

2015
Integrated Mosquito Management
Program
City of Bedford



Administered by the City of Bedford Public Works Department

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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. Only a small percentage of the known mosquito species are considered to carry the West Nile Virus.

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. 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.

Today, communities are developing locally tailored mosquito control programs that may be scaled to adapt to changing conditions. For many areas, this means providing the basic level of protection by monitoring mosquito movement, population size, and infection rates. Just as one keeps an eye on the checkbook to prevent overdrafts, or track hurricanes to avoid weather disasters, knowing how many and what kinds of mosquitoes are in the area helps communities respond more effectively when threatened, especially in the aftermath of flooding and clean-up activities.

Because regions vary in geography and climate, and because each community's economy is supported by different industries, the need for mosquito control is a local matter. In fact, the type of mosquito control program a community needs may change over time. This means a community needs a program that is tailored and flexible.

OBJECTIVES

The City of Bedford's Integrated Mosquito Management Program was developed to meet several objectives including, but not limited to:

- Provide guidelines and information on mosquito populations, prevalence of diseases, and control strategies
- Provide a systematic approach for utilizing mosquito sampling and human disease data to establish Risk Levels
- Establish actions that will be undertaken for each risk level
- Establish the escalation and de-escalation between risk levels
- Establish an adulticiding policy
- Provide for the consultation with subject matter experts
- Formalize the public notification procedures
- Maintain with Environmental Protection Agency (EPA) and Tarrant County Health Guidelines

WEST NILE VIRUS (WNV)

West Nile Virus is a mosquito-borne illness. Up to 80 percent of people infected with WNV will have no symptoms and will recover on their own; however, some cases can cause serious illness or even death. People over 50 and those with weakened immune systems are at a higher risk of becoming ill, if they become infected with the virus.

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 re-emerges 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 increase in the number of birds to become infected. If environmental conditions are favorable for transmission, the virus will amplify to a theoretical point of spillover. At the point of spillover, transmission to humans becomes more likely, unless a mosquito control program is implemented.

CITY OF BEDFORD PLAN FOR MOSQUITO SURVEILLANCE AND CONTROL MEASURES

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.

In 2003, the City of Bedford, along with other cities in the County, joined 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 determine the incidence of WNV or other viruses tested, as determined by Tarrant County Health.

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. In 2013, the City executed an Interlocal Agreement with Tarrant County that allows the City to utilize County contracts for abatement response operations such as ground fogging and aerial spraying.

The City of Bedford's Integrated Mosquito Management Program consists of the following control measures.

- Public Education and Role of the Residents
- Mosquito Surveillance
- Mosquito Control Strategies
 - Source Reduction
 - Larvicide
 - Adulticide
 - Gambusia Minnows
 - Bacterium/Oils

Public Education & Role of Residents

Residents can play an important role in reducing the number of adult mosquitoes by eliminating standing water that may support the development of mosquito larva and pupae. For example, residents can do some of the following:

- Proper disposal of discarded tires, cans, and buckets.
- Maintain pools correctly, unclog blocked gutters and drains, dump water from bird baths and pet dishes at least every two to three days.
- Ensure that air conditioning condensation is not pooling for several days and control irrigation so that standing water is not produced.



Surveillance

The surveillance of mosquitoes will be done by way of trapping and testing the trapped samples. The overall goal of mosquito surveillance is to:

- Assess the threat of human disease
- Determine the geographical areas of highest risk
- Determine the need for intervention events and the timing of these events
- Identify larval habitats that are in need of targeted control
- Monitor the effectiveness of control measures
- Develop a better understanding of transmission cycles and potential vector species



Mosquito Control Strategies

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

- **Source Reduction** is a viable means of control, both by residents and on municipal properties, including actions for stagnant water located on private property.
- **Larvicide:** There are many ways to combat larvae. Biological methods (fish/bacteria/etc) and chemical sprays are commonly recommended. Larvicide activities are feasible, practical, and likely to be effective.
- **Adulticiding:** If warranted, implement adult mosquito control measures through the use of barrier treatments and with ULV backpack sprayers. Adulticiding means reduction of adult mosquitoes; it can have immediate impact and is used as a method to control large surges in adult populations, especially in disease outbreak situations. The City of Bedford utilizes Permethrin and staff are licensed for application of pesticides.
- **Fish:** *Gambusia affinis*, also known as the mosquito fish, are native to many Texas streams and rivers. Their diet consists mainly of mosquito larvae. This makes them great to use for mosquito control purposes because they are natural and sustainable.
- **Bacteria:** Spinosad is a pesticide made from modified compounds from another soil bacterium, *Sacchropolyspora spinosa*. These compounds bind to receptors and disrupt the neurotransmitter acetylcholine, acting to paralyze the insect. In this way, it is comparable to organophosphates, but is a very low risk to other wildlife and non-target arthropods.
- **Oils:** Oils can be dispersed over the surface of the water to prevent mosquito larvae and pupae from breathing. Mosquito larvae and pupae do not have gills, but must access air through a breathing apparatus. Since oils do not need to be ingested, this is a good choice to kill later instar larvae and pupae that do not ingest food.
- Promoting the use of personal mosquito protection measures, especially for the elderly and those individuals with compromised immune systems, through public education and outreach.
- Providing public information so that citizens are informed about the current risk levels, which trigger specific measures in areas of the City where WNV has been located, and what can be done by the public to help reduce risks.
- With the recommendation of the City Manager, Mayor and the City Council, truck mounted fogging will begin upon high risk levels being reached.

