Tuscola County Mosquito Abatement

2018 Annual Report

2019 Program Plan

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TUSCOLA COUNTY / TECHNICAL ADVISORY COMMITTEE

COUNTY ADMINISTATION			
Michael Hoagland		County Controller	
TUSCOLA COUNTY COMMISSIONERS			
Thomas Young		District 1	
Thomas Bardwell		District 2	
Kim Vaughan		District 3	
Mark Jensen		District 4	
Dan Grimshaw		District 5	
TECHNICAL ADVISORY COMMITTEE			
Steven Carlson		MDARD	
Norman Adams		Saginaw Valley Beekeepers Association	
Erik S. Foster		MI Dept of Health and Human Services	
Doug D. Enos		Midland County Drain Commission	
Kent Singer		Tuscola County Health Department	
Kim Vaughan		Tuscola County Commissioner	
Joesph Rivet		Bay County Drain Commissioner	
Fred Yanoski		Midland County Public Health	
Cynthia Chilcote		Midland County	
Jerry Somalski		Bay Landscaping	
John Hebert		Bay County	
Tom Putt		Bay County	
CONSULTANTS			
Richard Merritt, Ph.D.		Michigan State University	
Edward Walker, Ph.D.		Michigan State University	
Michael Kaufman, Ph.D		Michigan State University	

TCMA STAFF

DIRECTOR	
Kimberly Green	
STAFF	
Gavin Greer, Biologist	
Lisa Ozbat, Administrative Assistant	
Larry Zapfe, Equipment Technician	
2018 SEASONAL EMPLOYEES	
Don Gohs, Biology Technician	Tom Perkins, Foreman
Renee Raney, Office Clerk	Mike Sherman, Assistant Foreman
Shyann Clark, Biology Intern	Patrick Dennis, Foreman
Matthew Downing, Utility	Patrick Webster, Assistant Foreman
2018 SEASONAL TECHNICIANS	
John Adamczyk	Kirk Bauer
Joe Benjamin	Jack Clark
Matt Dixon	Kevin Gainforth
Scot Garlick	Lee Garnsey
Garrett Greer	Rodney Hood
Connor Langenburg	Rich Lester
Rich Myers	Bill Owensby
Amos Perkins	Mike Priestly
Mike Ryan	Mark Seelye
Aaron Singer	Tim Singer
David Smith	Warren Swackhamer
Mike Westerby	

ORGANIZATION

The Tuscola County Mosquito Abatement (TCMA) district was originally formed in 1997, after a millage proposal was passed by the citizens of Tuscola County. In August 2014, a six year renewal was passed with 85% being in favor. Funding for the 2018 mosquito control season was collected during the winter of 2017 taxes, at a rate of 0.65 mils.

Tuscola County is one of four counties in Michigan with a formal, comprehensive mosquito control program. TCMA is a county governmental agency, which serves to control nuisance and disease vectoring mosquitoes.

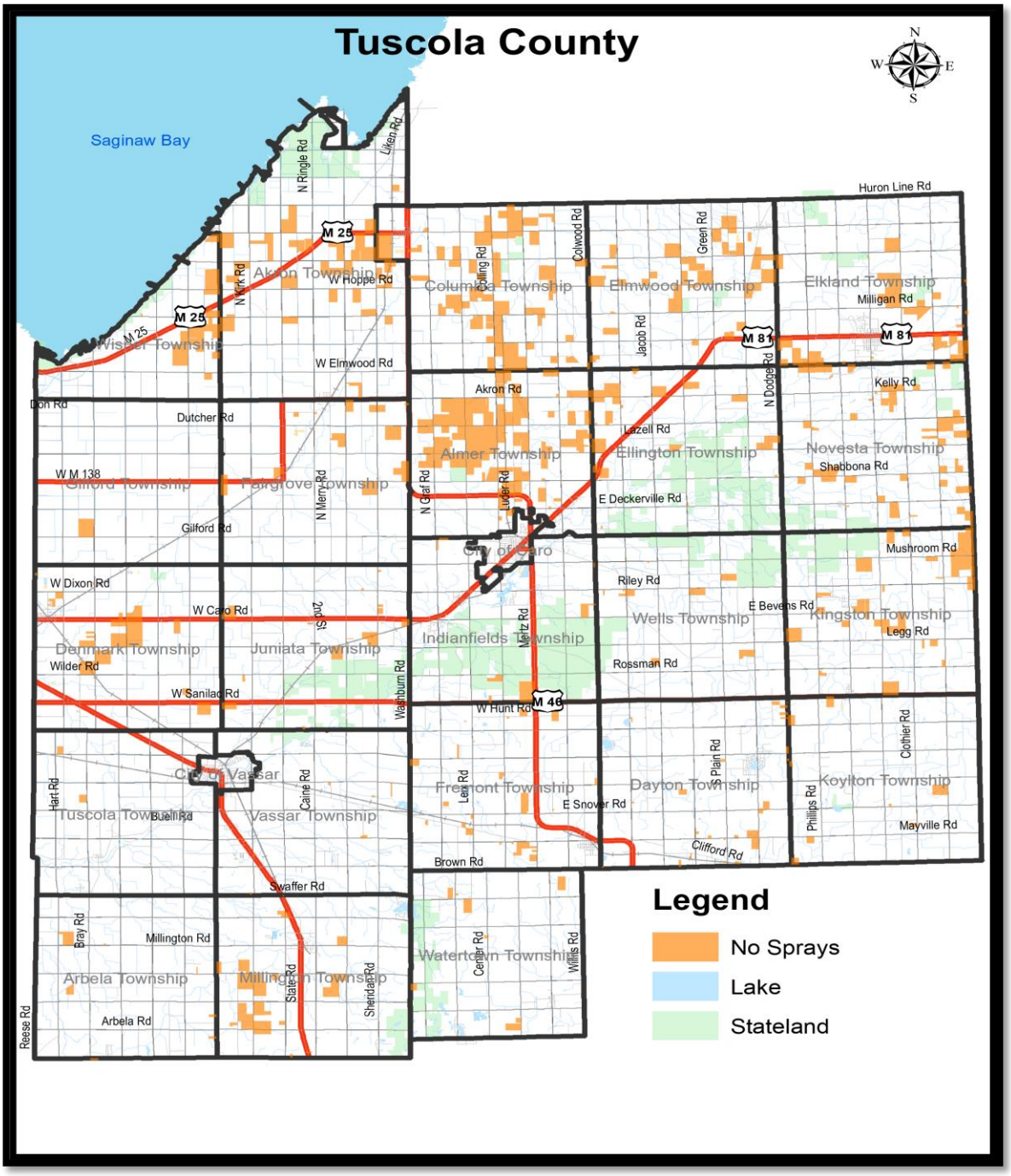
A Technical Advisory Committee (TAC), which is composed of some of Michigan's leading biologists, entomologists, conservationists and scientists, review TCMA's program every March.

