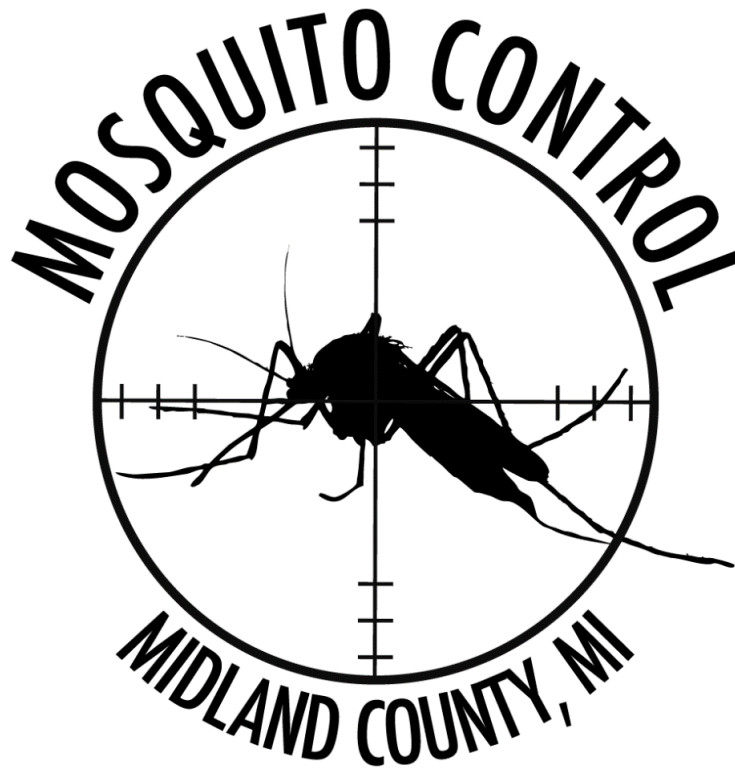


Midland County Mosquito Control

2022 Technical Program



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SUMMARY OF 2022 PROGRAM GOALS & CHANGES

- The hourly rate for seasonal personnel, will be increased from a spread of \$2 above minimum wage to \$4 above minimum in 2022 (starting wage for 1st year technicians \$14.10).
- A second hire date in early May will be established should efforts to hire a full crew in April be unsuccessful. This will appeal better to college students and so efforts to recruit from local universities will be enhanced.
- Install an additional London Fog gas powered ULV fog unit and a Clarke Promist Dura electric fogger to the fleet. These units offer variable speed output, which adjusts the delivery rate for the speed of the vehicle up to 20 MPH. The addition of these two will make for a total of six variable speed units in 2022. This is of considerable advantage to effectively and more rapidly make progress through fog routes.
- Complete the practice of adding large foot crew areas to the aerial larviciding program. This began in 2021 and involves an addition of 3,400 acres to the aerial program in 2022 compared with the 2020 acreage.
- Test the efficacy of reducing the liquid BTI concentration in a select aerial treatment block. This may lead to confidence to reduce the program mix concentration without compromising efficacy.
- Purchase ten hand-operated granular spreaders for application of Vectobac[®] G during spring foot crew treatment in high-impact woodlots, which occur primarily in the City of Midland.
- The use of Altosid XR (16 weeks of control) will be increased to over 5,000 catch basins in 2022 compared with 2021. XR will be used in more high traffic basins and those in the areas of Midland that have historically had the most WNV activity.
- Natular[®] G-30 will be the product chosen for pretreatment of retention areas and dry small ditches in 2022. The advantage of this product over MetaLarv, with active ingredient methoprene, is that it will be immediately evident following a flooding rain if the Natular treatment was effective.
- Droplet sampling gear was purchased in 2021 and will be utilized for sampling of ULV fog deposition in 2022.
- A study to measure mosquito capture of various species inside and outside of woodlot habitat will be continued in 2022 due to the poor spring trapping conditions in 2021.
- A capital project to install a separate gravel driveway that loops around south of the facility will be considered again in 2022. Also included in the project are plans to install a lean-to for equipment storage and expansion of the southeast parking lot. This project will be incorporated into a greater long-term facility plan.

