

2022 ANNUAL REPORT



**BAY COUNTY
MOSQUITO CONTROL
BAY CITY, MI**



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ADMINISTRATION

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Laura Ogar, Director, Bay County
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MANAGER'S REPORT

December 1, 2022

On behalf of Bay County Mosquito Control, I am proud to present our 2022 Annual Report. This year we finally welcomed more normalcy in our operations since the emergence of the COVID-19 pandemic. Among the successes we celebrated: transitioning new full-time staff into the program and having a complete roster of seasonal employees for the first time since 2019, continuing to make science-based progress in the surveillance and treatment of *Coquillettidia perturbans* in our shoreline areas, and experiencing minimal nuisance mosquitoes due to limited flooding events this summer which allowed us to focus on managing both permanent water and vector mosquito species.

Key highlights of our 2022 program include:

Progress with Cq. perturbans – We continue to make great strides in gathering data along the Saginaw Bay shoreline to better understand the breeding and flight range of Cq. perturbans. With additional data collected in 2022, we identified an area within the Quanicassee Wildlife Area that would benefit from larval control to reduce mosquito numbers. We submitted a formal treatment proposal to the DNR and received approval to conduct an aerial treatment of up to 600 acres in the Wildlife Area and bordering shoreline to help control this species in 2023. This will be the first large-scale project to control Cq. perturbans larvae ever undertaken in Michigan.

Surveillance is key– This is a repeated theme in our reports, but it cannot be stated enough that mosquito monitoring is the core of our program. We tripled our adult mosquito surveillance to the benefit of three separate mosquito studies being conducted in our program. This not only increased surveillance data, but also provided insight into the geographic range and prominence of West Nile virus in Bay County which can often be understated. Larval surveillance also increased this summer, thanks to a full crew of seasonal employees conducting 17,192 larval breeding site inspections compared to 4,908 inspections in 2021, when we suffered the effects of staffing shortages.

New Staff – Four of our seven full-time positions were filled by new employees this year, all being filled by deserving staff from within the program. These individuals bring fresh ideas and perspectives to their positions and we look forward to a bright future with them. We are also fortunate to have had many more qualified applicants apply for our seasonal positions which allowed us to be fully staffed all summer long with a qualified, hard-working crew.

While our program has seen great evolution and growth over the past few years, 2022 welcomed the return of some routine and normalcy as we focused on strengthening key core components of our program including staffing and surveillance.

Respectfully submitted,



Rebecca J. Brandt, Manager
Bay County Mosquito Control

About the Program

Bay County Mosquito Control is a community-wide public health program that seeks to protect the health and enhance quality of life of residents and visitors to Bay County by using an Integrated Mosquito Management (IMM) approach. Services are provided through a voter-approved millage (0.55 mils), renewed by Bay County residents in 2016 for 8 years. BCMC is overseen by numerous regulatory agencies that mandate strict adherence to federal and state laws to protect the public we serve.

Regulations

MDARD | Michigan Dept. of Agriculture & Rural Development

- Regulation 636 - pesticide applicators
- Regulation 637 - pesticide use
- Regulation 640 - bulk storage compliance

FIFRA | Federal Insecticide, Fungicide, & Rodenticide Act

- Federal regulations for pesticide use

EGLE | National Pollutant Discharge Elimination System

- 5 year certificate of coverage
- NPDES annual report
- Pesticide discharge management plan
- Self-certification summary
- Stormwater pollution prevention plan certification
- Sewage lagoon water treatment additive permit
- Rinsewater testing

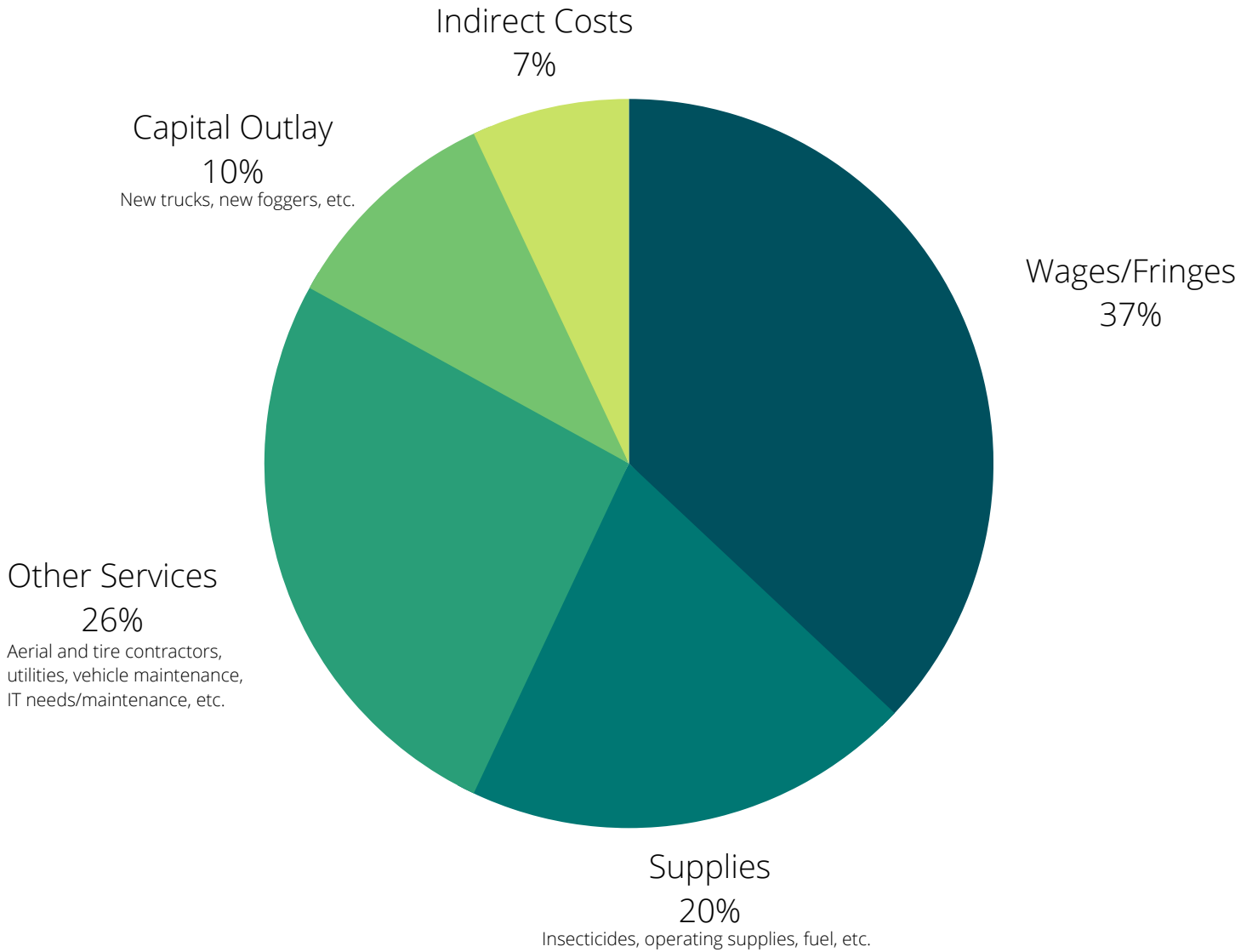
Collaborating Agencies

- American Mosquito Control Association
- Michigan Mosquito Control Association
- Mid-Michigan Technical Advisory Committee
- Saginaw, Midland, and Tuscola County Mosquito Control districts
- MDHHS, MDARD, EGLE, US Fish and Wildlife Service
- MSU Entomology Department



BUDGET BREAKDOWN

TOTAL 2022 EXPENDITURES: \$1,802,394



Integrated Mosquito Management (IMM)

We acknowledge the importance of serving the public by providing mosquito control services without producing adverse impacts to the environment; therefore, our goal for mosquito "control" is not elimination of the insect, but rather an Integrated Mosquito Management (IMM) approach to minimize risk.

