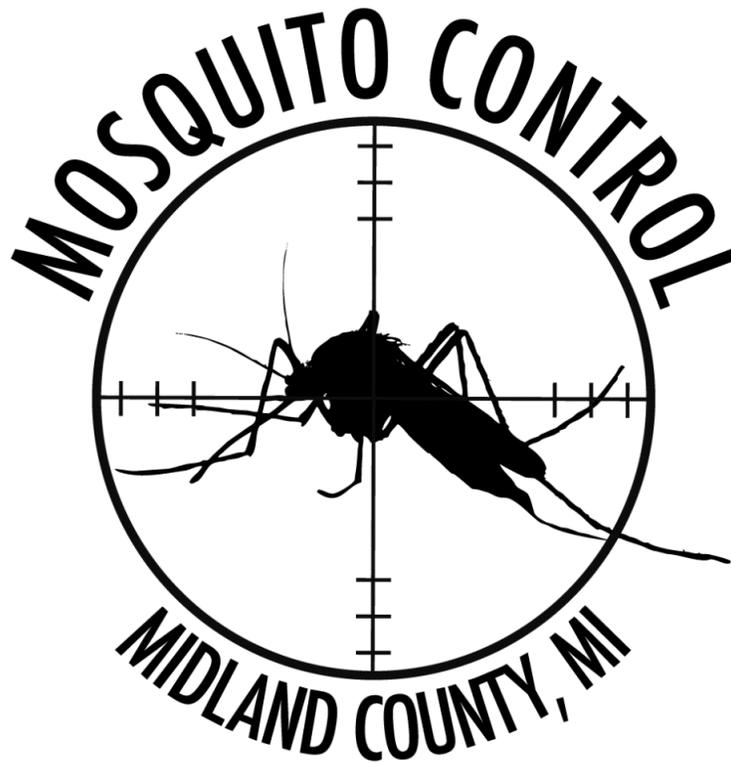


Midland County Mosquito Control

2021 Technical Program



2180 N Meridian Road
Sanford, MI 48657
(989) 832-8677
FAX (989) 832-6697
mosquito@co.midland.mi.us

TABLE OF CONTENTS

Contents

SUMMARY OF 2021 PROGRAM GOALS & CHANGES	1
STAFFING	2
FIELD OPERATIONS	4
Spring Larviciding (April 10 — May 15)	4
Ground Larviciding	4
Aerial Larviciding.....	4
Summer Operations (May 15 — September 15).....	4
Catch Basins	4
Scrap Tires.....	5
Small Ditch.....	5
Roadside Ditch.....	5
Mosquito Adulticiding.....	6
LABORATORY OPERATIONS	7
Encephalitis Virus Surveillance	7
Mosquito Surveillance	7
Adult Mosquito Surveillance	7
Larval Surveillance.....	7
Research.....	7
TECHNOLOGY	8
SOURCE REDUCTION	8
COMMUNITY OUTREACH	9
FACILITY & VEHICLE FLEET UPGRADES.....	9

SUMMARY OF 2021 PROGRAM GOALS & CHANGES

- Hire an Operations Planner, which is the position that has been created to replace the Operations Supervisor.
- A replacement truck was purchased in late 2020 and will be equipped this season with a gas-powered ULV.
- Add current large blocks of spring foot crew into Aerial. End goal is to have foot crew available for either second treatment of priority 1 sites or complete more priority 2 sites
- Granular spreaders for application of Vectobac® G will be evaluated in flooded woodlot sites in and around the City of Midland. Once a particular spreader is selected, more will be purchased with plans beginning in 2022 to treat the majority of the high-impact sites with granular material rather than liquid.
- A number of goals related to mapping this will be sought in the 2021 season: Based on analysis of historic data, establish summer sites as Priority 1-3 and symbolize for technician reference; apply a new naming convention to summer sites; refine and analyze historic treatment data entered into ESRI.
- Select retention areas for pretreatment with Metalarv.
- Purchase and outfit a fleet truck dedicated for Biology Section use. The vehicle will not be used for any pesticide applications and so will limit potential contamination of mosquito field samples needed for lab use.
- Gear for taking droplet samples will be obtained and used to measure fogging efficacy and penetration in various settings.
- Efforts are planned with the County GIS Department to use drones to survey exposed lake bottom areas from the 2020 dam failures for stagnant water sites that might allow mosquito development.
- A capital project to install a separate gravel driveway that loops around south of the facility will be considered again in 2021. 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.
- The Midland County Drain Commissioner (Doug Enos) retired in December 2020. Mr. Enos had served as a Midland County Representative on the Mid-Michigan Mosquito Technical Advisory Committee. A replacement for this vacancy will be identified.

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).

Approximately twenty seasonal employees will be added to the staff for the mosquito control season (April to September). Employment with MCMC is contingent upon obtaining pesticide applicator 7F certification or registration through the Michigan Department of Agriculture and Rural Development (MDARD). New technicians will participate in a formal two-day training session, April 5-6. Technicians will be instructed using the national “core” training manual and MDARD personnel will administer the registered applicator’s exam at the MCMC office on April 7. At this time, it is unclear what social distance efforts will be required due to COVID-19. These precautions played a major impact on our operations last year and may continue into 2021 as well.