STAFFING

Personnel. Midland County Mosquito Control (MCMC) has a staff of six full-time employees. Four of these positions are year-round (Director, Operations Planner, Biologist & Office Manager) and two work nine months of the year (two Field Supervisors).

Twenty two seasonal employees are included in addition to the permanent staff. Last year was particularly challenging to find seasonal personnel, but even before that year there has been a trend towards fewer applicants and more difficulty in hiring. In response to these challenges, the hourly rate for seasonal personnel (excluding the Mechanic as this rate is set by the Board of Commissioners), will be increased from a spread of \$2 above minimum wage to \$4 above minimum in 2022 (starting wage for 1st year technicians of \$14.10). This amounts to a \$2.23 increase compared with 2021 rates for all hourly seasonal positions. It is hoped that this effort will significantly increase the number and quality of applicants; allowing for a full crew to be hired.

Another adjustment planned for 2022 is to make additional efforts to recruit college students. These will include advertising a second hiring date in May and more efforts to reach out to, and participate in university campus job fairs. So if a full crew cannot be hired in April, it is hoped that the efforts to reach out to those available in May will be profitable.

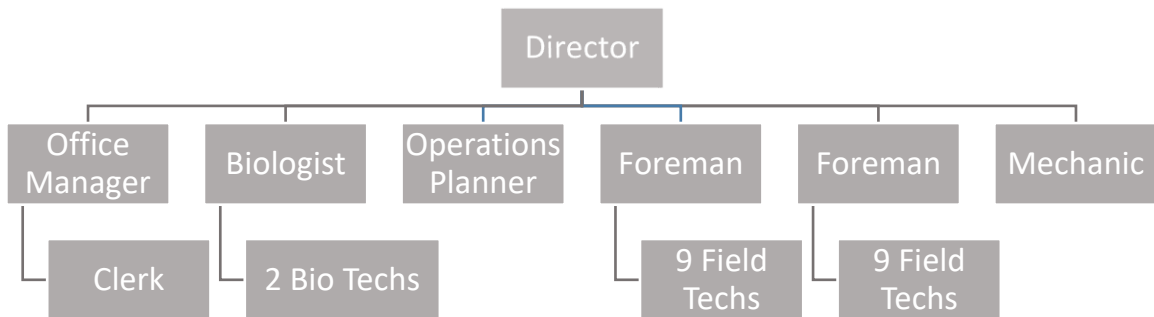


Figure 3. MCMC organizational structure since November 2019

Each season the newly hired seasonal personnel must train and prepare to take the State of Michigan pesticide applicator exam. Training is offered for the first few days and it is hoped that MDARD personnel will return in 2022 to proctor the exam.

During the spring season all technicians will work day shift and conduct larviciding operations. Separate day and night crews will be formed on or around May 15. After that time, day-crew technicians conduct surveillance and larviciding while the night technicians participate in larval control operations for the first part of their shift, and then switch to mosquito adulticiding.

The partnership program between Midland County and Ten16 Recovery Network will continue into 2022 for a fifth season. This allows for Ten16 to refer certain individuals to Midland County Mosquito Control for seasonal employment consideration as mosquito control technicians. Up to four Ten16 participants may be hired.

Field Staff	Hours in the Field	Activity
Day Crew	8:00 a.m.— 4:30 p.m.	Larviciding
Night Crew	4:30 — 8:00 p.m. and	Larviciding
	8:30 —11:30 p.m.	Adultciding
Part-Time and Sunday	8:30 —11:30 p.m.	Adultciding

FIELD OPERATIONS

FIELD OPERATIONS SCHEDULE												
Operation	April		May		June		July		August		September	
	1 st	15 th	1 st	15 th	1 st	15 th	1 st	15 th	1 st	15 th	1 st	15 th
Spring Season												
Woodlot (Bti)												
Woodlots (MLO)												
Summer Season												
Woodlots (MLO)												
Roadside Ditches (Bti)												
Summer Sites (Bti, MLO)												
Catch-basins (BS, Altosid PG)												
County Drains (Bti)												
Adulticiding (Permethrin)												