IMM uses a variety of methods to prevent and reduce the number of mosquitoes while minimizing impact to the environment. Emphasis is first placed on having a thorough knowledge of the pest life cycle and surveillance, as well as proactive measures including education, outreach, and reduction of breeding sources. The use of naturally-occurring bacterial products against the larval stages is prioritized, and the use of chemical control materials only occurs when deemed necessary by thresholds and evidence of mosquito-borne virus activity.



PROACTIVE

REACTIVE

**Education/
Outreach**

- Prevention
- Avoidance
- Personal protection
- Expectations
- Surveillance

**Source
Reduction**

- Tire Drives
- Removing
- Draining
- Dumping

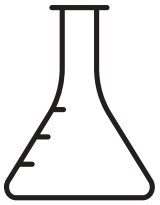
**Larval
Control**

- Biologicals preferred
- Oils
- Chemicals

**Adult
Control**

- Ultra-Low
- Volume fog

Proactive IMM Strategies



RESISTANCE MONITORING - Resistance is monitored through bottle bioassays to determine the response of adult mosquitoes to a given insecticide. The bottles are coated with insecticide, adult mosquitoes added, and time-mortality data collected, detecting possible resistance in order to verify control efficacy. Resistance tests run in 2022 showed no resistance to the permethrin products used for adult control at BCMC. Mortality averaged 90% within 15 minutes post-exposure and was 100% by 45 minutes. Results from MSU's Microbiology and Genetics Lab were similar when exposing *Culex pipiens* (reared from eggs) to permethrin (2019 test results).



PRODUCT EVALUATIONS - Evaluation of control materials and equipment is essential for BCMC to provide effective services, therefore product efficacy and operations are regularly evaluated. No new products were evaluated during the 2022 season.



SOURCE REDUCTION - Scrap tire drives are a method of source reduction, which means the removal or elimination of breeding sources that have the potential to produce mosquitoes. Two community tire drives were held this season on June 4 and August 6, collecting 2,608 scrap tires. In 2022, our agency received an EGLE Scrap Tire Cleanup Grant for up to \$8,000 to assist in funding this service.

POLLINATOR RESPONSE PLAN

Best Management Practices

To continue to be strong environmental stewards, Bay County Mosquito Control has always incorporated pollinator protection strategies into operations. Our program understands both the benefit of mosquito control and the potential harm that control measures could have on pollinators. BCMC is guided by the The State of Michigan "Managed Pollinator Protection Plan (MP3)" and the Michigan Mosquito Control Association's "Mosquito Control and Pollinator Protection Best Management Practices" as shown below, to ensure pollinators are not adversely affected by mosquito control activities designed to protect public health.

- **Primary use of larval control products to target larval stage mosquitoes in standing water, which offers little-to-no risk to pollinators**
- **Source reduction by draining standing water when possible to eliminate mosquito larvae**
- **Minimize pesticide exposure by following IMM principles and following labels**
- **ULV adult mosquito management that applies the lowest effective rate of material for small insects such as mosquitoes**
- **Time ULV applications to occur after sunset when honey bees and other pollinators are not foraging**
- **Avoid direct application of spray to flowering plants**
- **Monitor wind speed so insecticide off-target drift does not occur**
- **Maintain open and frequent communication with beekeepers to help avoid unwanted impacts on pollinators**
- **Work with any beekeepers who would like to set up "no spray" status**
- **Watch MDARD's Drift Watch website for hive locations**



EDUCATION & OUTREACH

- Interviews - newspaper, television, radio
- Press releases
- Facebook posts
- Staff training
 - Presentations and webinars
- Brochures
- BCMC Website
- General Industry OSHA training
- Bay C TV
- MDARD Community Outreach Plan
- Conferences
 - Michigan Mosquito Control Association (virtual)
 - MMCA 7F Training Seminar (virtual)
 - American Mosquito Control Association (virtual)
 - MiCAMP GIS



MEMBERSHIP & CERTIFICATION

- Michigan Mosquito Control Association
- American Mosquito Control Association
- Entomological Society of America
- MDARD - Category Core and 7F Certification
- Stormwater Pollution Prevention Plan Certification
- Mid-Michigan Mosquito Control Technical Advisory Committee



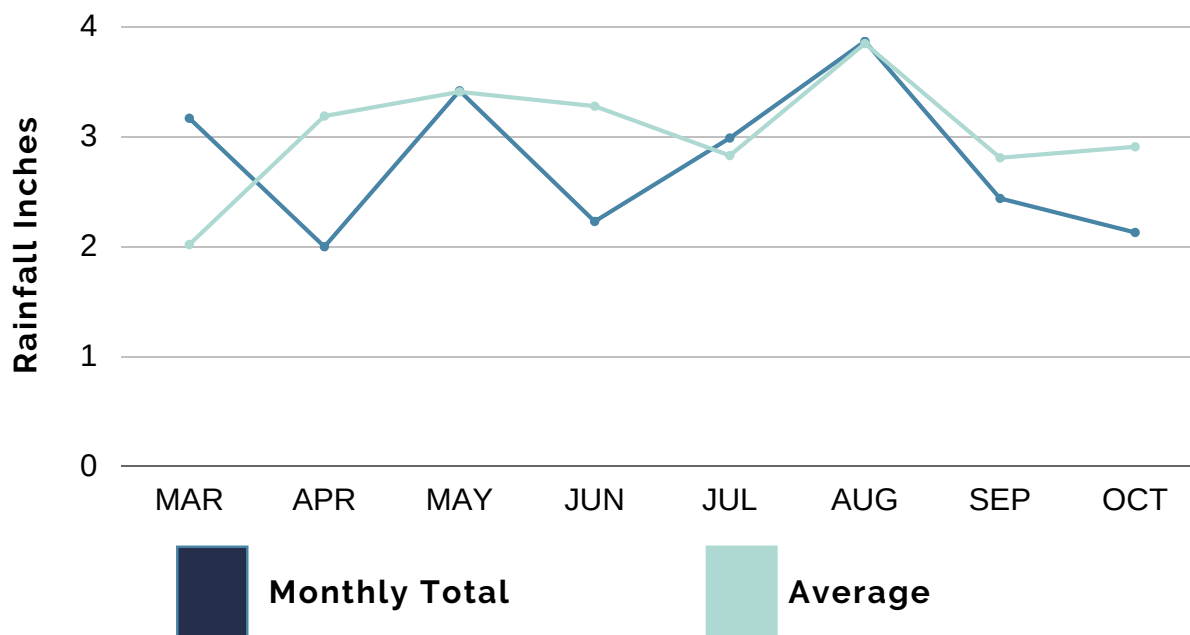
WEATHER



The relationship between rainfall and mosquito activity is important in understanding an IMM approach to mosquito control. Flooding rains create ideal breeding conditions for mosquitoes; standing water that remains for a week or more can lead to a significant influx of floodwater mosquito species. Therefore, monitoring rainfall is important for control operations and is accomplished by means of a network of county-wide rain gauges and online weather reports.

The 2022 season was characterized by drought-like conditions in the spring that thwarted significant flooding. Heavy rains the last half of May lead to the first minor rise in mosquito numbers in early June, which coincided with the natural emergence of high numbers of the cattail mosquito. Late July and early August rains soaked in to a great extent and only led to minor increases in mosquito numbers.

