

Monroe County Mosquito Control Program

It starts with you.

As a county resident, you can assist Monroe County Vector Control in reducing mosquito populations around your home by taking a few simple steps to reduce breeding habitats. Additionally you can take precautions to help prevent your exposure to mosquito borne diseases. (See FAQ)

The Integrated Pest Management (IPM) Approach

- Surveillance

Mosquito surveillance is an integral part of managing and assessing mosquito breeding and populations. Effective surveillance allows for the targeting of specific areas that need to be controlled to disrupt the life cycle of mosquitoes and protect against disease and nuisance. Surveillance plans must include the prioritization for site selection and pesticide application. Consideration must be given to the following.

1. Human Population

When trapping in an area for the first time or expanding the trapping site in an existing area, trap sites will be selected, in most cases, near human populations or areas of human activity. Since our program ultimately aims to reduce the public's risk of contracting mosquito borne illness, it is important to conduct surveillance near human populations or activity centers. Sites may be selected for surveillance that is not near human population based on other factors not included on this list.

2. History of infectivity

The Pennsylvania Department of Environmental Protection's West Nile Virus program was established in 2000. From 2000-2016, many sites have been selected for mosquito surveillance in Monroe County. At many of those sites, viral activity has been detected in mosquitoes through surveillance activities. These sites are noted in the DEP WNV database, and are revisited from year to year based on their history of infectivity.

3. Complaints

When complaints are received, a site is inspected for mosquito breeding and evidence of adult mosquito activity. Larval dipping is performed at possible mosquito breeding sites near the complainant and adult host seeking traps are usually set to collect nuisance mosquitoes to determine if further control activities are needed.

4. Previous Population Surveillance History

Similar to using the DEP WNV database to find sites with a history of infectivity, the database can also be used to find sites that have historically produced high populations of larval or adult mosquitoes. If a site has a history of producing high numbers of nuisance or possible disease carrying mosquitoes, it may be considered for trapping in the future.

5. Proximity to Susceptible Populations

Areas with higher populations of elderly, infants and/or people with a weakened immune system will be considered when selecting sites for mosquito trapping. These people are more at risk of developing severe symptoms if infected with mosquito borne diseases.

6. Representation of Habitat

The habitat must be conducive to mosquito breeding or adult mosquito activity when selected.

7. Reports of Bird, Horse or Human Arboviral Illness

When a bird, horse or human tests positive for an arbovirus, including WNV, the area should be considered for mosquito trapping to help determine the population size of diseased mosquitoes in the area.

8. Confirmed Infectivity in the Mosquito Populations

If a site produces a WNV positive mosquito collection, it should be considered for follow-up host seeking and oviposition trapping to help determine the infection rate of mosquitoes in the area. In addition, traps should be set in a larger radius around the site to determine the range of the infected mosquito population.

If actionable levels of mosquitoes are present, based on the pre-determined thresholds, adult mosquito control may take place. Follow-up adult mosquito trapping will occur after control events to evaluate the effectiveness of the control efforts. After nuisance mosquito control events, host seeking traps will be set to determine the density of host seeking mosquito populations at the site. After control events that are conducted to reduce disease carrying populations of mosquitoes, oviposition traps will be used to determine the efficacy of the control event and the density of disease carrying mosquitoes in the area.

- Control

It is policy of the Monroe County Vector Control that pesticides will not be applied to control mosquito populations without first conducting surveillance by larval dipping, adult trapping, or through a landing rate survey. Monroe County Vector Control will also consider and document, when practical, alternatives to using biological and chemical pesticides.

If action thresholds have been exceeded and the mosquito population is unable to be controlled through source reduction, application of pesticides is warranted. Pesticide products are chosen based on the life stage of the mosquito and the application habitat. Pretreatment in areas that are expected to hold water throughout the season are an important tool in suppressing mosquitoes throughout the year.

To reduce the risk of developing mosquito pesticide resistance, a wide variety of pesticide products are used to control both larval and adult mosquito populations. Please see the table below for information on what products may be used by Monroe County Vector Control throughout the mosquito season.

<u>Product</u>	<u>Target</u>	<u>Habitat</u>	<u>Dose</u>
Agnique MMF	Pupae	Water Surface	1 squirt/50 sq.ft.
DeltaGard	Adult Mosquito	Air Column	0.00045-0.00134 lbs./Acre
BioMist 3+15	Adult Mosquito	Air Column	0.00088-0.0264 lbs/Acre
AquaBac 200G	Larval Mosquito	Organic water	2.5-20lbs/Acre
AquaBac 400G	Larval Mosquito	Organic water	1.25-16lbs/Acre
GoldenBear MMF	Pupae	Water surface	3Gal/Acre
Altosid XR Briquettes	Larval Mosquito	Organic water/pretreatment	1 briquette/100 sq.ft.
Altosid XRG	Larval Mosquito	Organic water/pretreatment	5-20lbs/Acre
Altosid Briquettes	Larval Mosquito	Organic water/pretreatment	1 briquette/100sq.ft.
Altosid Pellets	Larval Mosquito	Organic water/pretreatment	2.5-10lbs/Acre
Altosid WSP	Larval Mosquito	Organic water	1 pouch/135sq.ft.
Permanone RTU 4-8	Adult Mosquito	Air Column	0.0035-0.007lbs/Acre
FourStar CRG	Larval Mosquito	Organic Water	20 lbs/acre
FourStar Briquettes	Larval Mosquito	Organic Water	1 briquette/100 sq.ft.

