

MOSQUITO CONTROL and WEST NILE VIRUS RESPONSE PLAN

Purpose

It is the intent of this plan to reduce the mosquito population which transfers West Nile Virus (WNV) and other diseases to humans and animals, increase awareness of WNV, and promote personal protection from mosquito bites and WNV. Reducing the incidence of mosquitoes and mosquito borne diseases increases quality of life by reducing nuisances and disease.

Background

West Nile Virus is a neuroinvasive disease transmitted by an infected mosquito biting a person. WNV is a bird disease now endemic to the bird population. It is transferred from an infected bird to humans by mosquitoes. In severe cases, it may develop into meningitis or encephalitis. In limited cases, it can lead to death.

There are 26 species of mosquitoes in McLennan County (85 in Texas). One specie, *Culex Quinquefasciatus*, is known to carry and transmit the virus in the Waco-McLennan County area. Mosquito breeding habitat is calm, stagnant water that exists for 7 days or more.

Depending on conditions, development from egg to adult can be as quick as 7 days but usually 10-14 days. The female mosquito lays up to 200 eggs at a time and repeats the cycle during its lifespan of about one month. The container holding the water can be natural or artificial and located on property that is public, private, residential, business, or commercial. The container can be any object such as tires, cans, birdbaths, clogged roof gutters, abandoned swimming pools, ponding of water, tree holes, blocked drainages, etc. The mosquito is a weak flier, usually traveling no more than 150 feet from the breeding site. Mosquitoes, eggs, and larvae do survive winter even though activity is reduced. When nighttime temperatures consistently are above 60 degrees Fahrenheit, mosquito activity increases. Eliminating mosquito habitat year round reduces the mosquito population and decreases WNV exposure.

Approaches

Five main approaches are recommended:

- Education
- Prevention
- Surveillance
- Direct action
- Evaluation

EDUCATION

Since the mosquito affects everyone and its habitat is found on all types of property the entire public including property owners need to know more and know what they can do personally. Educational emphasis must continue until the general public has an understanding and willingness to actively engage in self protection practices that include taking personal responsibility for the elimination of mosquito breeding sites on their own. Changing behaviors and perceptions may take several years to be effective.

The Health District and the Municipal Information Office have resources and educational materials

to develop information strategies. Greater distribution of materials and information to different groups of people through varied communication methods is necessary.

The following will be the concise message for the education program:

The best defense is to practice these habits, known as the “Four Ds”:

- Use insect repellent containing **DEET**, picaridin or oil of lemon eucalyptus.
- **Dress** in long sleeves and long pants when you are outside.
- Stay indoors at **Dusk and Dawn**, when mosquitoes are most active.
- **Drain** standing water where mosquitoes breed. Common breeding sites include old tires, flowerpots and clogged rain gutters.

Being proactive with several awareness campaigns and ongoing education efforts can prevent a high incidence of West Nile Virus by encouraging property owners to eliminate mosquito-breeding habitat, encouraging the general population to use preventative protection, and reduce activities that expose people to the mosquitoes. More publicity about the available educational resources is needed.

PREVENTION

As a responsible property owner, the City will lead by example and work to remove breeding habitat for mosquitoes from public properties.

Actions implemented through various city departments include but are not limited to:

- Identify and remove potential habitat from public property.
- Identify potential breeding areas on private property and contact property owners for corrections.
- Participate in and coordinate surveillance of mosquito activity (See Surveillance section).
- Provide insect repellent to employees working outside.
- This prevention plan does not advocate the regular use of chemicals. However, in some situations and when deemed necessary, pesticide applications limited to specific situations will be used. Only EPA registered products should be considered.
 - Use site-specific insecticide application, e.g., the “Mosquito Dunks” in standing pools of water that cannot be removed or drained when temperatures reach optimum breeding ranges. Site-specific application of “Mosquito Dunks” provides for 30-day protection. The dunks are bacteriological, USEPA approved, with no toxicity to wildlife, pets, fish, and humans.
 - Potential spraying on public property with large gatherings like baseball fields, if needed. **This option requires city staff obtaining insecticide applicator licenses.** The licenses and training should be obtained before March when mosquito-breeding activity in McLennan County increases and continues through October.

The following city departments all have a role in mosquito prevention and will develop activities as it relates to their scope of work. As an example, the Health District will provide educational programs and enforce the mosquito control ordinance.

