



MOSQUITO CONTROL PLAN

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INTRODUCTION

Mosquitoes are insects that belong to the order Diptera, or True Flies. Female mosquitoes have modified mouthparts that form a long piercing-sucking proboscis, while male mosquitoes have mouthparts that are incapable of piercing skin. There are over 2,500 different species of mosquitoes that have been identified throughout the world, with approximately 150 species occurring in the United States. The Texas Department of Health estimates there are approximately 82-84 mosquito species in the State of Texas, although only about 12 of these mosquito species have been implicated in the transmission of serious diseases.

Mosquitoes typically need still, stagnant water that is isolated from fish or other small predators to complete their metamorphosis from egg to adult. Larval habitats can range from marshes, freshwater wetlands, and tree holes to human-made structures like catchments, gutters, and discarded tires. Not all species of mosquitoes feed on humans and other mammals, many species feed mostly on birds, amphibians, or reptiles. Only a small percentage of the known mosquito species are considered to be vectors for disease.

Although only a small percentage of mosquito species are capable of transmitting diseases, mosquitoes are still considered to be a very important vector for disease transmission. Within the United States, the occurrences of mosquito-borne illnesses have been relatively rare in recent years. However, epidemics of mosquito-borne diseases were once common in the United States. Outbreaks of Yellow Fever have been recorded as far north as Philadelphia during the Colonial Period, and Dengue Fever was prevalent along the Gulf Coast until the mid-1940's. At one time, Malaria was well established in the continental United States, especially in the south. Other mosquito-borne illnesses like LaCrosse, St. Louis, and Eastern Equine Encephalitis are still threats in certain areas of the country. Many of these historical mosquito-borne diseases have been eliminated or at least controlled, the introduction and subsequent rapid spread of West Nile Virus within the United States is a topic of current concern.

Mosquitoes may be controlled through a variety of different physical, chemical, and biological methods. Physical methods usually involve source reduction, which is simply the physical removal of mosquito breeding habitats. Biological measures mainly center on the use of bacteria that kill mosquito larvae or the use of natural mosquito predators. Chemical treatment typically involves the application of pesticides to attempt to control adult mosquito populations.

WEST NILE VIRUS (WNV)

West Nile Virus was first recorded in North America during August 1999 shortly following the Center for Disease Control and Prevention (CDC) and the New York City

Department of Health responses to an unusual outbreak of encephalitis in northern Queens, New York. The cause of the observed illnesses was determined to be West Nile Virus (WNV). During 1999, approximately sixty people were diagnosed with WNV and seven elderly residents died from the infection. During the summer of 2000, WNV activity appeared to be spreading. WNV was detected in 13 states and in the District of Columbia. In 2001, a total of sixty-six human cases with nine fatalities were reported throughout the nation, mostly spread throughout the eastern United States. During 2002, there were 4,156 laboratory-positive human cases and 284 deaths. The number of cases increased dramatically in 2003 as the disease spread westward, with 9,862 cases and 264 deaths. After 2003, annual national case counts have ranged from a low of 712 during 2011 to a high of 5,674 in 2012. In 2012, the highest incident rates in the nation were observed in the North Texas region.

The relatively rapid spread of WNV and the increase in disease incidence indicates that WNV is permanently established in the United States. It is likely that the virus survives the winter either within birds that remain in the area or possibly within mosquitoes that survive the winter in the adult stage. When spring returns, the virus reemerges within the birds and is readily passed to early season mosquitoes. As mosquito populations increase, mosquitoes begin to feed more frequently on birds, causing an increasing number of birds and mosquitoes to become infected. If environmental conditions are favorable for transmission, the virus will amplify to a theoretical point of spillover. At spillover, the virus can bridge out of the enzootic, bird-mosquito cycle through mosquitoes that feed on birds, humans, and other animals. At the point of spillover, transmission to humans becomes more likely, unless a mosquito control program is implemented.

Understanding the types of mosquitoes in the area that transmit the disease is also a crucial consideration for directing control responses and public education activities. Since not all mosquitoes carry the virus, enacting mosquito control efforts that attempt to non-selectively reduce all mosquito populations will not necessarily reduce the risk of WNV. The most common carrier of WNV in the Dallas-Fort Worth region is the species *Culex quinquefasciatus*, also known as the southern house mosquito. This species' breeding habitat are waters heavily polluted with organic materials such as ditches, down spouts, and storm drains receiving grass clippings, leaves, septic tank overflow, and other organic materials and polluted waters. This mosquito will also breed in artificial containers. The southern house mosquito, although able to lay eggs just about anywhere, will less likely breed in flowing or pooled streams and other waterways, especially with the presence of predators such as small fish.

The past experience of numerous mosquito control districts suggests that a mosquito control program should be based on the principals of Integrated Pest Management (IPM). The principals of IPM 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; and
- continual education of the public to create awareness, understanding, and support.