Bay County Seasonal Precipitation, 2022



Mosquito-Borne Virus Activity Bay County

The primary goal of BCMC's program is to decrease the risk of disease transmission by reducing mosquito numbers. Data collected during virus surveillance guides Mosquito Control to the areas of highest risk.

Mosquito-transmitted pathogens are detected in Michigan every season. The main pathogens of concern include West Nile virus (WNV), St. Louis encephalitis (SLE), Eastern Equine encephalitis (EEE), LaCrosse encephalitis (LCE), Jamestown Canyon virus (JCV), and dog heartworm.

Captured mosquitoes are submitted to the Michigan Department of Health and Human Service's Bureau of Laboratories to be analyzed for pathogens they are potentially carrying; both West Nile virus and Jamestown Canyon virus were detected this season. Mosquitoes are submitted in groups of up to 50 mosquitoes of the same species collected from the same location. Results from the MDHHS are faxed within the week they are submitted.

All dead bird sightings are logged onto Michigan's Emerging Diseases website. Birds found suitable for testing are tested in-house using the WNV Vector Test™ kit.

WNV, SLE, JCV, and EEE Surveillance

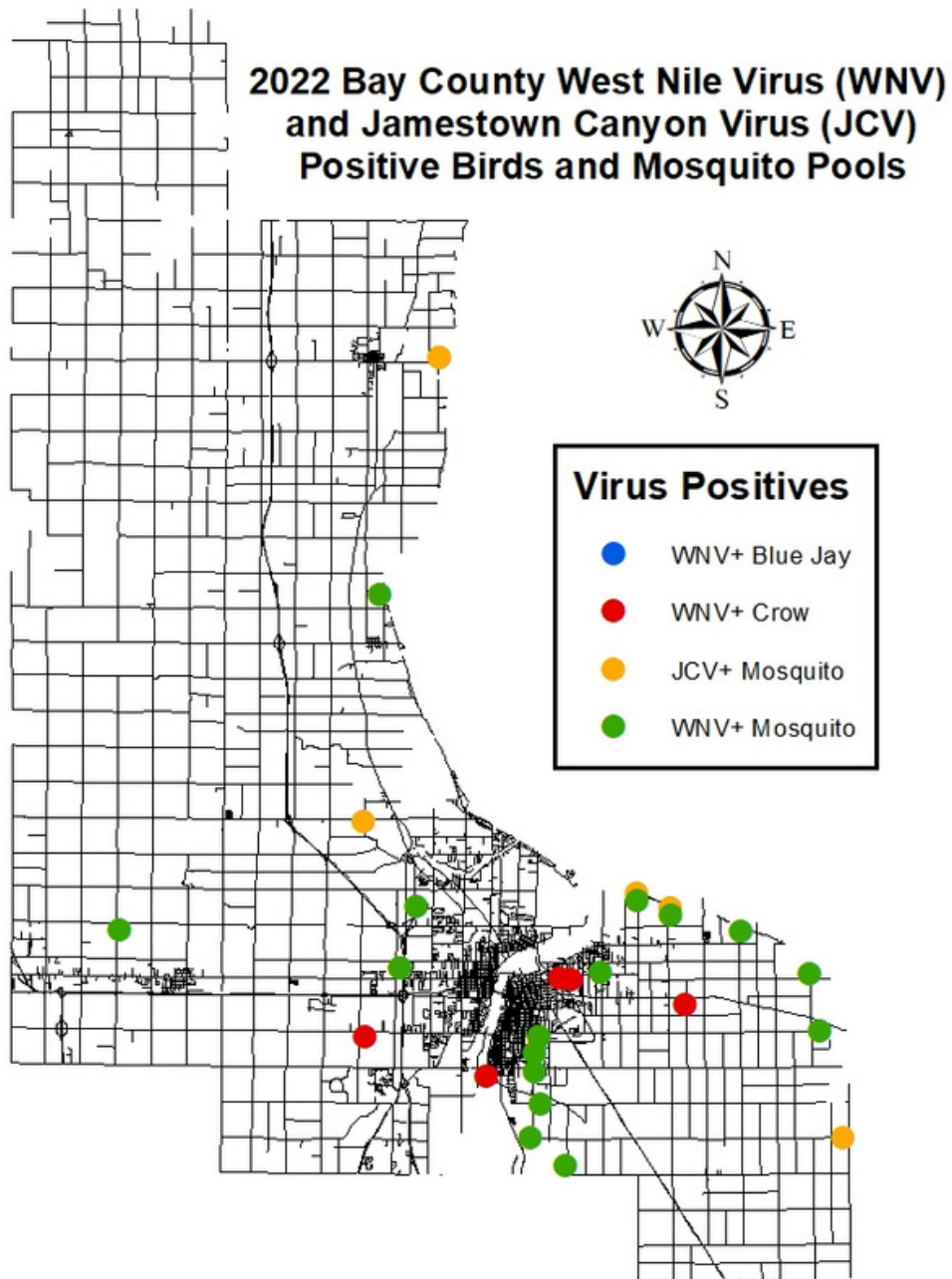
- 1,064 pools containing 33,903 females
 - *Culex restuans*/*Culex pipiens* (377 pools/10,403 females)
 - *Coquillettidia perturbans* (347 pools/14,232 females)
 - *Aedes japonicus* and *Culex erraticus* (9 pools/196 females)
 - *Anopheles* species (305 pools/8,291 females)
 - **29 WNV-positive *Culex restuans*/*pipiens* pools**
 - **2 WNV-positive *Anopheles* pools**
 - **1 WNV-positive *Culex erraticus* pool**
 - **6 JCV-positive *Anopheles* pools**
- 17 dead birds reported
 - 7 crows tested
 - **5 WNV-positive birds**



32 mosquito pools
WNV-POSITIVE

6 mosquito pools
JCV-POSITIVE

2022 BAY COUNTY WNV & JCV-POSITIVE BIRDS & MOSQUITOES



Disease Activity Michigan

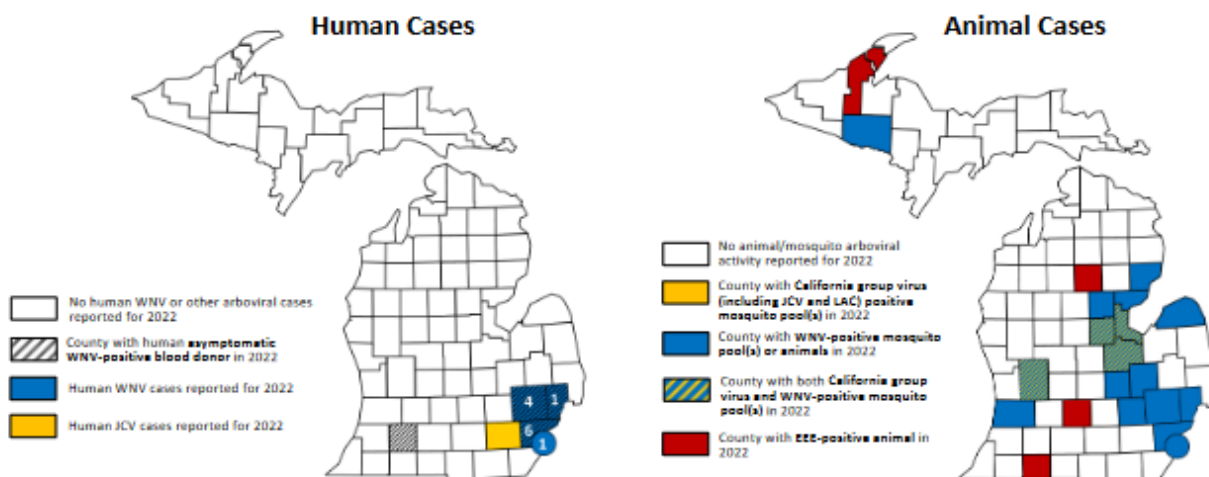
Historically speaking, human WNV cases were low for Michigan in 2022 with 12 cases reported (no fatalities). Most cases occurred in Macomb County, Oakland County, Wayne County, and the City of Detroit. WNV was also detected statewide in 77 mosquito pools, 18 birds, 1 horse (Livingston County), and 4 Michigan blood donors.