Mosquito Abatement is based on Integrated Pest Management (IPM) practices. IPM is generally broken down into five categories or steps. These steps include:

- Identification of the pest
- Understanding the biology of the pest
- Monitoring the pest
- Developing sound goals to manage the pest
- Implementation of an IPM program

Biological surveillance, disease surveillance, product evaluations, field operations, and public education are included in this program.

TUSCOLA COUNTY MAP



STAFFING

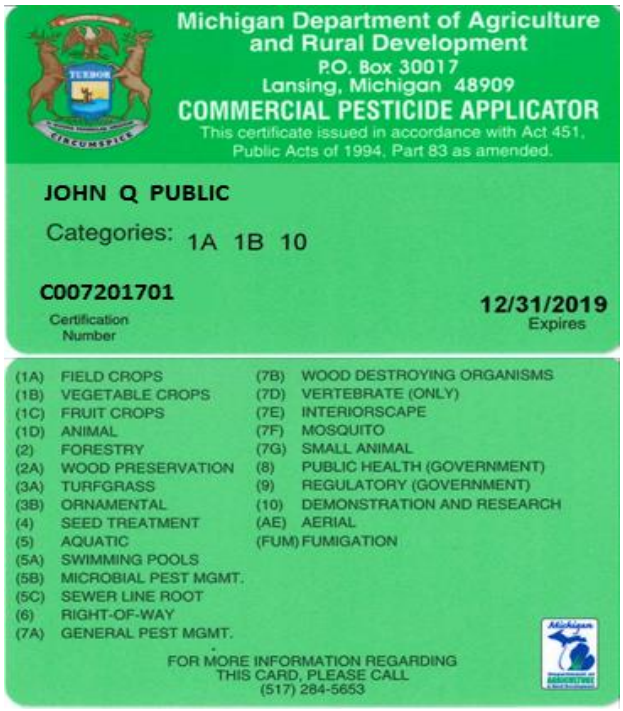
Tuscola County Mosquito Abatement employs 31 seasonal positions and four full time staff.

All TCMA technicians are required to have a MDA Certified Pesticide Applicators License (with a mosquito specific – 7F endorsement).

Newly hired staff, and those in need of re-certifying, are given study materials to review prior to testing. This year, we will be sending our newly hired technicians to the Frankenmuth Testing Center.

Once newly hired staff have passed all testing requirements, several days of training are provided to help technicians become familiar with equipment and operations.

Beginning with our annual spring treatment of flooded woodlots, all technicians are working the day shift, 8:00am to 4:00 pm. When night time fogging begins, a night shift will be added from 5:00pm to 1:00 am.


Michigan Department of Agriculture and Rural Development
P.O. Box 30017
Lansing, Michigan 48909
COMMERCIAL PESTICIDE APPLICATOR
This certificate issued in accordance with Act 451, Public Acts of 1994, Part 83 as amended.

JOHN Q PUBLIC

Categories: 1A 1B 10

C007201701
Certification Number

12/31/2019
Expires

(1A) FIELD CROPS
(1B) VEGETABLE CROPS
(1C) FRUIT CROPS
(1D) ANIMAL
(2) FORESTRY
(2A) WOOD PRESERVATION
(3A) TURFGRASS
(3B) ORNAMENTAL
(4) SEED TREATMENT
(5) AQUATIC
(5A) SWIMMING POOLS
(5B) MICROBIAL PEST MGMT.
(5C) SEWER LINE ROOT
(6) RIGHT-OF-WAY
(7A) GENERAL PEST MGMT.
(7B) WOOD DESTROYING ORGANISMS
(7D) VERTEBRATE (ONLY)
(7E) INTERIORSCAPE
(7F) MOSQUITO
(7G) SMALL ANIMAL
(8) PUBLIC HEALTH (GOVERNMENT)
(9) REGULATORY (GOVERNMENT)
(10) DEMONSTRATION AND RESEARCH
(AE) AERIAL
(FUM) FUMIGATION

FOR MORE INFORMATION REGARDING THIS CARD, PLEASE CALL (517) 284-5653

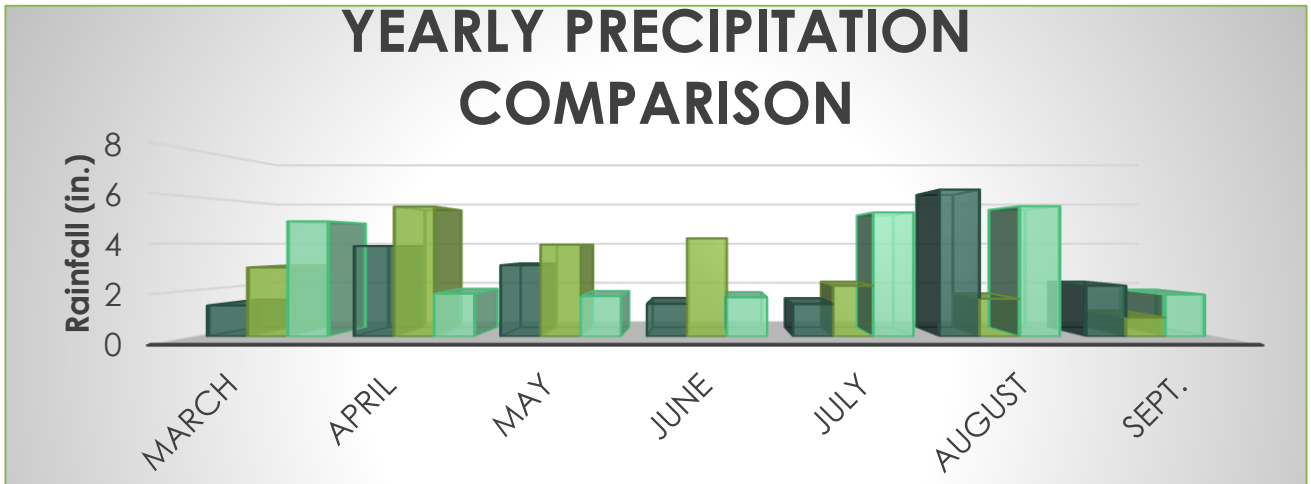
Weather Data

Weather plays a very important role in determining our mosquito population.

Rain events that cause flooding or standing water, create breeding areas that will result in a hatch of mosquitoes.

The 2018 season started out with drought like conditions. With little to no measurable rainfall, mosquito trap counts were very low. The end of August brought measurable rain amounts and increased mosquito activity for the end of our season.

Monitoring the weather is a daily event due to the fact that all of our treatment techniques are weather dependent.



	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPT.
2018	1.34	3.9	3.07	1.41	1.4	6.32	2.19
2017	2.98	5.59	3.96	4.23	2.19	1.63	0.82
2016	4.96	1.85	1.74	1.69	5.34	5.61	1.81

BIOLOGY

The biology department conducts routine trapping as a means of monitoring for mosquito population levels and disease testing. This information helps in developing a mosquito suppression strategy, a critical component in an IPM approach. We also rely on information provided by residents as a means of influencing our control efforts. This information can be helpful in determining where we need to focus our efforts.