Spring Larviciding (April 10 — May 15)

Ground Larviciding. The 2022 program will begin in April when supervisory personnel and seasonal technicians start treatment of woodland sites. Field personnel will treat approximately 3,000 acres of woodland pools (if a full crew can be hired). Vectobac® 12AS (liquid *Bti*) will be the primary larvicide used in woodlands during this period. BVA-2 MLO (Mosquito Larvicide Oil) will be used after the spring *Aedes* species mosquitoes begin to pupate.

Granular spreaders for application of Vectobac® G will be used in 2022 in flooded woodlot sites in and around the City of Midland. These sites were selected because they are highly productive and close to a high number of residents. Use of granule treatment offers the advantage of leaving a visual trace of areas treated compared with liquid material. On the downside, granule is more expensive compared with liquid and the granule spreaders are more difficult to operate and maneuver through brush compared with the Solo liquid backpack sprayers.

Aerial Larviciding. An approximated 62,000 acres of woodlots are scheduled for spring aerial treatment this year consisting of 31,000 acres treated with liquid *Bti* and 31,000 acres with granule *Bti*. Treatment includes all areas established in past years plus approximately 2,000 acres of previously established priority 1 foot crew sites. A total of 3,400 acres of this type of habitat has been added to the aerial program since 2020 and the process of incorporating these areas into aerial will be completed in 2022. This will allow the foot crew to focus on more priority 2 sites and to retreat priority 1 sites should rain events expand high impact flooded areas following the initial treatment.

A liquid treatment block will be selected to receive a reduced concentration mix of liquid BTI in 2022. This is part of an ongoing evaluation of efficacy of lower concentration mixes. These efforts may lead to confidence in reducing the BTI concentration and will allow for program savings or ability to expand the program more economically.

Vectobac® G granules and Vectobac® 12AS liquid *Bti* will be used in 2022. Agriflute, which was the contractor used in 2021, will again be awarded the contract in 2022.

The application rates will remain 4 lb/acre granule and 1 pint/acre liquid.

Summer Operations (May 15 — September 15)

Catch Basins. Catch basin treatments are done primarily to reduce risk of West Nile virus transmission as a prime vector of WNV, *Culex* spp., frequently utilize them for larval habitat. Treatments of catch basins will be scheduled according to larval development. MCMC will use water soluble packet formulations of Altosid® in the majority of catch basins.

The use of Altosid XR (16 weeks of control) will be increased to over 5,000 catch basins in 2022 compared with 2021. XR will be used in more high traffic basins and those in the areas of Midland that have historically had the most WNV activity. This will free foot crews to carry out other duties and will help ensure that the more hazardous areas to treat and those areas with more virus activity need only be treated once seasonally.

Scrap Tires. Scrap tires produce *Culex* species mosquitoes, *Aedes triseriatus*, *Aedes japonicus* and other species, and are of prime concern as a possible source of West Nile virus vectors. Abate® granules, *Bs/Bti* granules and BVA oil will be applied to tires and efforts will continue to support the removal of scrap tires from the environment (see Source Reduction section).

Prehatch treatment of dry habitat. Pre-treatment of dry ditches and select retention areas will be done with the product Natular® G-30. Pretreatment allows for material to be placed in areas that periodically flood and are activated with flooding rains. Following summer rain events there is often abundant area to treat and limited personnel to dispatch; therefore, pretreatment allows crews to focus on areas not already pretreated. The ditches/retention areas that receive this treatment will be evaluated regarding the expected number of residents benefited from this operation.

Natular will be the product chosen for pretreatment of retention areas and dry small ditches. The advantage of this product over MetLarv with active ingredient methoprene, is that it will be immediately evident following a flooding rain if the Natular treatment was effective.

Roadside Ditch. Roadside ditch larviciding will be conducted as usual with continued emphasis on treating *Aedes vexans* after summer rains using *Bti* (Vectobac® 12AS) liquid from truck mounted hydraulic sprayers.

