

CITY OF
SOUTHLAKE



VECTOR

CONTROL ANNEX

Record of Changes

Change Number	Date	Entered By	Summary of Changes
1	5-7-2013	Kyle Taylor	Original plan adopted by Council.
2	04-20-2015	Ben Williamson	Updated format and structure to match the City's Comprehensive Emergency Management Plan.
3	07-09-2015	Ben Williamson	Annual Update
4	04-01-2016	Ben Williamson	Update Zika information.
5	11-07-2016	Ben Williamson	Annual Update.
6	1-12-17	Lydia Bristol, Ben Williamson, Christi Upton, Ashley Carlisle	Annual Update
7	5-17-2017	Eric Hutmacher, Christi Upton	Update contact information.
8	2/13/18	Eric Hutmacher, Amanda Meneses	Annual Update.

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VECTOR CONTROL ANNEX

I. AUTHORITY

Authorities

- Southlake City Ordinance No. 351
- Texas Government Code Title 5, Subtitle A, Chapter 341, Subchapter B

II. PURPOSE

Purpose

This annex defines the organization, operational concepts, responsibilities, and procedures necessary to accomplish an effective approach to managing mosquito-borne diseases (arboviral diseases).

Scope

This annex is for mosquito response efforts in the City of Southlake that addresses arboviral diseases in the mosquito population.

III. EXPLANATION OF TERMS

Acronyms

CDC	Centers for Disease Control
DSHS	Department of State Health Services
IPM	Integrated Pest Management
WNV	West Nile Virus
CHIKV	Chikungunya Virus
DENV	Dengue Virus
ZIKV	Zika Virus
TCHD	Tarrant County Health Department

Definitions by Subject

Mosquito Management

Adulticide (spraying) - are products used to kill adult mosquitoes. Adulticides can be applied from hand-held sprayers, truck-mounted sprayers or using airplanes. Adulticides, when used well, can have an immediate impact to reduce the number of adult mosquitoes in an area, with the goal of reducing the number of infected mosquitoes that can transmit mosquito borne diseases.

Integrated pest management (IPM) is a science-based, commonsense approach for managing populations of disease vectors and public health pests. IPM uses a variety of pest management techniques that focus on pest prevention, pest reduction, and the elimination of conditions that lead to pest infestations. IPM simply means (1) don't attract pests, (2) keep them out, and (3) get rid of them, if you are sure you have them, with the safest, most effective methods.

Larvicide - are products used to kill immature mosquitoes before they become adults. Larvicides can be either biological (such as toxin from specific bacteria that is lethal to mosquito larvae but not to other organisms) or chemical products, such as insect growth regulators, surface films, or organophosphates. Larvicides are applied directly to water sources that hold mosquito eggs, larvae or pupae. Larvicides can help to reduce the overall mosquito burden by limiting the number of new mosquitoes that are produced.

Mosquito Types

Aedes – Genus name for the *Aedes aegypti* and *Aedes albopictus* mosquitoes. Resting areas tend to be in tall grasses and shrubs low to the ground. Both species typically remain with a range of 200 meters. These two species mosquitoes are the common transmitter of Dengue, Zika, and Chikungunya virus.



Culex – Genus name of a general group of mosquitoes which are nighttime-active, opportunistic blood feeder and a primary vector for the WNV. Temperature-dependence drives prevalence of species. In warm temperatures *Culex quinquefasciatus* (southern house) mosquito, becomes prevalent, although *Culex restuans* is an important vector species in the early spring and late fall. These species tend to rest high in trees during the day and come down at night to feed. The feeding range can be up to 1 mile. *C. quinquefasciatus* is a medium-sized brown mosquito that exists throughout the tropics and the lower latitudes of temperate regions.



Vector – the primary agent that transmits a disease. For the purpose of this plan, mosquitoes are the common vector.

Mosquito Viruses

Arbovirus – Any virus that is transmitted by arthropods (mosquitoes)

Chikungunya - Chikungunya (pronunciation: \chik-en-goon-ye) virus is transmitted to people by mosquitoes. The most common symptoms of chikungunya virus infection are fever and joint pain. Other symptoms may include headache, muscle pain, joint swelling, or rash.

Dengue - Dengue (pronounced den' gee) is a disease caused by any one of four closely related dengue viruses (DENV 1, DENV 2, DENV 3, or DENV 4). The viruses are transmitted to humans by the bite of an infected mosquito. The principal symptoms of dengue fever are high fever, severe headache, severe pain behind the eyes, joint pain, muscle and bone pain, rash, and mild bleeding (e.g., nose or gums bleed, easy bruising). Dengue Hemorrhagic Fever (DHF) is a more severe form of dengue infection. With good medical management, mortality due to DHF can be less than 1%.