These general guidelines have been used to develop the threshold-level responses of this surveillance and response plan.

MOSQUITO SURVEILLANCE

The risk of mosquito-borne diseases depends on the size of mosquito populations and the incidence rate of disease. Collecting information on adult mosquito populations is very important for both targeting control measures and gauging the potential for disease outbreak.

The Town of Pantego is part of the Tarrant County Public Health Mosquito Surveillance Program. The program's main objective is collecting adult mosquitoes through the use of gravid traps. Captured mosquitoes are sent to the Tarrant County Public Health Department lab for testing. Each sample or pool will consist of mosquitoes that are collected at a single collection site. The information obtained from these surveillance efforts will be used to map mosquito populations, provide public information, and to determine the incidence of WNV or other viruses. An effective surveillance and control program should therefore, allow analysts to detect the presence of WNV and of other mosquito-borne viruses during the amplification phase. The Town has also executed an Interlocal Agreement with Tarrant County that allows the utilization of County contracts for abatement response operations such as ground fogging and aerial spraying.

MOSQUITO CONTROL MEASURES

Town Staff Responsibility

The Community Development and Public Works Departments are tasked with directing the development and implementation of this Plan. That being said, it is the responsibility of all Town staff to assist in identifying issues and concerns. Assigned staff will also meet as needed during the peak mosquito season to discuss current response tactics, communication efforts and other mosquito related concerns.

Staff will practice source reduction year round by inspecting public facilities, infrastructures, and equipment to remove any potential mosquito breeding sites and will perform source reduction on public property that will include, but is not limited to:

- Draining and/or filling of areas where shallow stagnant water can accumulate such as gutters, potholes, and drainage ditches.
- Proper storage of outdoor equipment;
- Continuing to enforce current water conservation codes and ordinances;
- Monitoring the municipal irrigation systems for proper watering operations; and
- Treatment of culverts, catch basins, fountains, storm water inlets, and discharge areas.

During peak mosquito season, employees working in the field need to take steps to protect themselves from mosquitoes. Mosquito repellent containing DEET will be made available to employees at all Town facilities. When feasible, employees should take steps to cover arms and legs to minimize contact with mosquitoes. If an employee is bitten by a mosquito during work time and begins to experience symptoms, their supervisor should be notified. A First Report of Injury form needs to be submitted as soon as possible.

Personal Responsibility

All citizens must be active in personal protection and do their part to aid in the abatement process to protect themselves, their family, their homes, and their community. Since most land within Town is private property, the importance of personal protection responsibility cannot be stressed enough. It is important for the residents to know that the majority of mosquito breeding sites are developed due to the creation of artificial breeding sites around their homes. Residents should use the following information to assist them in the prevention of breeding grounds and the spread of mosquito-borne diseases. The key components of personal responsibility are a focus on the 4 D's:

- Dusk / Dawn: Dusk and dawn are the times of the day when mosquitoes are most active. During peak mosquito season, individuals should stay indoors if possible or limit outdoor activity during these periods.
- DEET: Individuals should use repellants that contain DEET as the active ingredient for treating exposed skin areas.
- Dress: Individuals should dress to keep skin covered as much as possible by wearing loose, long sleeved shirts and long pants
- Drain: Residents should drain any standing water on their property. This includes water from flower pots, bird baths, rain gutters, rain barrel, and pet dishes at least once a week.

Residents should also work to reduce the sources that create breeding sites for mosquito larvae and reduce mosquito exposure by:

- Reducing all standing water;

- Checking irrigation systems to prevent excessive watering of landscaping;
- Repairing leaky pipes and outside faucets;
- Cleaning gutters every three to four months;
- Emptying outside pet bowls when not in use;
- Cleaning and adding fresh water to birdbaths once a week;
- Using mosquito fish in decorative ponds and fountains;
- Using larvicidal dunks in areas of standing water; and
- Mowing tall grass and/or reducing the amount of brush and other foliage.

PUBLIC EDUCATION

Public Education information dissemination methods may include, but are not limited to, the following:

- Utilization of the Town's website to post information on positive human cases, mosquito abatement activities, maps, surveillance reports, mosquito FAQ's, personal protection best practices, and mosquito control website links;
- Utilization of the Town's Blackboard Connect system to alert the community of any potential virus threat and adulticide control applications;
- Adding mosquito control tips in the newsletter included in utility water bills;
- Letters, pamphlets, brochures, and/or door hangers to be distributed to residents, shopping areas, schools, and faith based organizations within the community; and
- Press releases describing WNV response activities.

