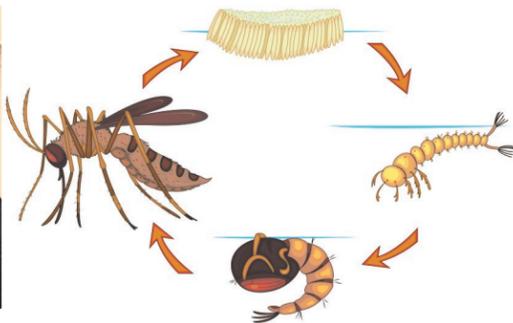


## MOSQUITO BIOLOGY

Surveillance for immature and adult mosquitoes and the diseases they may transmit is part of the Biology Department's daily operations. Larvae are sampled in woodlots, fields, ditches, pools, sewage lagoons, and retention ponds while adults are collected from mechanical traps. These traps include New Jersey Light Traps, CDC Traps, and Gravid Traps. Data are collected and analyzed in order to control mosquitoes in the most effective way and reduce disease transmission while minimizing environmental impacts. A series of rain gauges will also be monitored to determine where likely larval production is occurring and to decide where to dispatch crews.

Monitoring of mosquito-transmitted diseases will continue for 2017 through processing/testing of adult mosquitoes and dead birds for the presence of West Nile, St. Louis, and Eastern Equine encephalitis viruses. *Culex* species are important for the amplification and transmission of WNV and SLE virus in Michigan and *Coquillettidia perturbans*, the cattail marsh mosquito, is an important vector of EEE. Staff will keep abreast, through the CDC, of Zika and Chikungunya virus activity. Currently, the vectors for these diseases, *Aedes aegypti* and *Aedes albopictus* have not been found in the Great Lakes Bay Region.

Larval sampling/surveillance is important in determining the abundance of mosquito larvae in various habitats. The information can be used to determine optimal times for using larval control materials and to determine the need and timing for adult mosquito control. Crews collect larval samples daily that are identified by lab staff. Larvae are identified to the species level by using a dichotomous key and dissecting scope.



## 2017 HIGHLIGHTS

New Director and Supervisor

Purchase 7 new pickup trucks

Purchase 1 new ULV machine

Purchase DC-IV equipment

Apply for MDEQ scrap tire grant

Increase aerial acreage

Two additional seasonal staff

10 additional tracking units



## 2017 PROGRAM PLAN

Bay County Mosquito Control

### AERIAL CALIBRATION

Aerial calibration is one of the first tasks accomplished by the program. With aerial applications, Bay County can reach woodlots breeding mosquitoes that are otherwise very difficult or too large to treat. Having the ability to utilize aircraft is an effective complement to ground-based activities. To calibrate, aircraft fly over a row of 15 heavy-duty plastic tubs, dropping *Bti* granules. The granules are gathered and weighed to determine the application dosage rate. Aircraft calibration also allows a swath width determination.

## EDUCATIONAL OUTREACH

Mosquito control programs need the support of an informed public, so community outreach will continue to be an important part of the 2017 program. Educational presentations are designed to raise awareness of mosquito habitats and life cycles. Each season homeowners are reminded of ways to reduce backyard larval breeding. Presentations are given to community service groups and township/county officials, while flyers, brochures, door hangers, bookmarks, and rack cards are hand-distributed or mailed to county residents. Media will be utilized for press releases on important activities, events, and disease updates. K-5 educational programs will also continue.

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## Spring Mosquito Larval Campaign

Spring larviciding controls *Aedes* larvae in woodlots using *Bacillus thuringiensis israelensis* (*Bti*) to prevent them from emerging as biting adults. *Bti* kills 1st-3rd instar larvae, but does not adversely affect other wildlife or beneficial insects, people, or pets. Earl's Spray Service of Breckenridge, MI will be contracted to provide aerial application via fixed-wing aircraft. There will be about 50,000 woodland acres scheduled for treatment with a dosage rate of three pounds of *Bti* per acre. Treatment will occur after extensive surveillance has taken place and larvae are at the appropriate developmental stage.