West Nile Virus - West Nile virus (WNV) is most commonly transmitted to humans by mosquitoes. You can reduce your risk of being infected with WNV by using insect repellent and wearing protective clothing to prevent mosquito bites. There are no medications to treat or vaccines to prevent WNV infection. Fortunately, most people infected with WNV will have no symptoms. About 1 in 5 people who are infected will develop a fever with other symptoms. Less than 1% of infected people develop a serious, sometimes fatal, neurologic illness.

Zika - Zika is a disease caused by Zika virus that is spread to people primarily through the bite of an infected *Aedes* species mosquito. The most common symptoms of Zika are fever, rash, joint pain, and conjunctivitis (red eyes). The virus is usually mild with symptoms lasting for several days to a week.

IV. SITUATION & ASSUMPTIONS

Situation

- Mosquito-borne diseases such as West Nile have been present in the DFW region since 2003. The City of Southlake has experienced both positive mosquito samples and positive human cases of mosquito-borne diseases in recent years.

- These viruses are now part of the local environment and should be anticipated as a continuous threat to the City of Southlake.
- Arboviruses are not the same and the different species of mosquitoes (vectors) that spread them vary in behavior and ecology.
- The city’s response will follow recommended techniques based on Public Health Authorities at the federal, state, and county levels.
- Partnership with Counties:
 - Tarrant County conducts testing on the mosquito samples, public outreach, coordination, and subject matter expertise and the ability to offer additional resources
 - Denton County provides subject matter expertise and has the ability to offer additional resources.
- Personal protective measures are the most effective method for preventing the spread of arboviruses.

Assumptions.

- Each citizen should practice mosquito prevention techniques on private property. The City of Southlake, legally, can only take certain measures to protect citizens on public property.
- Based on data recorded over the past five years, mosquitoes in Southlake begin to pose a threat by May and last through October depending on environmental conditions.

V. CONCEPT OF OPERATIONS

Public Education

General Information

Public education before and during an arboviral outbreak helps residents and visitors understand the risks and what can be done to protect themselves. The prevention of any mosquito-borne disease is accomplished by ensuring that prompt and accurate information reaches the public.

From April to the end of October, the City provides information via Social Media and Public Education concerning arbovirus/disease frequently asked questions (FAQs), disease symptoms, personal preventative measures, and points of contact for additional information.

Personal Protection and Responsibility

Consistent application of personal protection is the current standard approach identified by federal, state, and local health authorities. The majority of the land within Southlake is private property where the City has no authority to enforce mosquito abatement techniques such as cleaning gutters or emptying standing water. Therefore, the City will communicate the importance of source reduction on private property by the property owners through its public information campaign each season. The

information listed below are examples of information that will assist the public to prevent the spread of mosquito-borne diseases. All citizens must be active in personal protection and do their part to aid in the abatement process to protect themselves, their family, homes, and community.

The key component of the City's public information campaign to promote personal responsibility will focus on the 4 D's:

- **Dusk / Dawn / Day:** Dusk and dawn are the times of the day when the Culex mosquitoes that transmit WNV are most active. During the day is when the Aedes mosquitoes, Zika transmitting, are most active. During peak mosquito season, individuals will be encouraged to limit outdoor activity during these periods and/or wear appropriate protective clothing.
- **DEET:** Individuals will be encouraged to use repellents that contain DEET as the active ingredient for treating exposed skin areas.
- **Dress:** Individuals will be encouraged to dress to keep skin covered as much as possible by wearing loose, long sleeved shirts and long pants. Light-colored clothing allow you to see mosquitoes on you more effectively.
- **Drain:** Residents will be encouraged to drain any standing water on their property. This includes water from flower pots, bird baths, rain gutters, rain barrel, and pet dishes.

The public will also be encouraged to reduce exposure to adult mosquito populations through the following actions:

- Mow tall grass or reduce the amount of brush and other foliage on the property that can provide a resting site for adult mosquitoes.
- Use screening in homes and pet kennels. Keep door and window screens in good repair, and be sure that they are properly sealed around the frames.
- Protect pets with drugs that prevent heartworms.

Employee Safety

During peak mosquito season, City employees working outdoors need to take necessary precautions to avoid bites. Mosquito repellent containing DEET will be made available to employees, by department, at all City facilities. When feasible, employees should take steps to cover arms and legs to minimize exposure to mosquitoes. Mosquito safety information will be made available to all city departments upon request.

Elevated Risk

If a sampled mosquito pool tests positive for arbovirus/diseases, information will be posted on the City's website listing the general location of the sampling, the date, and any other pertinent information.

Information dissemination methods may include the following:

- Utilization of the City's website to post mosquito abatement activities, maps, surveillance reports, mosquito FAQ's, personal protection best practices, and mosquito control website links.