12 human WNV cases in Michigan



Cases of Eastern Equine Encephalitis (EEE) were also reported in 2022 with EEE virus infecting 3 mammals and 1 bird in 4 Michigan counties.

Additionally, 1 Michigan resident and 12 mosquito pools tested positive for Jamestown Canyon virus. LaCrosse Encephalitis virus was also detected in 1 mosquito pool.



MDHHS Michigan Department of Health & Human Services
 Bureau of Epidemiology & Population Health
 Emerging & Zoonotic Infectious Diseases (EZID) Section

For more information
www.michigan.gov/westnile

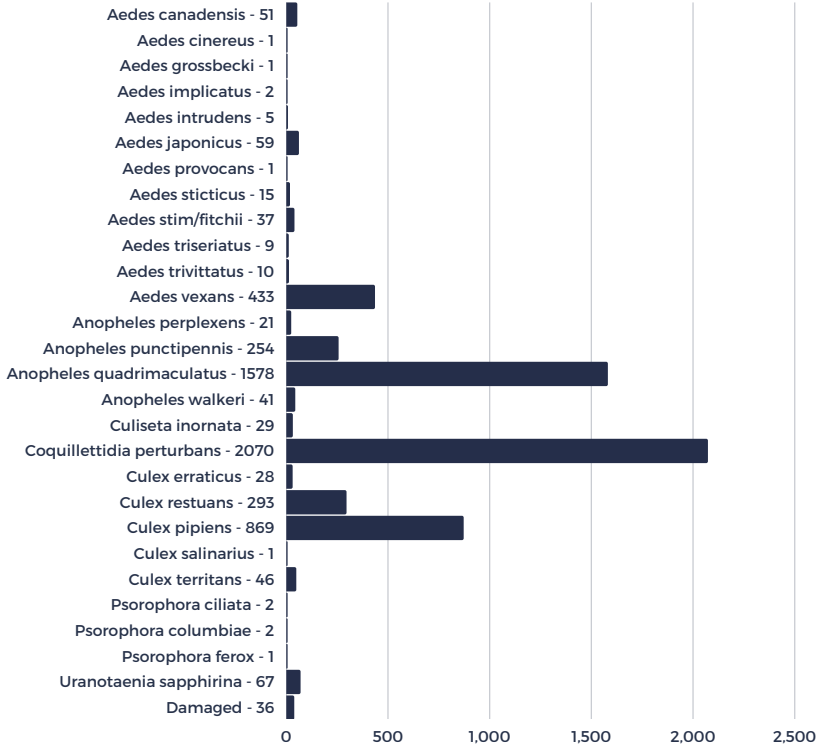
Adult Mosquito Collections



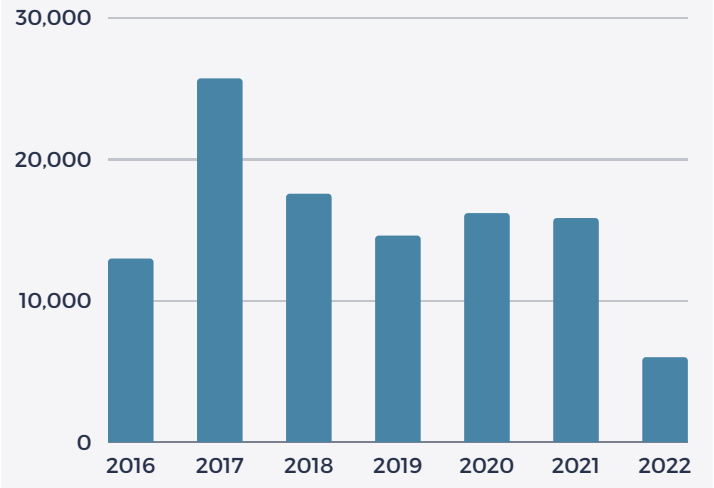
LIGHT TRAPS

Adult mosquito surveillance occurred from May-September through a network of 14 light traps. Total capture in light traps for the 2022 season was 5,959 mosquitoes, compared to the historical average of 14,479. Individual species data is shown below. The season was defined by a dry spring and below-average rainfall throughout the summer. Due to drought-like conditions, the heavy rains in late-May and late-summer (July into August) soaked in for the most part and did not cause a major influx of adult mosquitoes.

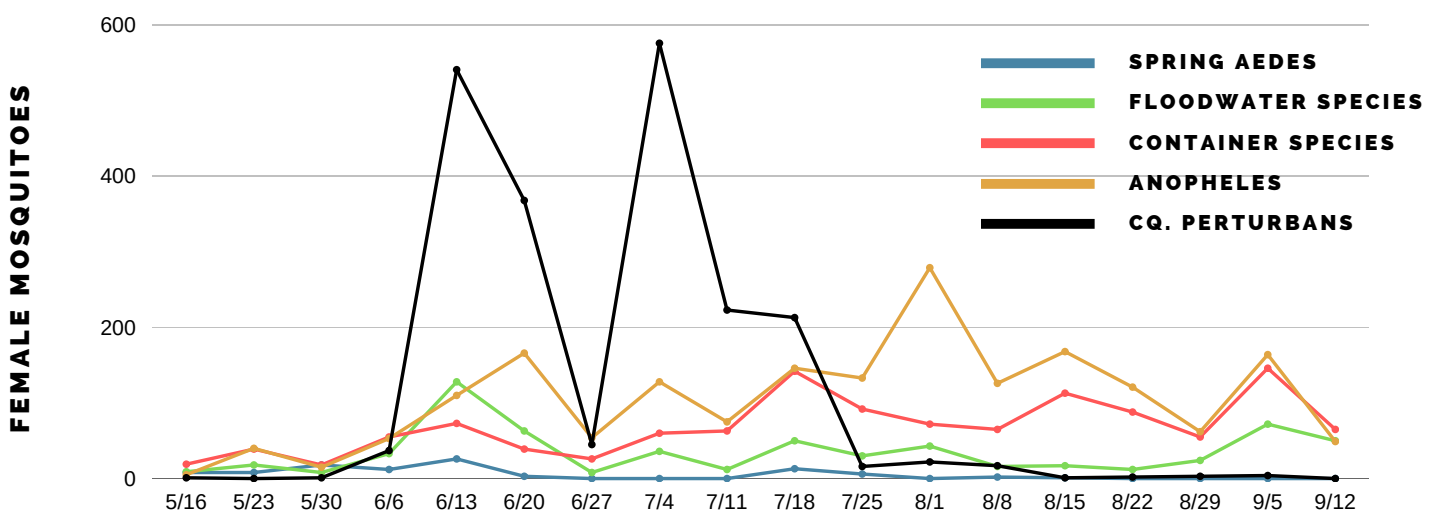
NEW JERSEY LIGHT TRAPS SPECIES COMPOSITION



NEW JERSEY LIGHT TRAPS HISTORICAL COLLECTIONS



WEEKLY CAPTURES



CDC TRAPS

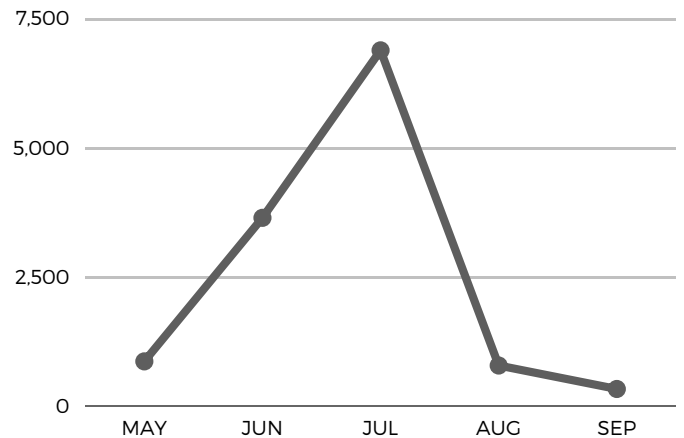
187 TRAP COLLECTIONS



12,568

TOTAL CAPTURE

The majority of female mosquitoes collected in CDC traps this season occurred in July with 6,896 captured; 79% were *Cq. perturbans*. Three new records were set this season for the highest nightly catch in a CDC trap. The new record, 10,858 mosquitoes consisting mostly of *Cq. perturbans*, was set on July 7 at Knight Road in Hampton Township during the Hampton Bayfront Study (study data is not included in these figures).