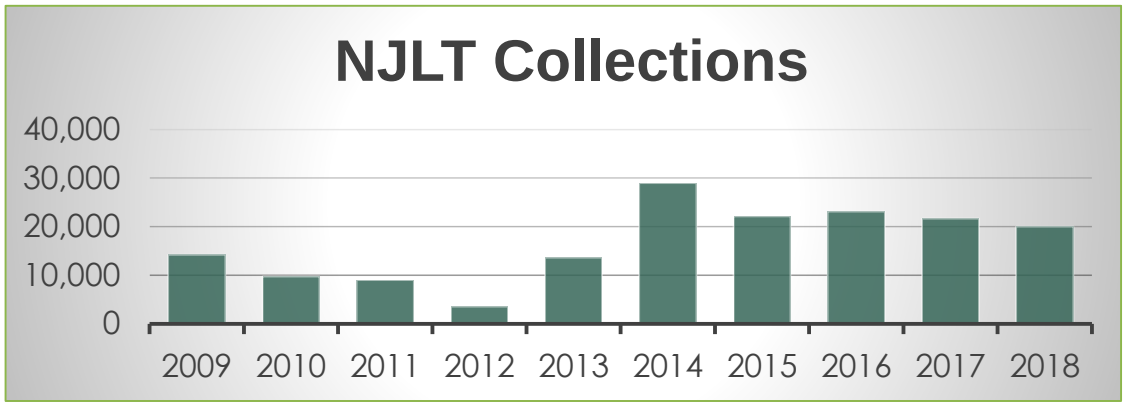
Our biology staff is also involved with monitoring the effectiveness of our control materials. During our spring treatment of flooded woodlots, the technicians will do routine dipping of the water to determine where mosquito larvae can be found. The crew will then treat those areas. Our biology staff will return to those sites to confirm the application was effective.

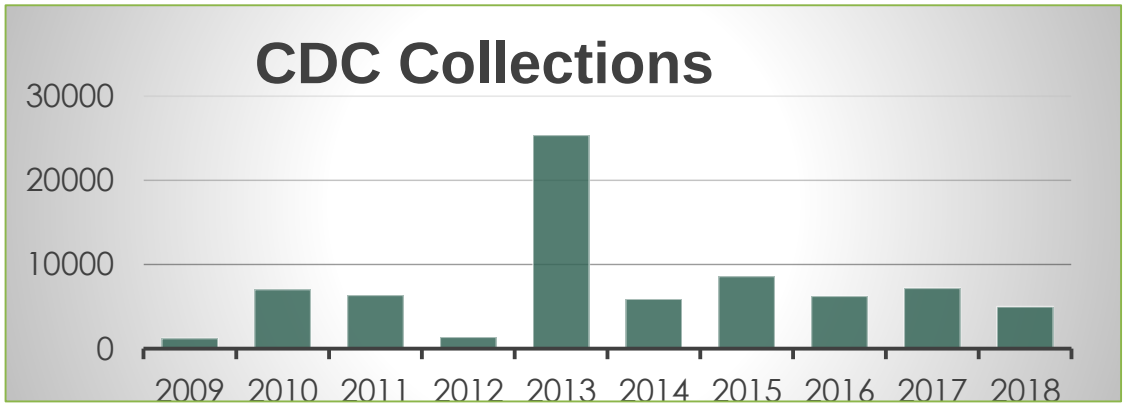
When monitoring the effectiveness of the adulticiding operations, traps are placed the night before an application, and then after. This will determine if the application was effective in suppressing mosquito populations.

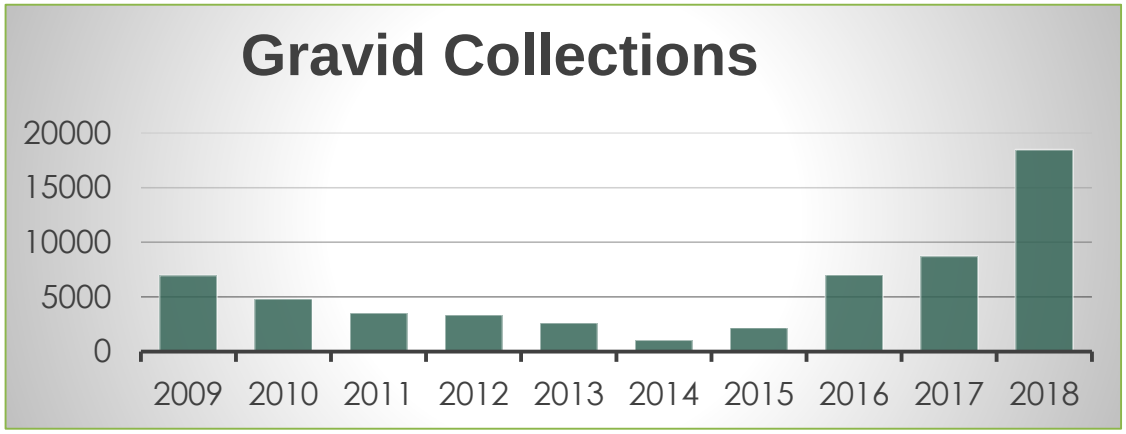
During the course of the season, the lab also conducts in house testing on dead birds that have been turned in by our county residents. This year, nine crows were tested. All tested negative for West Nile Virus.

The biologist will record all data obtained during the season to include in the annual report. New to the lab this season, was a microscope equipped with a tablet to allow better viewing, taking still photos and training.

HISTORICAL TRAPPING DATA







NEW JERSEY LIGHT TRAP

This trap is placed in fixed locations throughout the county year after year supplying historical data on mosquito populations. They require a supply of electricity, which provides a light source to attract mosquitoes. These traps are then collected two to three times per week, depending on the amount of mosquito activity. Often times, we will base our suppression strategy off the information provided by these traps.