RISK LEVELS AND RESPONSE

The purpose of this response plan is to:

- Minimize human illness through public education and vector control;
- Map the density of mosquitoes and the incidence of the virus within the Town and examine the relationship between mosquito density and land uses;
- Identify areas where the incidence of disease is high and post the appropriate warnings to citizens; and
- Identify the key vector species that carry diseases within the Town.

The prevention of WNV, as with many diseases, is most efficiently accomplished by ensuring that prompt, accurate information reaches the public. If the appropriate information reaches the public in a timely manner, personal protective measures may be implemented without panic and confusion.

The Town will provide updated information on the its web page concerning WNV frequently asked questions (FAQs), disease symptoms, personal preventative measures, and points of contact for additional information. If a sampled mosquito pool tests positive for a virus, information describing the location of the sampling event, the date, and other pertinent information will be provided.

This response plan is mostly based on, and is in line with, the Tarrant County Public Health (TCPH) guidelines for a phased response to mosquito surveillance. It should be noted that the Town retains the right to implement measures as it sees best fit for the residents based on health risks.

The plan is divided into five levels based on the risk of human disease. Each risk level is described below, along with specific recommended responses. In accordance with the principals of Integrated Pest Management Control, measures are recommended for each level.

NORMAL CONDITIONS

Conditions: No evidence of mosquito or viral activity.

Probability of Human Outbreak: None.

Surveillance Response:

- Develop and refine response plan.

Public Education Response:

- Initiate community outreach and public education programs.

Vector Control Response:

- Prepare and secure vector control resources for use if risk level escalates.

RISK LEVEL ONE

Conditions: Normal mosquito activity with little or no evidence of viral activity.

Probability of Human Outbreak: Low

Surveillance Response:

- Conduct mosquito surveillance with the Town's four traps on a weekly basis.
- Transport mosquitoes collected in the traps to TCPH for testing.

Public Education Response:

- Advise the public through Blackboard Connect of any ground-based adulticide spraying schedule.
- Communicate via website and/or social media accounts with a focus on risk potential, personal protection and residential source reduction.

Vector Control Response:

- Conduct larviciding operations on public property.
- Distribute larvicide to citizens.
- Offer mosquito fish to citizens, if available from TCPH.
- Conduct ground-based adulticide spraying once per month, if directed by Town Council.

RISK LEVEL TWO

Conditions: Virus detected in surveillance samples.

Probability of Human Outbreak: Moderate.

Surveillance Response:

- Continue Level One surveillance with an emphasis on areas where positive samples are collected.

Public Education Response:

- Advise the public through Blackboard Connect that a positive WNV test has occurred and subsequent ground-based adulticide spraying schedule.
- Communicate via website and/or social media accounts information on disease symptoms, personal protection and source reduction.

Vector Control Response:

- Consider ground-based adulticide spraying within ½ mile radius of positive sample location for three consecutive nights.
- Conduct additional larviciding around positive sample locations.
- Continue to conduct larviciding operations on public property
- Continue to distribute larvicide to citizens.
- Continue to offer mosquito fish to citizens, if available from TCPH.
- Continue to promote source reduction on public and private property.

RISK LEVEL THREE

Conditions: Virus detected in multiple mosquito samples from different times and locations and confirmed human cases.

Probability of Human Outbreak: High

Surveillance Response:

- Monitor the spread of the virus through continued surveillance operations.

Public Education Response:

- Advise the public through Blackboard Connect that additional positive WNV tests and human cases and subsequent ground-based adulticide spraying schedule.
- Continue to communicate via website and/or social media accounts information on disease symptoms, personal protection and source reduction.

Vector Control Response:

- Consider ground-based adulticide spraying throughout Town for three consecutive nights.
- Continue to conduct additional larviciding operations around positive samples.
- Continue larviciding operations on public property.
- Continue to distribute larvicide to citizens.
- Continue to offer mosquito fish to citizens, if available from TCPH.
- Continue to promote source reduction on public and private property.

RISK LEVEL FOUR

Conditions: Multiple human cases confirmed and detection of increased or continued viral mosquito activity.

Probability of Human Outbreak: Outbreak in progress

Surveillance Response:

- Monitor the spread of the virus through continued surveillance operations.

Public Education Response:

- Communicate the ongoing public health threat, any advisories from TCPH and subsequent ground-based adulticide spraying schedule through Blackboard Connect.
- Continue to communicate via website and/or social media accounts information on disease symptoms, personal protection and source reduction.

Vector Control Response

- Consider aerial spraying should TCPH offer it as a vector control option.
- Continue ground-based adulticide application around areas with confirmed positive samples.
- Continue to conduct larviciding operations around positive samples.

- Continue larviciding operations on public property.
- Continue to distribute larvicide to citizens.
- Continue to offer mosquito fish to citizens, if available from TCPH.
- Continue to promote source reduction on public and private property.

MOSQUITO SURVEILLANCE MAP