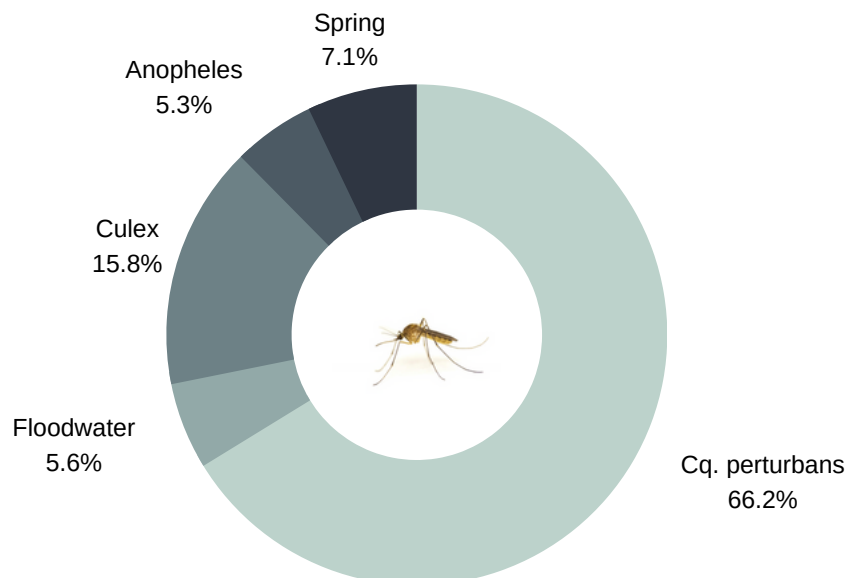


67

AVG. FEMALES PER TRAP

25

SPECIES COLLECTED



GRAVID TRAPS

84 TRAP COLLECTIONS

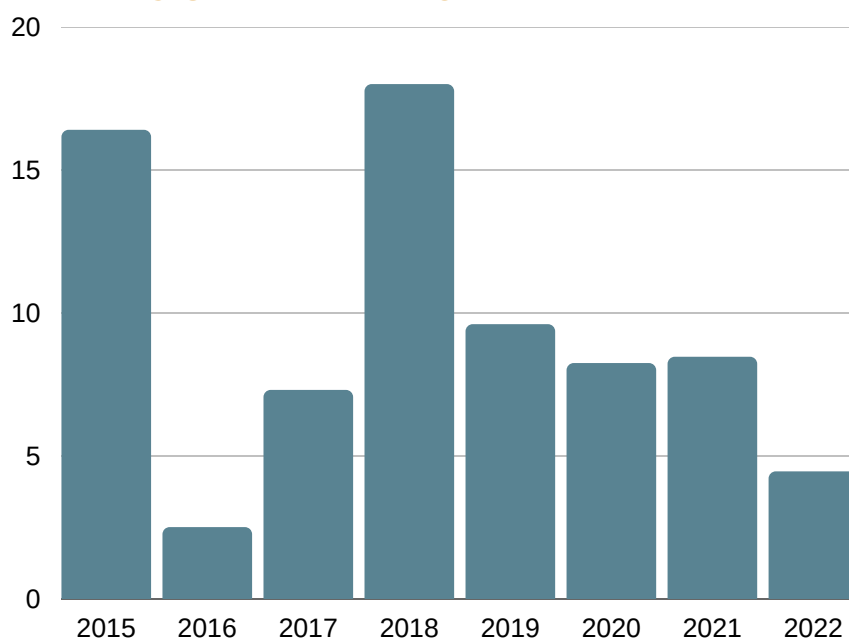


Gravid traps were used to monitor female Culex mosquitoes that are West Nile Virus (WNV) vectors. Culex mosquitoes who have taken a blood meal are then able to produce eggs and are attracted to gravid traps as a suitable place to lay those eggs (oviposit). Gravid traps were placed from June through September with 84 traps capturing 374 Culex females that were submitted for virus isolation analysis. Traps were placed in areas of past and current WNV activity. Trap placement, number of traps placed, and weather conditions, are the main factors influencing collections.

CULEX CAPTURED

374

HISTORICAL AVERAGE CULEX PER GRAVID TRAP



EXPANSION OF NEW MOSQUITO SPECIES IN BAY COUNTY

Bay County Mosquito Control staff has identified a few new mosquito species collected in traps over the last few years. A single *Aedes tormentor* female adult was collected from a CDC CO₂-baited trap near Linwood, MI in 2021. On June 22, 2022, *Aedes tormentor* larvae were identified from a collection near Pinconning. According to literature, *Aedes tormentor* is another floodwater species whose larvae are found in temporary flooded fields and woodlots following summer rains.

There was also an influx of *Culex erraticus* in 2022, first seen in 2020 with the collection of a single adult female. This season, consistent numbers of *Cx. erraticus* females have been collected in both light traps and CDC traps, especially in August. A pool of 8 *Cx. erraticus* females from the Saginaw Bay area in Hampton Township tested positive for West Nile Virus, proving their capacity as a disease vector in our area. A study published in the *Journal of Medical Entomology* also showed the potential role of *Culex erraticus* as a vector of Eastern Equine Encephalitis.

According to Darsie and Ward's Identification and Geographical Distribution of the Mosquitoes of North America, North of Mexico, multiple species identified in Bay County are beyond their northernmost range, which for *Cx. erraticus* is the southern border of Michigan and for *Ae. tormentor* is essentially the middle of Illinois, Indiana, and Ohio. This could be an indication that climate change is creating suitable conditions here for more vector species.