- Utilization of the City's Everbridge Emergency Notification System to alert the community of any potential virus threat and adulticide control applications.
- Utilization of the City's social media outlets to post mosquito FAQ's, personal protection best practices and mosquito control website links.
- Letters, pamphlets, brochures, and/or door hangers to be distributed to residents, shopping areas, schools, and faith based organizations within the community.
- Presentations to community groups and target populations concerning mosquito breeding reduction and related activities.
- Press releases describing arboviral response activities.

Customer Service

Southlake employees will respond to resident's questions, compliments, complaints, and concerns as appropriate. The Office of Emergency Management will respond to complaints and concerns within 7 business days and offer private property visits/inspections as needed.

Source Reduction

The elimination or reduction of mosquito breeding sites is critical, and typically, the most effective and economical solution for long-term mosquito control. Mosquitos have adapted to a wide variety of larval habitats, and it is important to check for larvae in all pools of standing water.

City staff will practice source reduction year round by inspecting public facilities, infrastructures, and equipment to remove any potential mosquito breeding site.

Mosquito Surveillance and Monitoring

The City's surveillance and monitoring program is conducted in partnership with Tarrant County Health Department. The City will survey and monitor mosquitoes consistent with guidelines and standards identified by the Tarrant County Health Department.

Information obtained from these surveillance efforts will be used to map mosquito populations, provide public information, and determine the occurrence of any mosquito-borne disease. All surveillance data is published on Tarrant County's website. (<https://gisit.tarrantcounty.com/VSCoop/>)

The City will use mosquito surveillance and monitoring to determine what control measures will be used and evaluate the potential for any arboviral disease outbreak within the community. The objective of the surveillance and monitoring program is to:

- Assess the threat of arboviral exposure to residents.

- Identify high risk adult mosquito population areas.
- Identify larval habitats that are in need of targeted control.
- Monitor the effectiveness of control measures.
- Determine what level of control methods need to be implemented.

The timing of the surveillance program is April through the end of October.

Indicators of Disease

Trapping for pools of mosquitoes in a location provides a data driven approach for taking action and preventing the risk of disease in animals and humans by detecting the presence of arboviral agents in female mosquitoes.

The city of Southlake has partnered with Tarrant County for identification and arbovirus isolation. Should the Tarrant County Health Department become unable to operate at a sufficient capacity, the city can consider Texas Department of State Health Services or utilize private laboratory services, if necessary.

Trapping for Culex and Aedes species

The City will utilize five gravid traps (see Appendix B) to collect for Culex species, an important vector of WNV. Gravid traps focus on female Culex mosquitoes that are looking to lay their eggs. This is an indicator that measures the current adult population and also indicates the upcoming offspring that may increase infection rates.

Efforts are made to consistently collect a sample of mosquitoes weekly through the trapping season, as defined by Tarrant County which is the first week of April through November. Occasional weather events can disrupt sampling efforts in which case sampling will resume the following week.

Monitoring Human Cases

Monitoring human cases is indicative of the risk for local acquisition of disease for the community. Dengue, CHIKV, and Zika, which are all most likely spread by Aedes mosquitoes, can be transmitted from one animal or human host to another. In the event of a human case, Tarrant County Health Department will notify the Southlake Emergency Management. Note: Medical patient information is subject to the Health Insurance Portability and Accountability (HIPPA) Act of 2003.

Vector Index

Vector Index Public Health has developed a protocol for determining a Vector Index (VI) across Tarrant County. This protocol has been refined in 2017 to measure the VI in Northeast Tarrant County. The Northeast Tarrant County VI will be a determinant of the risk of West Nile Virus in Southlake. The vector index is calculated by multiplying the infection rate by the average number of mosquitoes per trap.

Mosquito Control Methods

Overview

There are two major mosquito control methods: Larviciding and Adulticiding.

Larviciding (Larval Mosquito Control)

Larviciding is utilized when source water cannot be eliminated (such as a fountain or pond). There are several larval control methods available and the City will consider effectiveness, ecological impact and cost when choosing which larval control to apply. These include:

- Industry standard mosquito larvicides with reduced environmental impacts
- Gambusia fish

The city will focus on applying larvicide on public property. When inspections determine the source water lies on private property the City will first encourage the property owner to purchase and apply the larvicide. The City will only consider applying larvicide on private property when the property in question is uninhabited per the §341.019 of the Health and Safety Code, or the City believes the source water is creating a risk.

Adulticiding (Adult Mosquito Control)

Adulticiding is the standard application of pesticides to kill adult mosquitoes.

Culex Species

- *Culex quinquesfasciatus* as the main vector of WNV.
- *Culex* species can travel more than ¼ mile from the original breeding site and are active at dawn and dusk.
- Due to the transmit cycle of WNV (mosquito–bird, humans are incidental), the best indicator of threat is through mosquito pools and not human cases.

Trigger points for adulticiding:

- When a mosquito sample pool has tested positive for an arbovirus.
- When notified by a border jurisdiction of a positive mosquito sample pool within a half-mile of the border of Southlake.