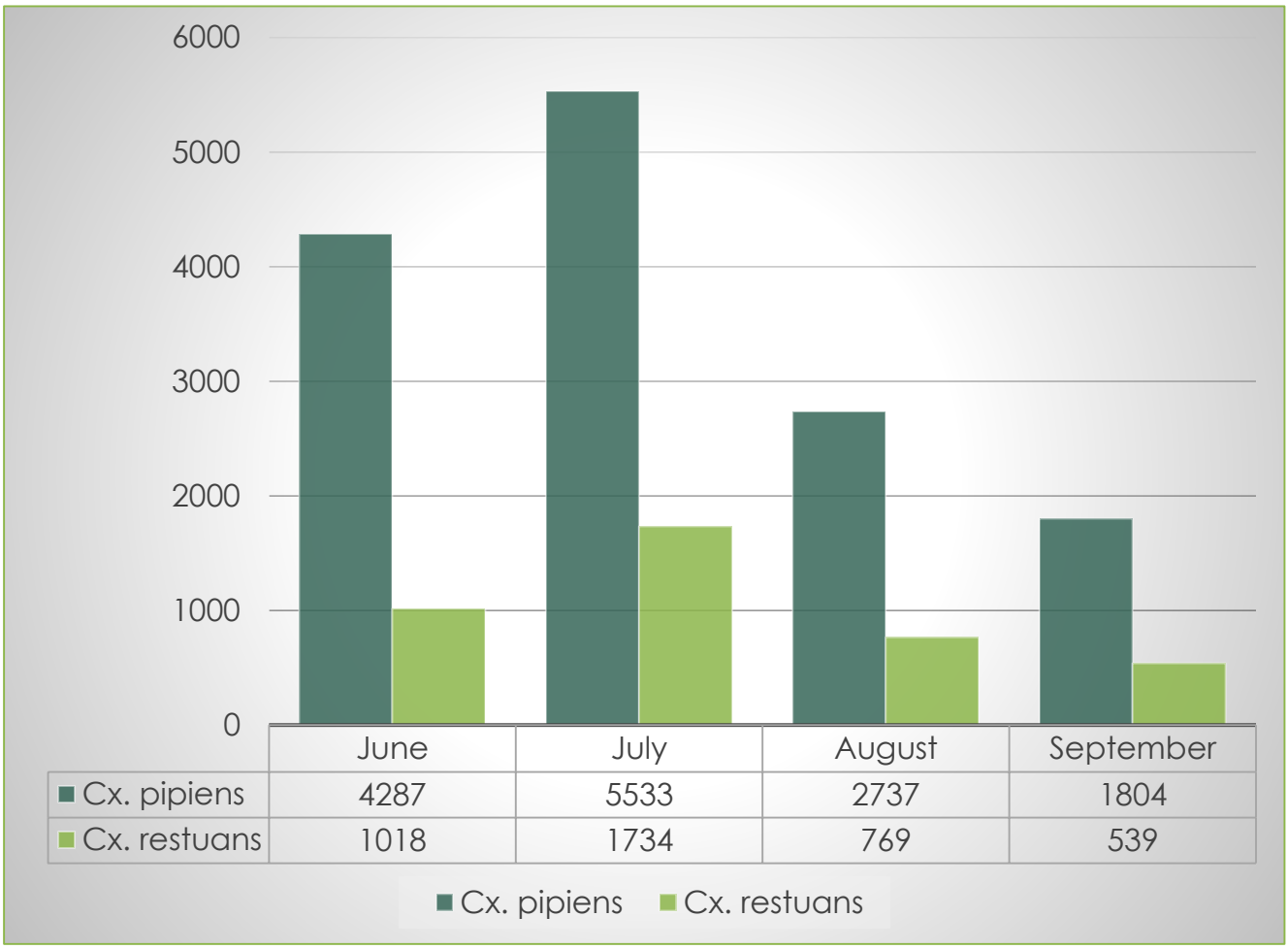
Compared to recent years, we have had an uptick in trapping numbers. Our biology department has significantly increased the amount of trapping we do throughout the summer which can skew the data. We had a dry summer, with low mosquito counts. However, we did trap three weeks longer in 2018. Overall, this had an affect on our total amount of females caught.

	MAY	JUNE	JULY	AUGUST	SEPTEMBER	TOTAL
AEDES:						
canadensis	93	96	0	0	0	**189**
implicatus	28	16	5	0	0	**49**
japonicus	5	2	1	17	28	**53**
provacans	45	67	0	0	0	**112**
stim/fitch	109	159	18	0	0	**286**
trivattatus	0	0	0	208	153	**361**
vexans	127	1029	869	867	1472	**4364**
ANOPHELES:						
punctipennis	28	118	202	282	374	**1004**
quadrimaculatus	422	1319	1467	1587	1770	**6565**
walkeri	87	371	590	619	423	**2090**
CULEX						
pipiens	44	317	233	369	269	**1232**
restuans	66	143	57	22	72	**360**
territans	0	0	72	58	3	**133**
CULISETA:						
inornata	2	4	1	3	4	**14**
minnesotae	0	1	0	1	0	**2**
moresitans	0	0	0	0	0	**0**
melanura	0	6	3	5	2	**16**
Cq.perturbans	0	15	3522	153	24	**3714**
Ur.sapphirina	0	0	1	2	5	**9**
Ps.cillata	0	1	4	3	1	**9**
Ps.ferox	0	0	0	2	1	**3**
TOTAL FEMALES:	**1056**	**3664**	**7045**	**4198**	**4601**	**20565**
TOTAL MALES:	**656**	**5148**	**2655**	**2496**	**3861**	**14816**

GRAVID TRAPS

Gravid Traps use highly organic water to lure mosquitoes. These mosquitoes are females that have had a blood meal and are looking for a potential place to lay eggs. The mosquitoes collected from these types of traps are generally Culex pipiens and Culex restuans that can transmit West Nile Virus. Relative to last year, the amount of mosquitoes caught by our traps was significantly lower. We also saw a decline in the amount of pools that tested positive for West Nile Virus.

The graph below indicates the number of these mosquitoes trapped during the 2018 season. As mentioned before, our biology department has significantly increased the amount of trapping we do throughout the summer. This in turn, caused the amount of mosquitoes caught to be much greater relative to recent years. In doing so, we gathered valuable information that allowed for us to treat lagoons more effectively. We will likely continue this trend into the future.



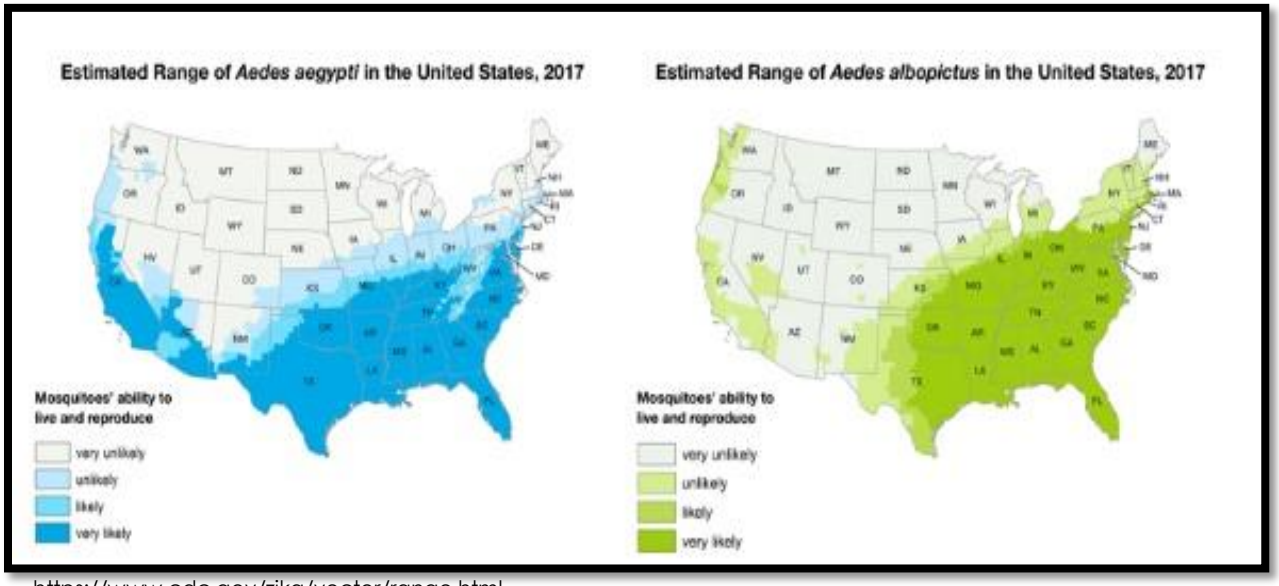
	June	July	August	September
Cx. pipiens	4287	5533	2737	1804
Cx. restuans	1018	1734	769	539