Aedes tormentor

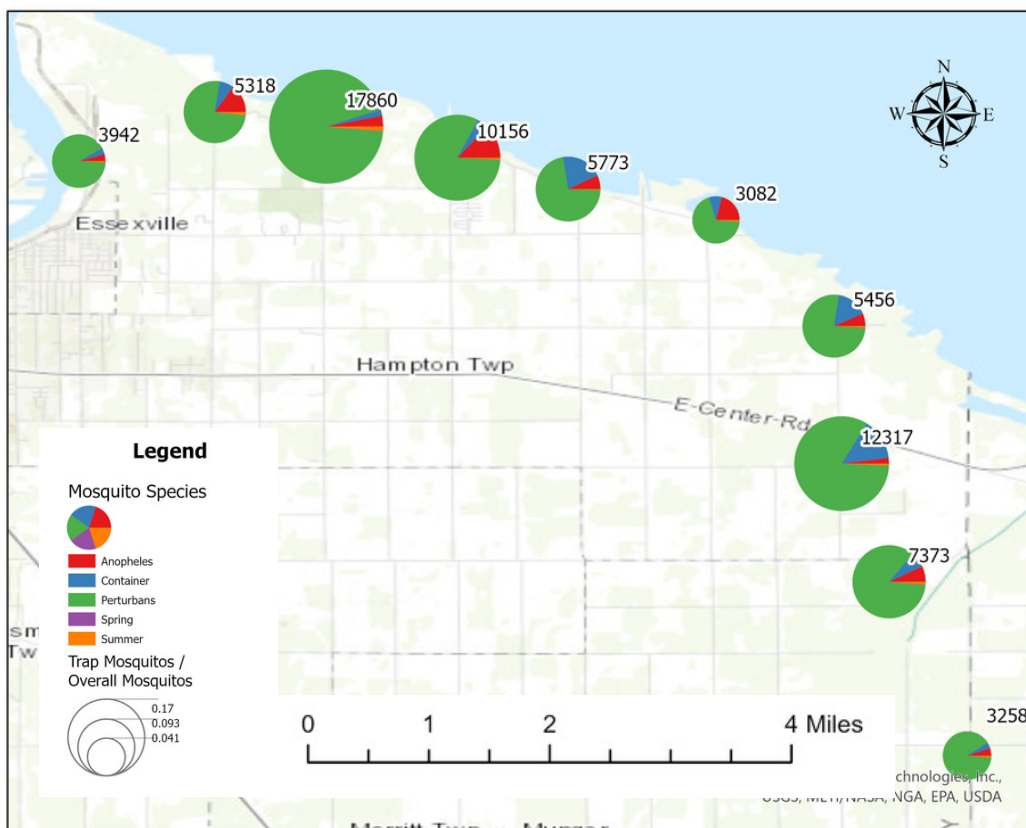


Culex erraticus

COQUILLETIDIA PERTURBANS UPDATE

Continuing to use strategies from Metropolitan Mosquito Control District's success in controlling Cq. perturbans, Bay County Mosquito Control worked this summer to accumulate more data on known breeding sites of Cq. perturbans. After verifying in 2021 that Cq. perturbans were indeed breeding in Phragmites habitat along the Saginaw Bay shoreline, evidenced by both adult emergence traps and larval dipping, staff expanded adult surveillance in this area with a 2022 Hampton Bayfront Study. This study entailed weekly trapping at 10 consistent locations (approximately 1 mile apart) along the Saginaw Bay Shoreline in Hampton Township from June through mid-September. A total of 74,608 female mosquitoes were captured, of which 84% were Cq. Perturbans, mostly captured in July. The highest numbers of Cq. perturbans were found around the Knight Road area.

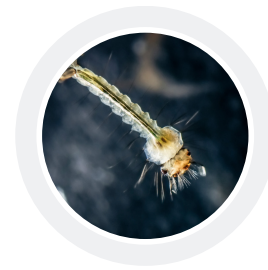
Hampton Bayfront - 2022 Counts



2022 SPRING TREATMENT

SURVEILLANCE & TREATMENT

- 19 woodlots monitored; larvae first observed March 22
- Aircraft calibration April 20
- Quality control - monitored 30 woodlots
- 95.5% larval mortality achieved
- No non-target effects noted
- Pupae observed April 29; adult emergence by May 6
- Aerial treatment April 22-28
- Operation based at James Clements Airport
- Applicator-Earl's Spray Service using 4 fixed wing aircraft
- Bti bacterium (VectoBac G) larval control product; 3 #/acre
- Spring field crews surveyed 277 sites, treating 41



AERIAL ACREAGE & CONTROL RESULTS

52,434

**ACRES
TREATED**

95.5%

**LARVAL
MORTALITY**

LARVAL CONTROL

BCMC's program focuses on routine larval surveillance and control to prevent adult mosquito emergence. From April through September, up to 20 certified technicians search the county daily, inspecting habitats, dumping containers, and controlling larvae as needed. Reducing breeding sources is the preferred method to eliminate mosquitoes. When controlling larvae, it is important to select the appropriate control material and formulation based on life stage present. Application dosage rate and timing are critical.

17,192

breeding site inspections

13.6%

sites requiring treatment

SEARCH AND DESTROY

Technicians conduct daily surveillance in a variety of habitats in a process known as Search and Destroy. Staff search for mosquito larvae in sites such as containers, pools, ponds, ditches, woodlots, fields, and drains. During yard inspections, staff educate homeowners on strategies to reduce mosquito breeding.



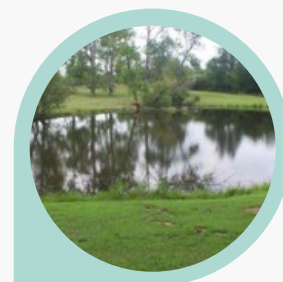
SEWAGE LAGOONS

Sewage lagoons are a prolific source of Culex mosquitoes because of their organic nature. Surface and emergent vegetation along a lagoon's edge provide shelter and food for developing larvae. White Birch Village Trailer Park sewage lagoon was monitored 9 times resulting in 4 larval treatments.



RETENTION & DETENTION PONDS

Mosquito Control inspects about 155 retention or detention basins that are designed to manage storm water runoff to prevent flooding. Floodwater and permanent water mosquito species breed in both habitats. Technicians completed 477 inspections, finding and treating larvae or pupae 18% of the time.



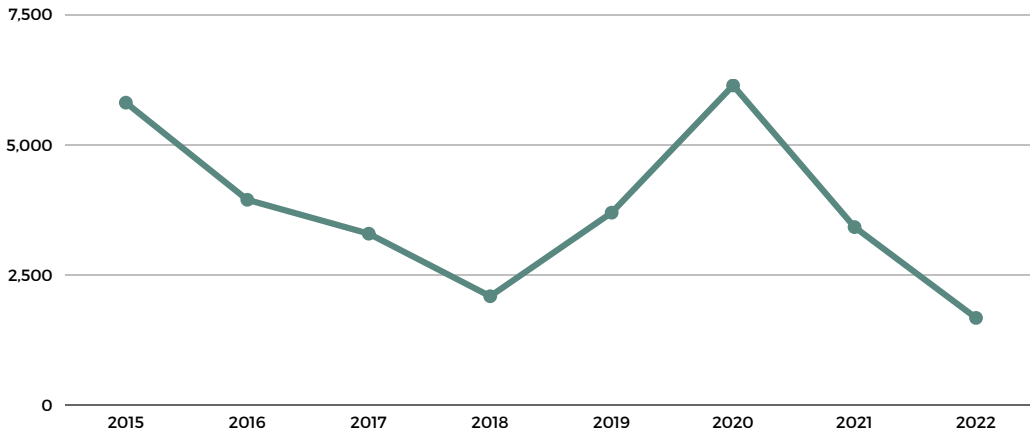
LARVAL CONTROL

ROADSIDE DITCHES

Ditch trucks logged 1,679 miles as technicians responded to ditches actively breeding mosquito larvae. This occurs when heavy rains create standing water that lasts long enough for mosquitoes to complete their life cycle. Most of the treatment (45%) occurred in two townships - Merritt and Beaver - this was due to localized rain events and subsequent mosquito hatch. Just over 614 gallons of liquid Bti (VectoBac 12AS), 383.5 gallons of VectoLex WDG, and 674 pounds of VectoLex FG were dispensed.



