant a local public health emergency, the City Council will be notified of the potential and a request be made for the Mayor to declare a public health emergency. If public health emergencies are declared at the county or state level, the recommended responses associated with the declaration may be considered as part of the control plan of the City of Mansfield.**

6 CHIKV, DENV, ZIKV and other *Aedes*-borne disease response summary table

Risk Category	Condition	Action
Preparation	Vector possible in area	<ul style="list-style-type: none"> ● Plan surveillance of <i>Aedes</i> by preparing the BG Sentinel traps and securing source of dry ice to fuel the traps
Category 1	Mosquito season	<ul style="list-style-type: none"> ● Consider expanding adulticide activity ● Intensify public education to prevent biting
Category 2	Local transmission	<ul style="list-style-type: none"> ● Expand adulticiding efforts to affected locality ● Monitor <i>Aedes</i> with BG Sentinel traps
Category 3	Widespread local transmission	<ul style="list-style-type: none"> ● Continue with Category 2 procedures ● Work with regional and statewide entities to reduce human risk
Category 4	Local transmission in larger area (multiple counties)	<ul style="list-style-type: none"> ● Expand response activity and capability regionally and statewide

7 References

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8 Contact and Resources

City of Mansfield Stormwater Management Program

Howard Redfearn 817-276-4240

Cameron Cowden 817-728-3340

<https://www.mansfieldtexas.gov/248/Mosquito-Control>

Tarrant County Health Department

Environmental Health 817-321-4960

<https://www.tarrantcounty.com/en/public-health/disease-control---prevention/west-nile-virus.html>

Texas Department of State Health Services

<https://dshs.texas.gov/idcu/disease/arboviral/westnile/>

Centers for Disease Control and Prevention (CDC)

<https://www.cdc.gov/westnile/index.html>

9 Appendix A – Adult *Culex* Mosquito Intervention Table

Truck-based *Culex* mosquito adulticide action matrix for control of WNV*

	Isolated Trap Conditions				Adjacent Positive Trap Conditions			
	First Positive	Previously Positive	Second Consecutive	Third Consecutive	First Positive	Previously Positive	Second Consecutive	Third Consecutive
Early Season	No spraying	Spraying, 2 nights/0.5 mile	Spraying, 3 nights/0.5 mile	Spraying, 3 nights/1.0 mile	Spraying, 2 nights/0.5 mile	Spraying, 2 nights/0.5 mile	Spraying, 2 nights/1.0 mile	Spraying, 3 nights/1.0 mile
Peak Season	Spraying, 2 nights/0.5 mile	Spraying, 2 nights/0.5 mile	Spraying, 3 nights/0.5 mile	Spraying, 3 nights/1.0 mile	Spraying, 2 nights/0.5 mile	Spraying, 2 nights/1.0 mile	Spraying, 3 nights/1.0 mile	Spraying, 3 nights/1.0 mile

***Changes to these adulticide decisions are contingent upon recommendation from Tarrant County Public Health due to changes in disease risk.**

Variables listed and defined:

- Early: Late February through Late May.
- Peak Season: June through Early November.
- First Positive, Isolated Trap: When a trap tests positive for WNV for the first time in the season, and the trap is not located near other positive trap sites.
- Previously Positive: When a trap tests positive for WNV after testing negative, but was positive within three previous weeks.
- First Positive With Adjacent Positive: When traps adjacent to one another test positive for WNV for the first time in the season. This refers to traps within the City and directly outside.
- Previously or Consecutive Adjacent Positive Traps: Either trap consecutively or previously testing positive for WNV will result in the response for adjacent conditions. This refers to traps within the City and directly outside.
- Spraying: Truck-based, ultra-low volume treatment from streets with adulticide of the areas indicated in published maps. Adulticide treatments shall not take place without an indication of disease risk present.
- No spraying: The choice not to spray. Other actions such as habitat removal, larvicide, and public education will be conducted.

10 Appendix B – 2020 Mansfield Mosquito Surveillance Trap Map



Trap locations and map subject to change as needed.