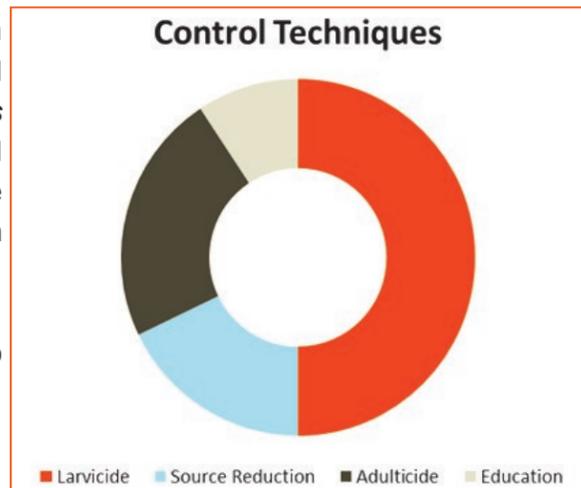
Aerial program components include: 40 woodlots monitored, 200 acres of woodlots treated by ground crews, 3 aircraft, 1 loading zone, aircraft calibration, 50,000 acres treated by air, and quality control to monitor the aerial application. Woodlots are monitored by dipping larvae from treated and untreated (control) woodland pools both before and after application to determine the effectiveness of the aerial program. Public notification of the aerial woodlot treatment is accomplished through press releases, television, and radio announcements. Letters are also sent to various governmental and public safety agencies.

## LARVAL MOSQUITO MANAGEMENT

Larviciding involves the introduction of control materials into aquatic habitats to control larvae or pupae and prevent adult emergence. Habitats with a previous history of breeding will be investigated, with additional emphasis on mapping new sites. We expect to survey nearly 20,000 sites, treating about 15% of them. Emphasis will be given to source reduction in the form of dumping water from containers to eliminate larvae. Technicians will respond to residential service requests as well as survey known breeding sites or new sites found during daily monitoring.

Larviciding (including source reduction) is a main program component, comprising about 70% of control efforts. Control materials utilized include the microbial products *Bti*, *Bacillus sphaericus*, and Natular (spinosad), as well as temephos and larvicide oils. Habitats monitored include catch basins, roadside ditches, abandoned pools, flooded fields and woodlots, retention ponds, scrap tires, and containers.

Ten new MqTrack™ GPS units will be utilized in our larviciding fleet to monitor vehicle routes and locations.



## ADULT MOSQUITO MANAGEMENT

*Protecting public health by managing mosquito populations is BCMC's primary goal. Through control, the number of adult mosquitoes is lessened, thereby reducing their annoyance and disease risk.*

In order to meet that goal, nine ultra low volume (ULV) truck-mounted spray units will be used with treatment occurring from sunset to 2:00 am, provided mosquito populations warrant treatment and that weather conditions are conducive. The ULV machines dispense a small amount of control material that must come in contact with adult mosquitoes in order to effectively control them. Machines are calibrated to ensure the proper dosage is applied according to label recommendations. Droplet size is also measured and adjusted on a regular basis ensuring the spray is as effective as possible.

Focus will continue where there is potential disease risk, as well as in areas where high mosquito numbers, as indicated by traps, are adversely affecting Bay County residents. Recreation areas in the county will also be serviced. Two of the nine ULV machines used will be electric during the 2017 season.

Ten MqTrack™ GPS units, that are fabricated and installed by Velocity Systems of Big Rapids, MI, will track control material application, including rate and volume measurements.

## SERVICE REQUESTS & SPECIAL PROGRAMS

Bay County citizens call for service when adult mosquito populations rise, when rain creates standing water on properties, or when planning outdoor activities such as picnics, weddings, and graduations. These calls are logged into a database and used as a means to monitor mosquito annoyance. Crews are dispatched to help in each situation.

### LONG DRIVEWAY PROGRAM

Homes that sit a distance off the main road that do not receive adequate adult mosquito control may opt into the long driveway program. Drives are mapped and sprayed during regular township sweeps.

### MEDICAL NEEDS PROGRAM

This program offers extra service to residents who have a verifiable, doctor-supported medical need that warrants additional mosquito surveillance/control. Often, these are residents who suffer from severe mosquito allergies.

## TRAINING

Technicians are required to attend a day-long May training session where all aspects of the program are discussed. Hands-on training takes place with a certified trainer. Seasonal employees must pass two written tests administered by the MDARD to receive a certified pesticide applicator card. This certification lasts three years. Additional safety training will also take place in 2017 regarding chemical spills, driver safety, etc.

### NO SPRAY PROGRAM

Some residents prefer their property not be treated for mosquitoes. Yellow reflective signs mark property lines as a visual reminder to "skip" the property. Frequently, residents who opt out of adult mosquito control are still in favor of larval control.

### STAFFING

Seven full-time and 30 seasonal employees will be working during the 2017 season. Seasonal employees fill the following positions: 1 data entry clerk, 2 biology assistants, 18 larval control technicians, and 9 adult control technicians. Shifts are 8am-4:30pm (days) and 8pm-2am (nights), but may be variable.