DITCH TRUCK MILES



2022
1,679
DITCH MILES TREATED

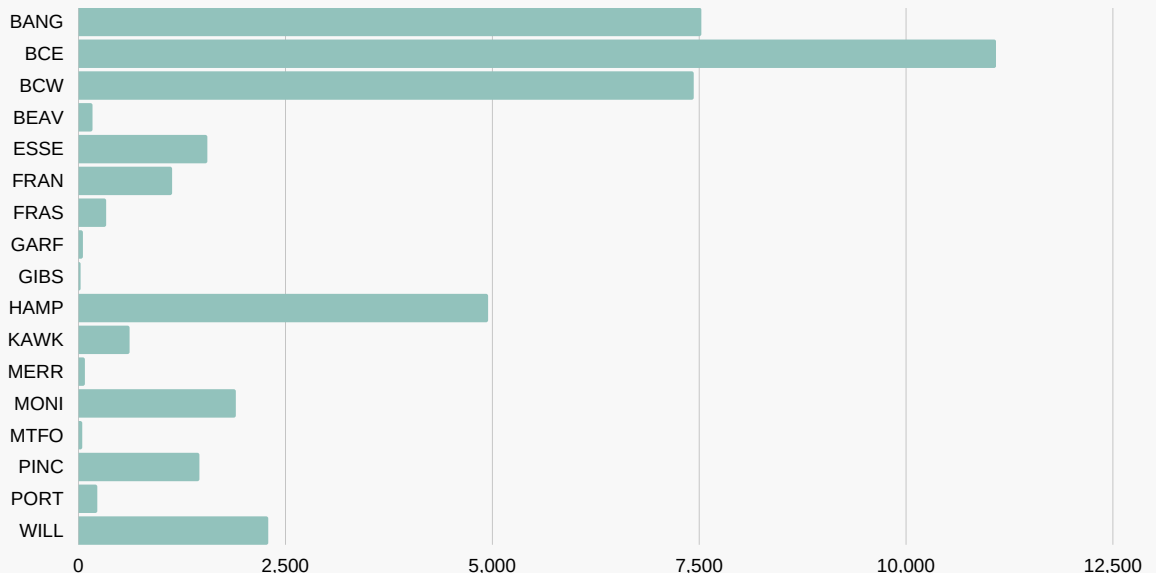
CATCH BASINS

Treatment of catch basins, or storm drains, helps control Culex mosquitoes, vectors of WNV and SLE. Basins were treated with VectoLex FG (1,018 lbs) or Natular XRT (6,479 tablets).



CATCH BASINS TREATED

2022
40,789
CATCH BASINS TREATED



ADULT MOSQUITO CONTROL

While larval control is the preferred method of treatment, it is virtually impossible to find and treat all breeding sites, so adult control, fogging to control adult mosquitoes in flight, is also a part of the control program.

Fogging adult mosquitoes includes the use of both gas-powered and electric Ultra-Low Volume (ULV) machines that allow a small amount of material to be dispensed from the spray unit. Truck-mounted units are fitted with flow control monitors that can adjust the flow rate of the insecticide pump based on truck speed.

Label recommendations are strictly followed to assure proper dosage rate and droplet size. To accomplish the latter, droplet measurements were taken several times throughout the season using a DC-IV droplet measuring device where a heated probe was inserted into the fog to measure droplet diameters.



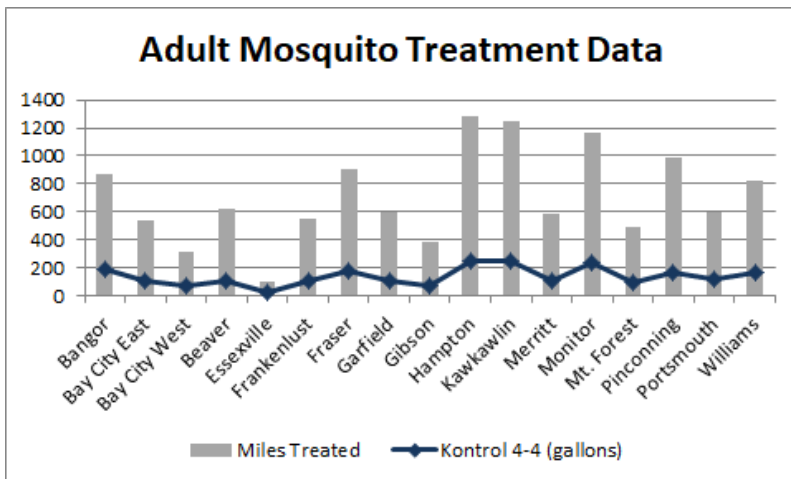
12,047
ROAD MILES FOGGED

120

**NO SPRAY PARCELS:
PROPERTIES OPTING
OUT OF TREATMENTS**

53

**EXTRA NEEDS PROPERTIES:
RESIDENTS WHO BENEFIT FROM
ADDITIONAL MOSQUITO CONTROL,
AS VERIFIED BY A MEDICAL
PROFESSIONAL**



ADULT CONTROL SERVICE REQUESTS

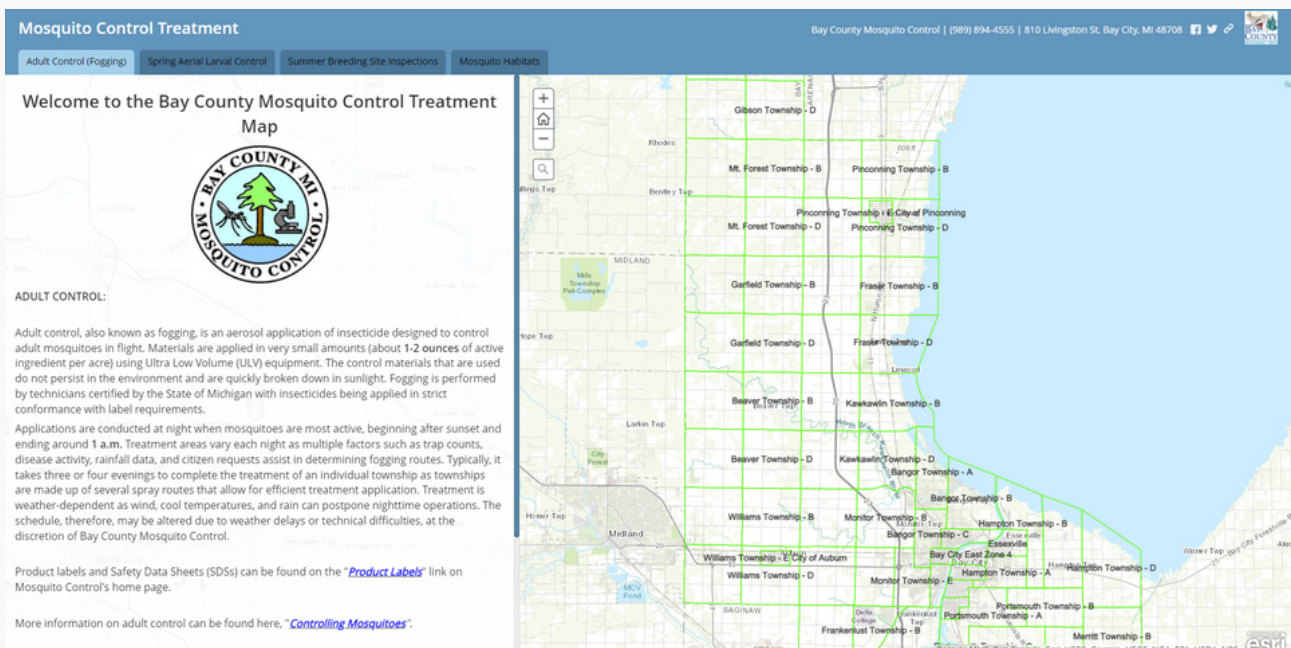
Localized adult mosquito control is done to reduce mosquito annoyance and disease vector populations, a process that supplements the larval control program. These adult mosquito control applications are performed after sampling detects mosquito populations meeting threshold levels in park and recreation areas, for public events, or in response to citizen reports of mosquito annoyance. Residents call to report mosquito issues on their property. The information is submitted to field staff and added to a daily service request log.