BG GAT TRAP/ CATCHMASTER TRAP

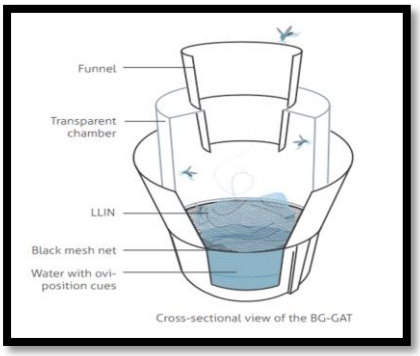
The BG-GAT Trap and the CatchMaster trap are used to collect the Aedes mosquito, by providing a place to oviposit their eggs. These traps are used for surveillance in monitoring mosquitoes that may transmit diseases, such as Zika.

The Zika Virus is a growing concern within the United States. This will make the BG- GAT Trap and CatchMaster trap extremely helpful moving forward, determining whether or not the Aedes aegypti or Aedes albopictus have migrated to our area.

We also monitor reports on disease and migration from the CDC. During the 2018 season we were fortunate enough to have had little success with these two traps. Besides a few japonicus and pipiens, we had little to no mosquito activity.



https://www.cdc.gov/zika/vector/range.html



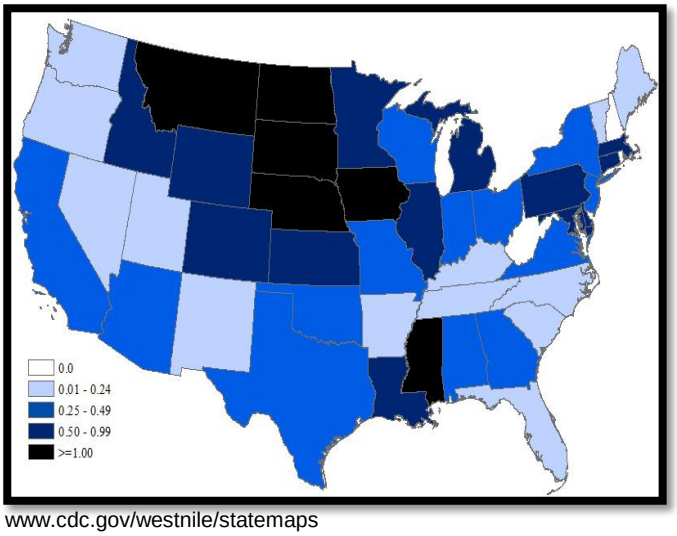
DISEASE SURVEILLANCE

The mosquitoes captured in all forms of traps, are sorted and identified. Those species, which are more likely to be involved in disease transmission, are selected for testing. These tests are used to check for the presence of West Nile Virus, St. Louis Encephalitis and Eastern Equine Encephalitis.

For the 2018 season, our Biology Department decided to take a different approach in treating sewage lagoons throughout the county. After consulting with other districts on the matter, we decided to try a larviciding oil. We managed to significantly reduce the amount of positive pools out of these areas. This year, Michigan State tested 220 mosquito pools, twelve of which tested positive for West Nile Virus.

The Biology Department also used the VecTOR Test Kit more exclusively than in previous years. This allowed for a quick turn around on results. Overall, we tested 47 mosquito pools. All mosquitoes tested negative for West Nile Virus. The VecTOR Test Kit was also used to test birds. During the 2018 season, we tested 9 crows, all tested negative for West Nile Virus.

One human case of West Nile Virus was reported to the Tuscola County Health Department this fall. The Department of Natural Resources also reported a bird that tested positive for West Nile. We plan to continue working closely with these two organizations to aid in disease surveillance.



www.cdc.gov/westnile/statemaps

ZIKA VIRUS

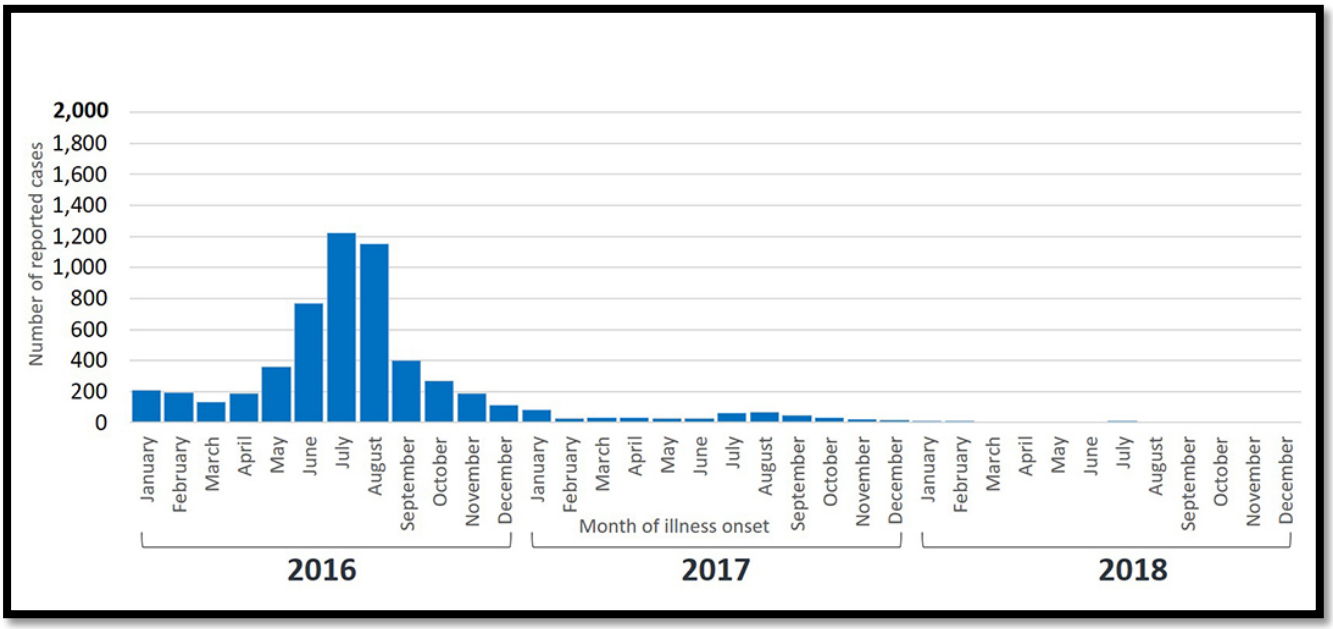
Zika Virus is spread various ways, through mosquito bites, during sex with an infected partner and from a pregnant woman to her fetus. It is also likely to be spread through blood transfusion, however this has not been confirmed.