Guidelines for Pesticide Use

Prior to the application of pesticides, Monroe County Vector Control will evaluate the management options listed below with consideration given to water quality impacts, impacts to non-target organisms and pest resistance: A-F will be considered, but may not be practical when managing mosquitoes for human disease.

- a. **No Action** – In some cases, it may be determined that the best course of action to control mosquito populations is to take no action. For example, it may be determined that a mosquito breeding woodland pool is temporary and will be dry in a few days. In this case, no action would be necessary. Once dry, no breeding will occur.
- b. **Prevention** – One of the best ways to eliminate mosquito breeding is by using prevention techniques. Prevention can involve covering or drilling holes in artificial containers.
- c. **Source Reduction** – When possible, elimination of a mosquito breeding source, completely, is the best alternative to using pesticides.
- d. **Education** – Educating the public on reducing mosquito breeding on their property, usually by using prevention and source reduction techniques, is especially essential to mosquito control efforts in urban environments.
- e. **Biological Control Agents** – If source reduction, public education and mosquito breeding prevention techniques are not or will not be effective, biological control agents may be used to reduce larval mosquito populations. Biological control agents include products that use bacterial toxins that target the lining of mosquitoes' gut to cause death. Other biological control agents interrupt the growth cycle of larval mosquitoes and do not permit them to become viable adults.
- f. **Pesticides** – If all other options have been considered or exhausted and mosquitoes continue to breed at a site, chemical pesticides may be used to reduce both the larval and/or adult populations.

FAQ

Q: What Can Homeowners Do?

A: As a resident you can assist vector control and your community in reducing the risk of mosquito borne disease transmission. In addition to reporting active breeding sites and nuisance mosquito populations, you can take active role in reducing mosquito populations. Emptying any container with water will prevent mosquitoes from breeding in that container. These containers include, but are not limited to, clogged gutters, tires, bird baths, buckets, and flower pots.

Below are some basic steps a homeowner or resident can take to reduce mosquito populations around their home:

- Dump all standing water from containers around the home.
- Clean out bird baths once a week.
- Eliminate standing water or low areas in your yard.
- Clean the gutters on your house.
- Use an aerator or fish in any ornamental pond.
- Drill holes in the bottom of recycling containers that are left outside. Drainage holes that are located on the sides collect enough water for mosquitoes to breed in.
- Remove any discard tires from your property and recycle them.
- Clean and chlorinate swimming pools, even if they are not being used. A swimming pool left unattended can cause a mosquito problem for your whole neighborhood.

Q: Do Commercial Mosquito Equipment Work Effectively?

A: In short, no. Generally this equipment uses a lure or some means of attraction. While they may catch large numbers of mosquitoes, generally they attract more to your property and create a larger issue for you and your family.

Q: How Can I Prevent Mosquito Bites?

A:

1. **Use Repellents** – Insect repellents can be extremely effective at preventing mosquito bites. If used correctly these repellents do not pose a health concern. Repellents containing DEET, Picaridin or IR3535 have been shown to be the most effective for repelling mosquitoes. We recommend **Off! Deep Woods Insect Repellent VIII (DRY)**
2. **Wear Protective Clothing** – Covering exposed skin reduces the risk of mosquito bites greatly. Wearing long sleeves, socks, and pants are ideal.
3. **Avoid Mosquitoes** – While some mosquitoes may bite during the day, most are active at dusk and dawn. Avoid outdoor activities a couple hours before and after sunrise and sunset. During day time hours, mosquitoes rest in shaded humid areas, and will feed if you go through their habitat. Using window screens will greatly reduce any risk of mosquitoes from entering your home through open windows.

Q: What is the Life Cycle of a Mosquito?

A: Mosquitoes of different species lay their eggs in a variety of water sources that range from small containers to large wetlands. The larval stage is an aquatic stage that shuttles from the subsurface where it filter feeds on micro-organisms, to the surface for oxygen. The pupal stage is also an aquatic stage in which no feeding occurs. The pupae are extremely active and tumble about within the body of water, reaching the surface to obtain oxygen. The adult emerges from the pupal casing; it does so using air pressure. Unlike the larval and pupal stages, the adult stage is terrestrial and not aquatic. The time for an egg to reach the adult stage varies on environmental conditions. Generally an egg will reach the adult stage in 7 to 10 days. The adult will then live 4 to 6 weeks during the summer.

Q: Why do Mosquitoes Bite?

A: Mosquitoes belong to a group of insects that require a blood meal to develop fertile eggs; thus male mosquitoes do not bite. Female mosquitoes will lay numerous batches of eggs throughout its life and require blood meals for each batch. These blood meals do not go towards the energy require for survival of the mosquito. For this energy both male and female mosquitoes feed on plant nectar and fruit juices.

Female mosquitoes use mouthparts to penetrate the skin of its blood meal host. As it pierces the skin it injects a small amount of saliva into the wound, this saliva acts as an anticoagulant. The welts and irritation that typically follow a mosquito bite are not from the bite itself, rather, they are an allergic reaction to the saliva. These reactions subside within a few hours in most cases.