642
adult control requests

124
nuisance mosquito requests

426
yard spray requests for events

An online, interactive treatment map is also available on BCMC's webpage. The map allows residents to view when their neighborhood was last fogged and when future treatment is anticipated.



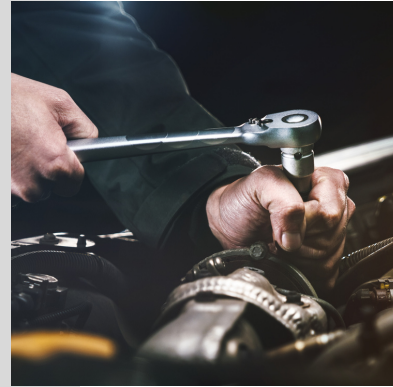
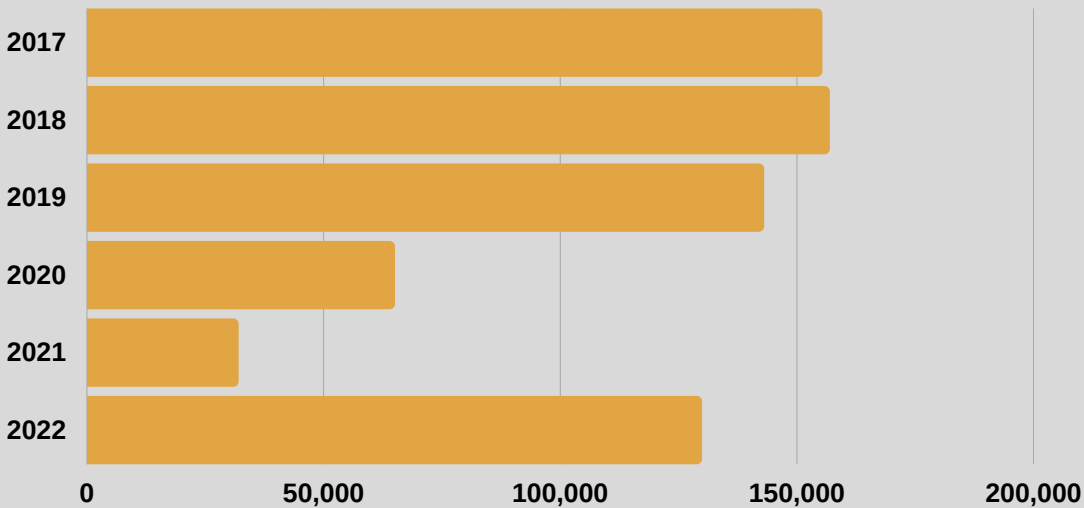
Control Materials

TRADE NAME	APPLICATION RATE	ACTIVE INGREDIENT DOSAGE	AMOUNT USED
Altosid® P35	2.5-20 lb/acre	0.106-0.85 lb methoprene/acre	106.86 lb
Duplex G	5-20 lb/acre	375 Bti ITU/mg .08-0.32lb methoprene/acre	77.97 lb
BVA2 Larvicide Oil	1-5 gal/acre	0.97-4.85 gal petroleum distillates/acre	20 gal
Sunspray Larvicide Oil	1-5 gal/acre	0.988-4.94 gal petroleum distillates/acre	3.49 gal
Summit Bti Briquets™	1 briquet/100 sq ft	7000 Aedes aegypti (AA) Bti ITU/mg	376 briquets
VectoBac® G	2.5-20 lb/acre	0.273-0.4555 billion Bti ITU/acre	157,700 lb
VectoBac® 12AS	0.25-2 pints/acre	0.15-1.21 billion Bti ITU/acre	49 gal
VectoLex® FG	5-20 lb/acre	0.115-0.46 billion BsITU/acre	1,929.3lb
VectoLex® WDG	0.5-1.5 lb/acre	0.1495-0.4485billion BsITU/acre	79 lb
Natural™ XRT	1 tablet/CB	6.25% spinosad/tablet	6,558 tablets
Natural™ G30	5-20 lb/acre	2.5% spinosad	693.49 lb
Masterline® Kontrol 4-4	0.67 fl oz/acre	0.00175 lb permethrin/acre 0.00175 lb PBO/acre	2,346 gal

VEHICLE MAINTENANCE

Our state-certified mechanic maintains BCMC's 33-vehicle fleet, forklifts, foggers, various application equipment, and traps (see below). In 2022, 129,863 miles were driven, which falls below the 30-year average of 166,978. This is an indication primarily of a dry season, however. The use of extended residual products and improved efficiency due to mapping improvements has also decreased driving. Two new 4WD trucks were ordered in 2022 and arrived at the end of the year due to continued COVID-related production delays.

Historic Fleet Miles



VEHICLE & EQUIPMENT REPAIR

- | | |
|------------------------------------|---|
| 0 Brake systems | 10 Body repairs |
| 0 Fuel systems | 0 Emission repairs |
| 13 Front end repairs | 0 Exhaust repairs |
| 26 Truck oil changes | 10 Maintenance/Service |
| 7 Electrical system repairs | 26 ULV repairs/oil changes |
| 5 Drive lines | 1 Ditch truck repairs |
| 9 New tires | 2 CDC traps/battery packs |
| 12 Used tire repairs | 0 Light traps |
| 5 Engine repairs | 1 Pumps |
| 2 Air conditioning | 3 Vehicle prep |
| 5 Coolant system repairs | 1 Truck wash bay |
| 7 Other equipment | 4 Air compressor |
| 15 Transmission repairs | 22 Repairs for other departments |

EQUIPMENT INVENTORY



FLEET

1994 GMC C1500
1994 GMC K1500
1997 GMC K1500
1997 GMC C1500
2000 FORD F150
2000 GMC SIERRA
2002 CHEVY SILVERADO
2004 FORD F250
2006 CHEVY SILVERADO
2006 CHEVY SILVERADO
2008 CHEVY SILVERADO
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2018 CHEVY SILVERADO
2018 CHEVY SILVERADO
2018 CHEVY TRAVERSE
2020 CHEVY SILVERADO
2020 CHEVY SILVERADO
2020 CHEVY SILVERADO
2020 CHEVY SILVERADO
2020 CHEVY SILVERADO
2021 CHEVY TRAVERSE
2022 CHEVY SILVERADO
2022 CHEVY SILVERADO
2022 CHEVY SILVERADO
2023 CHEVY SILVERADO
2023 CHEVY SILVERADO

ULTRA-LOW VOLUME FOGGERS

GAS MACHINES

LECO GAS (~1990)
GRIZZLY GAS (1999)
GRIZZLY GAS (2000)
GRIZZLY GAS (2008)
GRIZZLY GAS (2010)
GRIZZLY GAS (2019)
GRIZZLY GAS (2019)
GAS MACHINE (REBUILT 2020)
GRIZZLY GAS (2020)
GRIZZLY GAS (2021)
GRIZZLY GAS (2021)

ELECTRIC MACHINES

DURAMIST ELECTRIC (2014)
DURAMIST ELECTRIC (2015)
DURAMIST ELECTRIC (2017)
DURAMIST ELECTRIC (2017)

LARVAL CONTROL POWER EQUIPMENT

STIHL BACKPACK BLOWER (2018)
STIHL BACKPACK BLOWER (2021)
11 TRUCK-MOUNTED LIQUID DITCH UNITS

SURVEILLANCE TRAPS

14 NEW JERSEY LIGHT TRAPS
19 CDC MINIATURE LIGHT TRAPS
10 GRAVID TRAPS