Zika Virus is linked to birth defects in infants. Pregnant women have been warned not to travel to areas with the Zika Virus.

Travelers going to areas with Zika, are returning with the virus and have the potential to spread it to others.

Controlling disease carrying mosquitoes is the best way to prevent the virus. Protect yourself by using insect repellant, wearing long sleeves and long pants. Avoid travel to places with the virus.

As of October 31, 2018 there were 5,734 symptomatic Zika Virus disease cases reported. Of those 5,734 cases, 5,448 were travel related. Three were acquired through local transmission in Florida and Texas. Other cases were sexually transmitted. The table below shows the provisional data for laboratory-confirmed symptomatic Zika Virus disease cases with illness onset in 2016-2018, reported to ArboNET by US states.
www.cdc.gov/zika

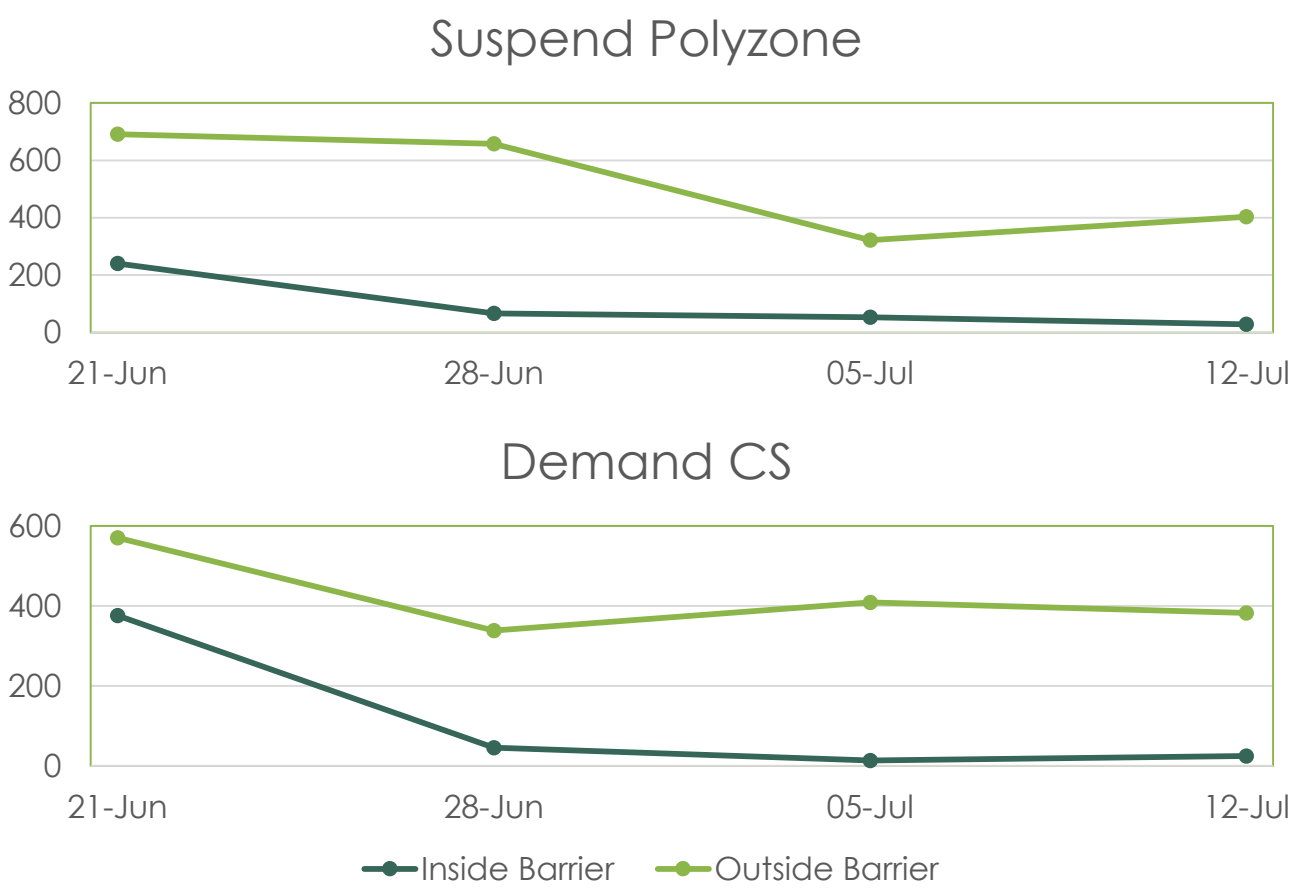


BARRIER TREATMENTS

During the 2018 season, we continued testing Suspend Polyzone. Suspend Polyzone features a proprietary polymer layer that protects the active ingredient from weather, irrigation and mechanical abrasion. We also tested Demand CS this summer. These types of products give us control in areas that are often times extremely difficult to treat. Backpack sprayers are used to apply these barriers to the perimeter of the property. Once dry it will provide a longer acting barrier to kill adult mosquitoes.

Below are examples of two of the tests we conducted during the 2018 season. These were two of our better examples due to low mosquito counts, county wide. We ran into the same issue that we faced in 2017. During the summer months of June and July, mosquito populations tend be lower. Which makes it difficult to determine the overall efficacy of the product. The process we use begins by placing CDC traps the night before the barrier is applied. One CDC trap is placed inside the barrier, the other is placed outside. We then pick up the traps early the next morning before the barrier is applied. A day after the initial barrier is laid down, we go back out and repeat our trapping process. We do this several more times to determine length of control and efficacy.

On July 7th, we repeated the process after our barrier had been applied. We found a significant decrease in the number of mosquitoes we trapped inside the barrier, providing homeowners with much needed relief.



TREATMENT SITES

MATERIAL	TREATMENT SITE
MLO	Swamps, Flooded Woodlots, Flooded Fields
(highly refinded petroleum distillate)	
Kontrol 4-4 (permethrin)	Roadside fogging, Public Use Areas, Private Property
Four Star Briquets 90 Day	Retention Pools
(Bacillus sphaerricus 6% Bacillus thuringiensis 1%)	
Mavrik (Tau-fluvalinate)	Public Use Area, Private Property
Mosquito Dunks (Bacillus thuringiensis)	Small water hole, artifical containers
Altosid Pellets (Methoprene)	Catch Basins
Suspend Polyzone (Deltamethrin)	Public use areas, Private Property
VectoBac G (Bacillus thuringiensis)	Flooded Woodlots, Artifical Containers, Tires, Ponds
VectoBac 12AS (Bacillus thuringiensis)	Roadside Ditches, Retention Ponds
VectoLex WDG (Bacillus sphaericus)	Lagoons

OPERATIONS

Mosquito Abatement strives to keep residents safe from mosquito-borne disease, by reducing the mosquito population in our county.

This is done through various forms of treatment, typically beginning in late March, when we begin surveillance and treatment of the flooded woodlots with ground crews.