City departments include:

Department	Control and Response Actions
Animal Control	Identify potential breeding locations
Code Enforcement	Identify potential breeding locations Take Direct Action to eliminate breeding locations (citations)
Facilities	Identify potential breeding locations Take Direct Action to eliminate breeding locations
Health District	Education Surveillance Identify potential breeding locations Take Direct Action to eliminate breeding locations
Municipal Information	Education
Parks and Recreation	Education Identify potential breeding locations Take Direct Action to eliminate breeding locations (public areas and unlined creeks)
Solid Waste	Identify potential breeding locations Take Direct Action to eliminate breeding locations
Streets	Identify potential breeding locations Take Direct Action to eliminate breeding locations (storm drainage pipe areas and lined creeks)
Utilities	Assist in surveillance Identify potential breeding locations Take Direct Action to eliminate breeding locations (remote sites)

Most department mosquito control and response actions are those tasks and activities normally performed as part of their daily mission. One example is the Parks and Recreation Department mowing and maintaining public areas; looking for standing water in containers would require emptying that water, or standing water in a field might require applying a “Mosquito Dunk”.

SURVEILLANCE

West Nile Virus is endemic to both the bird and mosquito populations. Mosquitoes and mosquito populations can be sampled by trapping, identifying and testing but requires time, personnel, equipment, supplies, and laboratory space to be effective. A cooperative surveillance agreement and sharing of information with Baylor University through Drs. Sim and Duhrkopf as they continue research on WNV and mosquitoes provides the expertise and materials with a low cost. Additional activities and information may be obtained through projects using the Center for Reservoir and Aquatic Science Research (CRASR). This cooperative agreement between the City, the Health District, and Baylor University facilitates studies and surveillance that benefits all parties.

Increases in mosquito populations signal an increased potential exposure to McLennan County residents. For this initial Control and Response Plan, the total number of mosquitoes trapped can be used to indicate increased probability of *Culex Quinquefasciatus*, rather than attempt to quantify the specific mosquito. This approach can be implemented should another mosquito-borne disease occur in the county.

Occurrence of WNV in humans is monitored and tracked through disease reports submitted to the Health District. The Health District has an epidemiologist on staff to evaluate the information submitted in the reports.

DIRECT ACTION

Before 2012, there was **less** interest in knowing more about mosquitoes and WNV. Therefore, there is no background data to determine when mosquito populations are excessive, when WNV exposure is at its highest, how active and infective the virus is in the bird and mosquito populations, or when actual WNV cases are considered excessive. However, there is no question that WNV is present in McLennan County in the bird population and in the mosquito population.

No specific series of triggering conditions or thresholds are defined, rather, a continuous series of prevention actions (Prevention Section) are proposed. Additional data are needed to determine numerical or environmental factors that would indicate moving to a more aggressive action to prevent WNV exposures. The prevention actions can be implemented singly or in groups to respond to conditions and concerns.

Mosquito control and elimination of breeding locations is a year round activity due to our mild winters. Some predictive criteria to indicate when to increase efforts are:

- 1) Night time temperatures consistently above 60 degrees Fahrenheit, which starts active mosquito breeding
- 2) Virus activity increases from May through October, increasing human exposures, based on existing data (Dr. Sim)
- 3) Observed increases in mosquito populations (surveillance) by citizen reports and city employees
- 4) Increased number of reported WNV cases.

Implementation of this plan is recommended prior to February 2013 to facilitate license training, educational campaign planning, and prevention activity scheduling.

EVALUATION

To be effective this plan has to be a regular part of city departments' activities. The virus will never go away and mosquitoes will never be completely eliminated. Mosquitoes survive year round and their rapid and prolific development (7 to 14 days from egg to adult; 200,000 adults from one female within 30 days), and diversity in breeding locations and habitat ensure that the WNV will continue to be present.

Educational emphasis must continue until the general public has an understanding and willingness to actively protect themselves and eliminate breeding sites on their own. Changing behaviors and perceptions may take several years to be effective.

Evaluation will be informal through comments, perceptions, and opinions received. Evaluation can be quantitative by the number of breeding habitats identified and removed (buckets and tires drained) reported by participating departments. This plan can be evaluated and revised as we learn more through the various efforts and as new research becomes available.