Insecticide	Active Ingredient
Vectobac® G	<i>Bacillus thuringiensis israelensis</i>
Vectobac® 12AS	<i>Bacillus thuringiensis israelensis</i>
Altosid® XR Briquets	Methoprene
Altosid® WSP	Methoprene
Abate® 5%	Temephos
Natular® G-30	Spinosad
BVA-2 MLO	Mineral oil
Kontrol 4-4	Permethrin

SUMMER LARVICIDING SITES			
Site	Description	Treatment Interval	Control Material
Catch Basins	Crocks along city streets	2 - 3 times yearly	Methoprene or <i>Bs</i>
Roadside Ditches	Ditches along county roads	Following flooding rains	<i>Bti</i>
County Drains	Large ditches that transfer water to rivers	As needed	<i>Bti</i>
Small Ditches	Shallow ditches along residential lawns	May-June / after major rains	Methoprene, <i>Bti</i> or larviciding oil
Seepage Runoff	Small bodies of water high in organic content	As needed	<i>Bti</i> or larviciding oil
Sewage Lagoons	Larger bodies of organic water	As needed	<i>Bs</i> , larviciding oil
Tires	Discarded tires capable of holding water	Twice yearly	<i>Bs</i> , <i>Bti</i> , temephos, novaluron or oil
Containers	Barrels, boats, large trash, etc. holding water	As needed and encountered	<i>Bs</i> , <i>Bti</i> , temephos, novaluron or oil
Ponds	Permanent pools with some open water	As needed (uncommon)	<i>Bti</i>
Flooded Fields	Shallow, temporarily flooded areas	Following major rains	<i>Bti</i> , methoprene or larviciding oil
Cattail March	Cattail marshes and/or brush-covered areas	Following major rains	<i>Bti</i>
Swamps	Permanently-flooded areas with emergent vegetation	As needed, generally late in the season	<i>Bti</i>

Mosquito Adulticiding. Kontrol 4-4 (permethrin) applied with ultra low volume (ULV) technology will be utilized during 2022 adulticide operations. Truck-mounted ULV fogging is conducted evenings during the period of peak mosquito feeding activity as the mosquito population dictates and weather permits. Throughout most of the season this period is from 30 minutes prior to sunset until approximately 11:30. When fogging before sunset, a one-mile no-treatment zone is maintained around known honeybee locations until sunset.

As of 2022, six of eleven fleet vehicles will be equipped with variable speed fog units, which adjust the spray output with the speed of the vehicle up to 20 MPH. This capability allows for more progress through fog routes during times of high mosquito populations.

Pre-designated routes, which provide an estimated 10-day turnaround throughout the county, will be followed. Based on field inspections, landing counts, trap results, resident complaint calls and disease surveillance, treatment will be concentrated in areas where problems persist and reduced in areas with minimal adult mosquito activity. In compliance with Regulation 637, campgrounds and major parks will be permanently posted informing the public that these sites receive periodic treatment to control mosquitoes.

LABORATORY OPERATIONS

Encephalitis Virus Surveillance

An active disease surveillance program increases the chance of early detection of virus activity, allowing the most time possible to develop an appropriate response.

Light traps, landing collections and gravid traps will be used to capture adult mosquitoes. VecTOR Test (VecTOR Test Systems, Inc., Thousand Oaks, CA) field test kits will be used to test dead corvids (crows and blue jays) for presence of West Nile virus. Mosquitoes are pooled by species/genera and sent to the State of Michigan (DHHS) lab for testing. The following viruses are screened against pools of mosquitoes, West Nile virus, St. Louis Encephalitis, Eastern Equine Encephalitis, LaCrosse Encephalitis and Jamestown Canyon virus. Results of MCMC surveillance efforts and communication with other agencies will be used in a continuing evaluation of mosquito-borne disease risk as outlined in the CDC guidelines.