Once adult mosquitoes are present, usually in mid May, we introduce our second shift of technicians. They will begin to conduct routine roadside fogging and yard treatments for homeowners, when requested.

Early summer larviciding will include routine surveillance and treatment of ditches, catch basins and sewage lagoons. Later in the season we will conduct surveillance and treat cross country ditches.

We maintain public use areas such as parks, campgrounds, trails, conservation clubs and golf courses on a weekly schedule during the season. This is to keep our citizens safe from disease carrying mosquitoes.

Residents may request yard treatments for special events such as weddings, parties, etc. We also provide treatment for the many festivals that occur throughout the county.

SPRING / SUMMER LARVICIDING

We begin in the early spring with the treatment of flooded woodlots.

This is done with technicians using a hand held spreader to deliver granular BTI or a backpack sprayer to deliver Mosquito Larvicide Oil to the flooded areas.

We utilize a citizen tracking database, which allows us to keep a historical record of homeowners and locations throughout the county, with woodlots that may require treatment in the spring.

Biology staff and larviciding crews conducted routine surveillance and quality control on 2,599 flooded woodlot sites during the 2018 season.

Tuscola County is home to nine sewage lagoons. Many of these areas have been known to be breeding sites. Each of these sites were checked routinely and treated throughout the 2018 season, using liquid BTI (VectoBac ®12 AS) , BTI (VectoBac® G) , VectoLex® WDG® and MLO® Mosquito Larvicide Oil. Catch Basins are treated 2-3 times throughout the season, depending on need, using Altosid® pellets.
In addition, larviciding is also performed in the cross country ditches, flooded fields and artificial containers as needed using BTI (VectoBac® G).

ADULTICIDING

Tuscola County is made up of 23 townships. Each township is assigned a technician that will perform roadside fogging.

Tuscola County currently has 724 “NO Spray” areas. These no sprays are organic farms or beekeepers, as well as residents who wish not to be treated. We utilize the FieldWatch site to help us stay current with new fields or beehives.

Assigning a technician to a specific township, allows them to become familiar with these special conditions. No Spray signage is checked at the beginning of every season to replace or post signs where needed.

Treatment route maps are updated routinely during the season, utilizing updates received from FieldWatch and our county citizens.

Kontrol 4-4 (Permethrin) is applied at 4.5oz. per minute, with truck mounted ULV units. Treatment is also conducted on a routine basis in all public use areas (parks, golf courses, campgrounds, rail trails, gun clubs and archery clubs) using our Kawasaki Mule, equipped with a ULV unit. For treatment to be effective temperatures must be above 55 degrees and winds below 10 miles per hour.

In 2018 we equipped two trucks with an electric Ultra Low Volume (ULV) sprayer. These sprayers are very quiet and ideal for treating campgrounds and public use areas.

Citizens requesting treatment of their property are treated using a hand held thermal fogger or ULV backpack sprayer.

ROADSIDE DITCH TREATMENT

TOWNSHIP	MILES DRIVEN	GALLONS USED
AKRON	786	6.54
ALMER	358.7	1.4
ARBELA	692.1	4.62
COLUMBIA	331.7	1.1
DAYTON	493.6	2.38
DENMARK	662.4	5.98
ELKLAND	465.6	2.69
ELLINGTON	500.7	2.88
ELMWOOD	530.1	2.68
FAIRGROVE	524.8	4.6
FREMONT	538.6	4
GILFORD	484.7	4.08
INDIANFIELDS	404.4	2.06
JUNIATA	537.3	3.2
KINGSTON	641.6	4.65
KOYLTON	652.3	5.22
MILLINGTON	517.7	13.1
NOVESTA	424.5	2.64
TUSCOLA	352.3	1.62
VASSAR	534.3	16.07
WATERTOWN	410.4	1.61
WELLS	730.2	5.44
WISNER	325.1	2.7

ROADSIDE TRUCK FOGGING

TOWNSHIP	MILES DRIVEN	GALLONS USED
AKRON	1901.6	298.26
ALMER	871.6	125.36
ARBELA	2111.3	419.77
COLUMBIA	395.7	55.12
DAYTON	2702.3	439.15
ELKLAND	823.1	138.26
ELLINGTON	1214.4	153.98
ELMWOOD	859.2	123.21
FAIRGROVE	786.1	145.81
FREMONT	1984.1	339.73
GILFORD	659	115.6
INDIANFIELDS	2401.1	410.02
JUNIATA	914.2	201.28
KINGSTON	1136.3	186.51
KOYLTON	1249.1	532.47
MILLINGTON	1314.6	327.04
NOVESTA	1625.9	429.71
TUSCOLA	1160.2	216.4
VASSAR	2826.6	535.51
WATERTOWN	1948.3	468.93
WELLS	2035.7	329.63
WISNER	1126.4	242.79

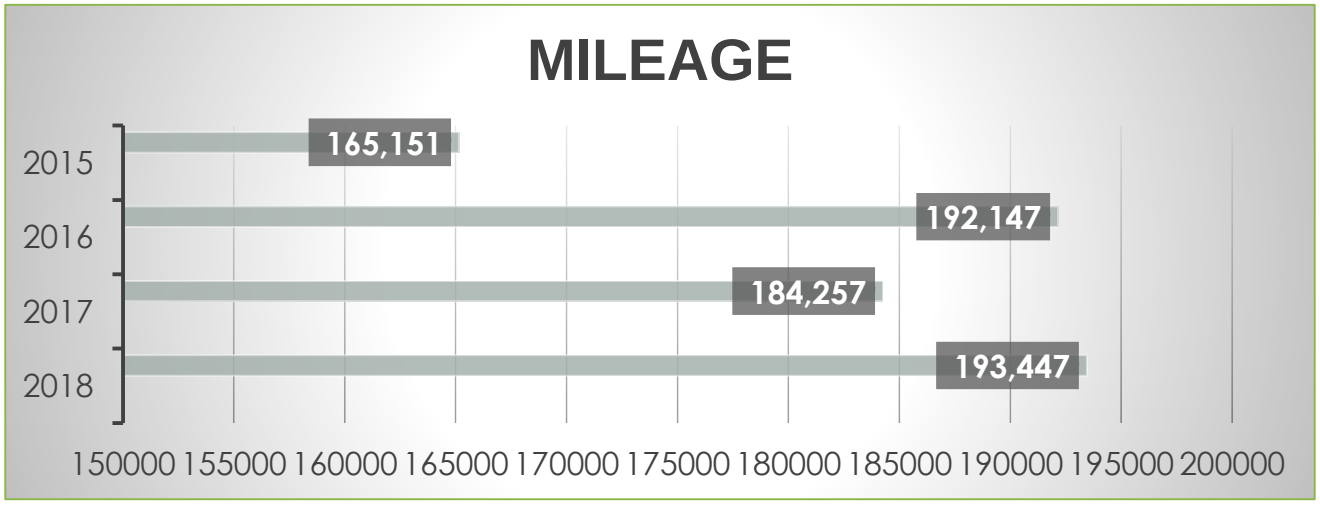
GARAGE NEWS

During the 2018 mosquito season, Tuscola County Mosquito Abatement's twenty truck fleet, added 193,447 miles.