- On the recommendation by Tarrant County, Denton County or the DSHS for any public health reason.

The City will use the following guidelines when applying adulticide:

- Spraying shall be conducted during overnight hours only, as appropriate for the vector.
- Notification sent to stakeholders (business, residents, regional partners) in the areas being sprayed. Notification must occur 24 hours prior to any application.
- The areas where spraying takes place shall be treated three (3) times on three (3) consecutive days.
- There are variables that prohibit spraying after the 24 hours notification is complete (examples of variables below).
 - Precipitation or threat of precipitation.
 - Wind over 10 mph.
 - Under 50 degrees at time of spraying.
 - Contractor availability.
- When variables prohibit spraying on a specific day the schedule will not be altered:
 - Example: notification on Wednesday, spray on Thursday, Friday, and Saturday. If a variable does not allow for spraying on Thursday, then only spray on Friday and Saturday.

Aedes Species

- *Aedes aegypti* is believed to be the main vector for CHIKV, ZIKV, and DENV.
- *Aedes aegypti* remains local to breeding sites and usually does not travel beyond 200 meters. This species tends to rest in vegetation in and around urban and suburban property.
- Quantity of positive mosquito pools and human cases of mosquito-borne diseases are considered indicators and may require mosquito abatement action. Spraying for the *Aedes* mosquito is best accomplished using handheld/backpack/ATV spraying.

The thresholds are:

- When the City has been notified by Tarrant County, Denton County or the DSHS of a confirmed human case.
- When the City has been notified by Tarrant County, Denton County or the DSHS of a significant increase in the population of *Aedes* mosquitoes that warrants further action or recommendation by Tarrant County, Denton County or the DSHS for any public health reason.
- Or, when the City's leadership believes that the threat level has increased to necessitate a response.

VI. ORGANIZATION & ASSIGNMENT OF RESPONSIBILITIES

Emergency Management Coordinator

- Manage traps
- Determine spray area
 - Coordinate with GIS
- Manage Contract, mobilize contractor for control measures
- Respond to public inquiries
- Internal notification (Appendix A)
- External notifications
 - Stakeholders
 - Emergency Notification System
 - DPS Social Media
 - Website
- Coordinate with regional partners
- Communicate staff personal preparedness, source reduction, and preventative measures
- Public education coordination

GIS

- Generate maps for spray areas

Public Information Officer

- My Southlake News Article

Deputy Director of Communications

- City Twitter and Facebook
- Meet with City Manager's Office about current conditions

Executive Team

- Approve spraying application each season
- Provide input on new arboviral conditions (CHIKV, DNV, ZIKV)
- When variables cause unique situations , provide direction
- Provide updates to senior staff and elected officials

VII. PHASES OF EMERGENCY MANAGEMENT

Mitigation

- Look for potential mosquito breeding sources and eliminate them

Preparedness

- Update the Mosquito Response Plan
- Attend training seminars and meetings to prepare for the arboviral season
- Public education and outreach materials
- Mosquito monitoring with traps
- Maintain spraying contracts
- Update the City's website with the most current arbovirus information
- Maintain all needed equipment
- Acquire mosquito repellent for staff members
- Acquire larvicide(s)

Response

- Adulticiding operations
- Utilize larvicide as appropriate
- Utilize code enforcement to eliminate mosquito breeding grounds
- Utilize public outreach to maintain the information flow to residents/businesses and stakeholders
- Work with Tarrant County and neighboring jurisdictions to coordinate response activities
- Search for and eliminate mosquito breeding sources

Recovery

- Conduct an After Action Review (AAR) and account for any operational changes that need to be made
- Review the plan for any changes that are needed

VIII. DIRECTION & CONTROL

This Hazard-Specific Annex to the Comprehensive Emergency Management Plan is hereby approved. This plan is effective immediately and supersedes all previous editions.

In addition, it is understood that you and/or your department has been assigned roles and responsibilities in this plan. You understand these requirements and hereby approve your department's support, including but not limited to personnel and resources as both explicitly and implicitly described in this plan.

Annex Coordinators

Primary Department: Southlake Fire Department

Supporting Department: Office of Emergency Management

IX. PLAN DEVELOPMENT & MAINTENANCE

The Emergency Management Coordinator is responsible for maintaining this annex. Each department will maintain Standard Operating Guidelines (SOGs) that address their assigned tasks.

X. REFERENCE/SOURCES

- Center for Disease Control: <https://www.cdc.gov/>
- World Health Organization: <http://www.who.int/en/>
- Tarrant County Public Health: <http://access.tarrantcounty.com/en/public-health.html>
- Denton County Public Health: <http://dentoncounty.com/Departments/Health-Services/Denton-County-Public-Health.aspx>

XI. APPENDICES

Appendices

Appendix 1Notifications