Mosquito Surveillance

Adult Mosquito Surveillance. Adult mosquito surveillance is used to guide the selection and timing of control strategies and is used in estimation of disease transmission potential. New Jersey Light Traps will be maintained at five locations in Midland County. Collections will be picked up three times weekly. CDC traps will be used in areas not covered by New Jersey traps. Two Biogents modular traps with attached BG Counter devices have been used since 2020. These units register when a mosquito is captured and graph this in 15 minute increments on a website. Gravid traps are useful for collecting *Culex* species, which are important in surveying West Nile virus risks.

Adult mosquito landing counts are an important tool for determining mosquito biting pressure in various areas and at certain times. These are routinely taken by night shift personnel before beginning evening fogging.

Larval Surveillance. The numbers, species and location of immature mosquitoes also influence the selection and timing of control strategies. Biology and field staff will sample many aquatic sites and samples will be returned to the lab for identification. Major emphasis will be placed on sampling the habitat appropriate to each season, i.e. woodlots in the early spring, followed by grasslands and summer sites. The Ovi-Catch™ mosquito bucket trap (Catchmaster) will be used in 2022 to monitor for presence of *Ae. aegypti* and *Ae. albopictus* introduction to Midland County. The trap will be placed at the C.M. Rubber processing facility in Coleman, MI and checked weekly or biweekly.

Research. A trapping study was conducted measuring mosquito trap capture at various distances within and outside of woodlot habitat in 2021. This involved three mosquito districts of Midland, Saginaw and Bay counties. This effort is planned for 2022 as well to capture spring mosquitoes since 2021 was an abnormally dry spring.

In 2021 MCMC purchased slide spinners and the supporting gear to sample droplet impingement in the field from ULV fogging. Efforts to carry out sampling will commence in 2022 to measure droplet accumulation at various distances from fog delivery.

TECHNOLOGY

The use of mapping technology for MCMC has advanced significantly over the past few years. Several operations that used to be paper based have converted over to iPad-entered that are aided by ESRI-based mapping processes. This has allowed for timely reporting of treatments, more precise tracking of surveillance and control efforts and opened the way for extensive data analysis.

Goals for 2022 include: Processing of historic treatment data for better analysis and characterization of mosquito habitat sites. Automated the process for checking Midland County Resident's names against the land information to locate new owners that may want to change treatment status. Integration of the new County website with ESRI tools such as the hub.

SOURCE REDUCTION

Midland County recognizes that source reduction is one of the most effective ways to control mosquitoes. Through cooperation with and education of property owners and other agencies, many mosquito breeding sites are eliminated or improved. Additionally, MCMC will schedule and host two scrap tire drives and will continue to encourage property owners to eliminate scrap tires and other mosquito habitat from the landscape. Partial funding for these events will be provided through a Michigan Department of Environmental, Great Lakes, and Energy scrap tire removal grant.

COMMUNITY OUTREACH

Community outreach is an important part of the MCMC Integrated Mosquito Management (IMM) program. Property owners are notified of scheduled treatments with direct mailings, updated phone greeting message, website, social media postings and door-to-door personal contacts. Print and display advertising are purchased throughout the year to notify County residents of control operations and to direct residents' questions and concerns. Presentations are provided to community groups on request.

MCMC develops a series of short videos that address various topics of community interest regarding treatment and operations. Examples of developed videos include a description of the spring aerial larviciding program and nighttime fogging operations. Future videos may include a description of West Nile virus surveillance, and topics such as fogging trucks in transit through fogging routes. Various video clips and photos of operations are helpful to obtain throughout the season are obtained for raw material to include in videos.

Midland County will be introducing a new website and efforts to adjust to this format will be made. Particularly, how will various ESRI interfaces such as the hub be incorporated into the new website formatting.

FACILITY UPGRADES

A capital project to install a separate gravel driveway that loops around south of the facility will be considered again in 2022. Also included in the project are plans to install a lean-to for equipment storage and expansion of the southeast parking lot. The project was not pursued in 2020 and 2021 due to the flood and funds that were pulled from reserves to pay for the aerial adulticiding operation. This project will be incorporated into a greater long-term facility plan, which will be sought with the aid of professional planners.