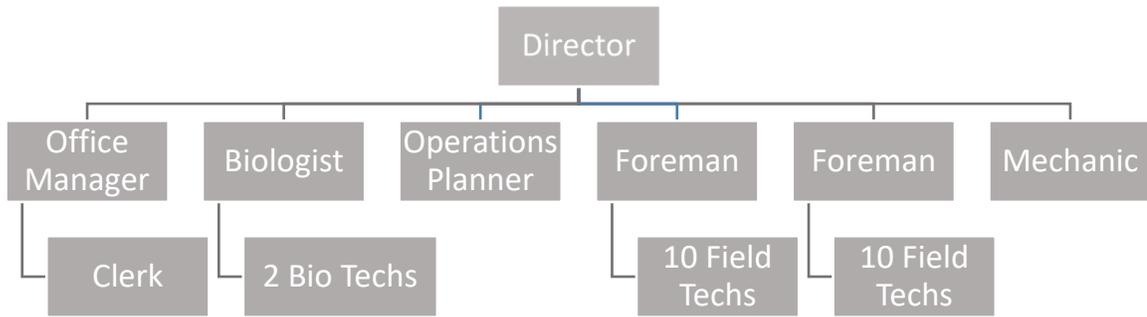


Figure 3. MCMC organizational structure since November 2019

Efforts to hire for the Operations Planner position will begin in 2021. This position has been vacant since the Operations Supervisor (the Operations Supervisor position was changed to the Operations Planner) resigned in November of 2019. COVID precautions and the flood/dam failure of 2020 prevented concerted efforts to hire this vacancy. But this position will be vital to the optimal operation of the department and should be filled in 2021.

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 2021 for a fourth 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 Fresh Start participants may again be hired in 2021.

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 8:30 —11:30 p.m.	Larviciding Adulticiding
Part-Time and Sunday	8:30 —11:30 p.m.	Adulticiding

FIELD OPERATIONS

FIELD OPERATIONS SCHEDULE												
Operation	April		May		June		July		August		September	
	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 2021 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 evaluated during 2021 in flooded woodlot sites in and around the City of Midland. Once a particular spreader is selected, more will be purchased with plans beginning in 2022 to treat the majority of the high-impact sites with granular material.

Aerial Larviciding. A total of 59,000 acres of woodlots are scheduled for aerial treatment this year consisting of 28,000 acres treated with liquid *Bti* and 30,600 acres with granule *Bti*. Treatment area will be approximately the same as 2020, but will include some added areas that were traditionally foot crew sites. The goal over the next few seasons is to see how much of the foot crew areas make sense to add in to the aerial program.

Vectobac® G granules and Vectobac® 12AS liquid *Bti* will be used in 2020. Agriflite®, which was the contractor used in 2020, will again be awarded the contract in 2021.

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. Altosid® XR briquettes will be applied to a select number of high-traffic catch basins so that only one seasonal treatment will be required.

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*, Mosquiron® pellets 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).

Small Ditch. Pre-treatment of dry ditches will be done with the product Natular® G-30 or Metalarv™ SP-T. Pretreatment allows for material to be placed in ditches 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 that receive this treatment will be evaluated in 2021 regarding the expected number of people benefited from this operation. Also considered for pretreatment with Natular/Metalarv will be retention areas that impact a high number of residents, e.g. those that occur in the City of Midland.

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
Metalarv™ SP-T	Methoprene
Natular® G-30	Spinosad
Mosquiron®	Novaluron
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 2021 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 year this period is from 30 minutes prior to sunset until midnight. When fogging before sunset, a one-mile no-treatment zone is maintained around known honeybee locations until sunset.

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.

A replacement truck was purchased in 2020 and will be obtained and equipped in early 2021. A gas-powered ULV unit will be purchased for this truck. The intention is that a new gas-powered unit will be purchased as each new truck is purchased until all of the existing ULV foggers have been replaced.

Day-crew technicians will conduct adulticiding with hand-held thermal foggers in special circumstances during the day. Areas that may be treated in this way include city/county parks, and woodlots around suburban areas. A half-mile no-treatment zone is maintained around known honeybee locations while thermal fogging.

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 Michigan State University lab for testing. 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 CDC traps will be used with BG Counter devices, which register when a mosquito is captured and graph this in 15 minute increments. These devices were first utilized in 2020 and offer a number of useful data.

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. Container habitat will be surveyed as often as possible to monitor the presence and range of container breeding species such as *Aedes triseriatus* and *Aedes japonicus*. The Ovi-Catch™ mosquito bucket trap (Catchmaster) will be used in 2021 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. MCMC is preparing to purchase slide spinners and the supporting software and gear to sample droplet impingement in the field from ULV fogging. 2021 will be the first season to use this method to evaluate fogging effectiveness.

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, allowed more precise tracking of surveillance and control efforts and opened the way for extensive data analysis.

A number of goals related to mapping this will be sought in the 2021 season: Based on analysis of historic data, establish summer sites as Priority 1-3 and symbolize for technician reference; apply a new naming convention to summer sites; refine and analyze historic treatment data entered into ESRI.

Following the 2020 dam failures and drainage of Wixom and Sanford Lakes, much of the lake bottom is now exposed and may provide mosquito habitat from flooding and rain events. Efforts are planned with the County GIS Department to use drones to survey these areas and identify any areas allowing stagnant water to collect.

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. This grant was originally awarded for 2020 and due to COVID, was not entirely utilized that year. The remainder of the grant funds (just over \$2,000) will be used in 2021.

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, telephone notification of local property owners with special security needs, postings on social media and websites 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. The MCMC website, phone directory menu options and a website and Facebook page provide up-to-date treatment schedule information and news on MCMC operations.

MCMC develops a series of short videos that address various topics of community interest regarding treatment and operations. Examples of recently 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.

FACILITY & VEHICLE FLEET UPGRADES

A capital project to install a separate gravel driveway that loops around south of the facility will be considered again in 2021. 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 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.

Purchase and outfit a fleet truck dedicated for Biology Section use. Anticipated specs on the truck include a mid-size crew cab pickup. The vehicle will not be used for any pesticide applications and so will limit potential contamination of mosquito field samples needed for lab use.