Our trucks, ULV's, hand held equipment and mule (ATV), receive routine maintenance and repairs when needed.

In addition, truck mounted ULV equipment is calibrated at the beginning of the season and again in July.

All truck mounted ULV's are set to deliver 4.5 ounces of adulticide per minute. The droplet sizes produced by each ULV are measured and calibrated utilizing the Army Insecticide Measuring System (AIMS), following the label recommendations. The droplets are set to be delivered in a range that helps ensure safety and efficiency.



LONG DRIVEWAY PROGRAM

We realize that many homes in Tuscola County are set back from the county road and therefore, are subsequently shielded from the effect of the road-side adulticiding operations. If requested by the owner, their property will be reviewed to see if it meets the criteria. If the property does meet the established requirements, it will be placed on our Long Drive Program. The drive, at that time, will be marked with our long drive stake, that has a reflective band at the top. These stakes are placed by our technicians. (We do ask the homeowners to remove them during the winter months to avoid possible damage from snow plows etc.). By placing these stakes at the end of the drives, our technicians are able to see the reflective band and treat the drive as required.

The criteria for a home to be placed on the Long Drive Program are:

- There must be a primary residence on the property and the front of the home must be 300 ft. or greater from the roadway.
- There must be an adequate turnaround for our trucks that does not require driving across any lawn areas.
- The drive must be passable with two-wheel drive vehicles.
- The drive must have significant vegetation that provides areas for mosquito harborage.

In 2018, we held our open enrollment for the long driveway program from March through April.

Tuscola County currently has 472 residents enrolled in this program.

TIRE RECYCLING

In collaboration with the Tuscola County Recycling Center, we were able to host scrap tire collections throughout the County.

With many of our townships participating in these collections, it allowed residents to take their scrap tires to a nearby location for drop off. We were able to recycle 4,195 tires in 2018.

A trailer was also provided for the annual Cass River clean up. We are grateful to the volunteers who took the time to remove these tires from the river.

These Tire Clean Ups are made possible by the generous funding from Tuscola County Mosquito Abatement

2018 FREE TIRE COLLECTIONS

These collections are limited to Tuscola County residents only (no out of county residents, no business, and no commercial tires). **Residents are limited to bringing only seven (7) tires per vehicle. Tires must be no taller than 48" in height and up to 12" in width**. Please make sure tires are clean and they are not attached to an axle. Please bring help to unload your tires. Please contact Tuscola County Recycling for additional information at 989-672-1673 or email recycle@tuscolacounty.org

***Vassar Township** on April 21,2018, at the Vassar Township Hall 4505 W. Saginaw Road Vassar, MI 48768

Collection held from 9:00AM-Until trailer is full

***City of Vassar** on April 25th, 2018, at the Municipal Building 287 E. Huron Ave, Vassar , MI 48768.
Collection held from 9:00AM-3:00PM.

***Watertown Township** on May 12th, 2018, at the Township Hall 9405 Fosters Street, Fostoria, MI 48435
Collection held from 8:00aAM– until 12:00PM

***Village of Cass City** on May 19, 2018, at the Municipal Building in the South side parking lot 6506 Main Street Cass City, MI 48726. Collection held from 9:00AM– 1:00 PM

***Kingston Township** on July 21, 2018, at Zimba Farms 7634 Mushroom Road Deford, MI 48729

Collection held from 8:00AM—12:00 PM

***Tuscola Township** on July 28th, 2018, at the Township Hall 8561 VanCleve Road, Vassar, MI 48768
Collection held from 8:00AM– 12:00 PM

***Millington Township** on September 22, 2018 ,at the North West corner of the Township Hall ,8553 State Street, Millington, MI 48746. Collection held from 9:00AM– 1:00PM

***City of Caro** on October 13, 2018, by the tennis courts, at the Tuscola County Fairgrounds Caro, MI 48723

Collection held from 8:00AM– 12:00PM

PUBLIC EDUCATION

The goal of TCMA's Public Education Program is to make residents aware of mosquito habitat and their life cycle. This will help citizens to be aware of how to prevent and eliminate breeding sites for disease carrying mosquitoes. Informed residents can be integral in creating a safe and disease-free environment.

When mosquito populations are high, we hope the residents can identify the source or the reason for the increased activity. They will also be aware of the steps they can take to reduce mosquito related problems and prevent breeding sites on their property.

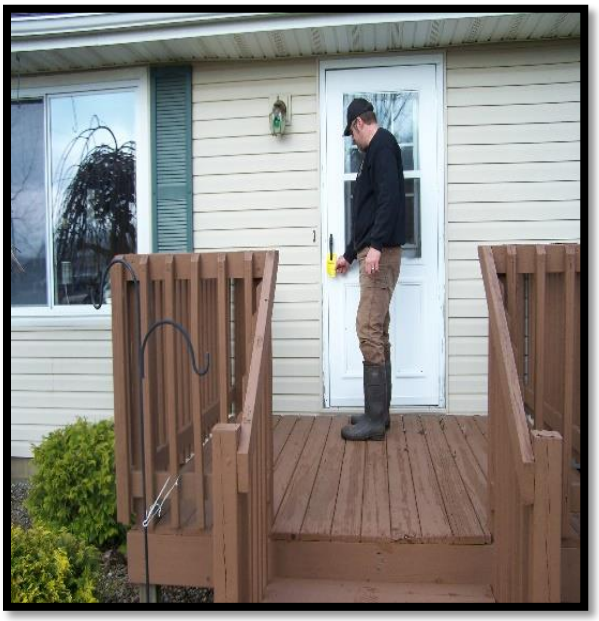
This task is completed in many different ways. Some of the most important ways TCMA distributes this information are through:

- Face to face contact
- TCMA website
- TCMA Facebook page
- Brochures and door hangers

These brochures are also made available to township halls and at the county administration buildings.

Presentations are given to various groups and county officials throughout the season.

School Presentations
Biologist, Gavin Greer and intern Shyann Clark, gave several presentations to the students at Millington Schools. Kimberly Green and Lisa Ozbat attended Career Day at the Caro Middle School.



MEMBERSHIPS

TCMA staff are required to obtain and maintain licensing through the Michigan Department of Agriculture (MDA) as certified pesticide applicators, in both the Core Category and 7F (Mosquito Control). To assist our technicians and ensure proper training, a two day training seminar was held March 12th and 13th, with the MDA available onsite for testing the second day.

In order to stay informed of current developments, the permanent staff of TCMA are also encouraged to attend conferences, classes and seminars relating to mosquito biology and control. TCMA's Technical Advisory Committee (TAC) also provides new insight and important data in the areas of Biological Environmental Sciences.

The permanent staff of TCMA also maintains memberships and are active in the Michigan Mosquito Control Association (MMCA) and The American Mosquito Control Association (AMCA).

TCMA CREW

1500 PRESS DRIVE
CARO, MICHIGAN 48723

www.tuscolacounty.org