Risk Levels and Response

The City of Bedford will operate the Integrated Mosquito Management Program under three different risk levels. The risk levels and the actions taken by the City are described below.



LOW RISK LEVEL

Probability of human outbreak is low, subnormal to normal mosquito activity is observed, and no evidence of WNV in the immediate area.

Public Education – The City of Bedford will conduct abatement mosquito operations, such as providing printed materials (brochures, flyers about mosquito habitat reduction), provide property inspections by request to help identify mosquito breeding habitats on individual properties, and publicize information about avoiding mosquito bites and encourage larviciding by residents using *Baillus Thuringiensis Israelensis* (BTI) and other low toxicity products.

Larvicide – The City of Bedford will larvicide within public right-of-way areas and City-owned properties containing stagnant water with mosquito larvae, using low toxicity materials such as Vectolex granules, Natular tablets and granules and Cocobear larvicide oil. This operation will be done during mosquito season (as directed by Tarrant County Public Health).

Surveillance – The City of Bedford will set up five traps each week, four in static locations and one roving trap alternating throughout the City. The City then submits the weekly samples to Tarrant County Public Health Department for testing. The City also participates in off-season trapping.

MEDIUM RISK LEVEL

WNV has been detected in trapped mosquitoes, probability of human outbreak is increasing, and normal to above normal mosquito activity is observed. All activities at the Low Risk Level will continue and the following additional actions will take place at this level.



Notification – Citizens and property owners will be immediately notified of the detection of WNV in trapped mosquitoes by an outreach notification system within at least a ¼ mile radius of the positive site.

Mosquito Control Strategy – Immediately upon receiving notification of a positive sample, the test site and surrounding area will be inspected and treated with low toxicity materials such as Vectolex, Natular granules or tablets. Barrier treatments will be conducted on creek banks and City parks.

Monitoring – Public Works staff will prepare and distribute a weekly status report of mosquito activity and program functions to the City Manager’s Office.

Targeted Application of Adulticides – In a situation where a single test site has had three positive samples in a row, targeted application of adulticides by barrier treatment will be required. This will take place in the creek channels and City parks twice a month at the positive location and enhance mosquito inspection within a half mile. Once the test site tests negative for two straight weeks, ULV fogging applications will cease.

HIGH RISK LEVEL

Confirmed human case has occurred within the jurisdiction. Multiple static trap sites have tested positive for WNV. All activities at the Medium Risk Level will continue, and additional actions will be required by City staff.



Notification – Citizens will be immediately notified of the detection of WNV human case and information on the infected area will be posted on the City’s website so that citizens can take extra precautions to avoid being bitten.

Site-specific investigation – The City of Bedford will conduct an area inspection within a ½ mile radius of the mosquito sampling site that tested positive nearest the human case, in order to identify locations in need of mosquito source or habitat reduction. The survey will include all areas that are visible from public property and will not involve City staff entering private property. If obvious sources of mosquito breeding environments are found, Public Works and Code Compliance staff will notify the property owners of the situation and direct action be taken to eliminate the source(s). Obvious sources of mosquito breeding environments include, but are not limited to, tires, open containers, buckets, plant pots, wading pools, and overhead roof drains.

Adulticiding – If City staff determines that fogging is needed, the Director of Public Works will recommend to the City Manager to start the fogging process. Mobilization will take effect and be completed during a two day period with the use of an ATV mounted with a ULV backpack fogger. Fogging operations will take place in City parks, City creek banks and streets within a quarter mile of the positive human case reported by Tarrant County Health Department. In order to be effective, adulticiding will be combined with larviciding and public notification.

Contact Information

City of Bedford Environmental Supervisor (817)952-2258

City of Bedford Public Works Main Office (817)952-2200

Tarrant County Public Health Department (817)884-1111

The Tarrant County Public Health Department (TCPH) website is a good source of educational materials and contains frequently asked questions.

<http://access.tarrantcounty.com/en/public-health.html>

Center for Disease Control and Prevention WNV information.

<http://www.cdc.gov/westnile/>