Plainfield Township

2020 Mosquito Management Program
Annual Service Report

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clarke

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Clarke Environmental Mosquito Management
2020 Annual Report

Introduction

The year 2020 was dominated by some of the most significant public health challenges in generations. The COVID-19 novel coronavirus pandemic put public health front-and-center throughout the nation and the world, with mandatory lockdowns, mask orders, remote schooling, and stockpiling of groceries making headlines around the world.

In the world of mosquito control, surveillance and tracking of arboviruses remained relatively quiet, with sometimes-drastic changes in data over recent trends. Whether this data is a true legitimate anomaly, or perhaps impacted by COVID – possibly by changes in behavior, budgets, staff resources, or other metrics – we may not know for many years.

Overall, mosquito control activity was remarkably contained, with fewer than 500 West Nile virus cases reported nationally, only four Illinois counties reporting West Nile virus activity, no Zika activity, and an average number of Eastern Equine cases.

As always, Clarke is dedicated to helping the residents of your community reduce their risk of contracting mosquito-borne diseases like West Nile virus through a comprehensive program of support, education, and contracted services.

Service Contracts

Clarke provides an annual report to its customers to outline control activity and provide an overview of mosquito control challenges around the country and in our state. As mosquito control is always weather-dependent, we examine carefully the impact that local weather had on mosquito breeding and the responsive control undertaken by Clarke in your community. We work closely with our municipal partners to create and execute a mosquito control program specifically tailored to their environmental challenges, risks, and community needs.

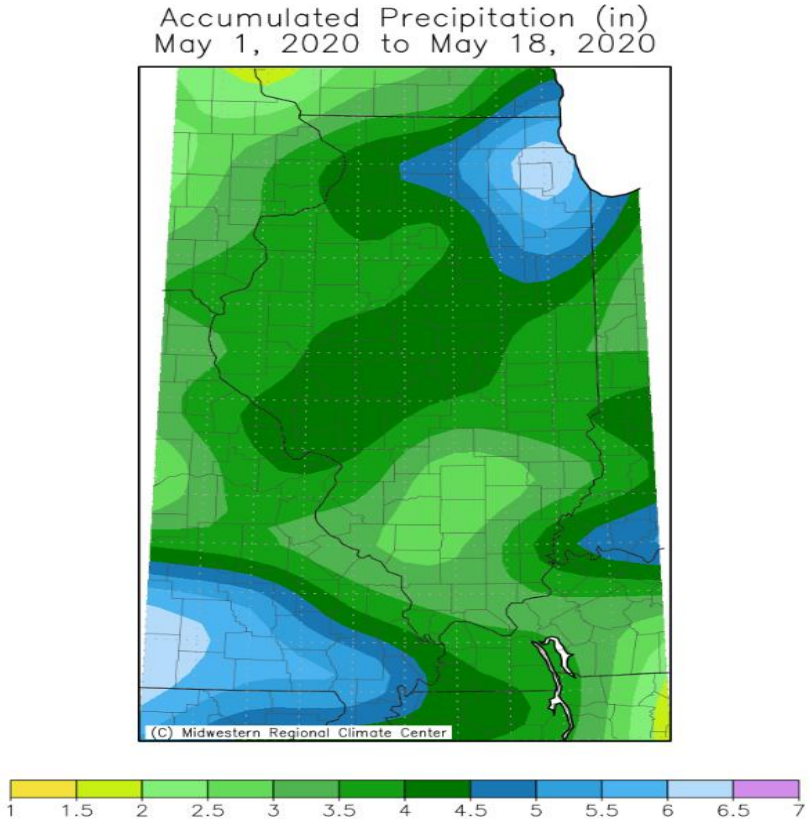
Using best practices and proven industry protocols, Clarke works in close consultation with customers to conduct mosquito surveillance and interventional methods to reduce mosquito populations, especially when the risk of disease is present.

Seasonal Overview

Record-breaking rains in May, followed by a hot, dry summer.

May 2020 was the wettest May on record in the Chicago area, with 9.51 inches of rain recorded at O'Hare. However, the conditions quickly reversed to a mini drought-like period with less than an inch of rain falling during the first 21 days of June.

The map to the right by the Illinois State Climatologist Office shows the Chicagoland area received a range of 5.0 to over 6.5 inches of rain through May 19.

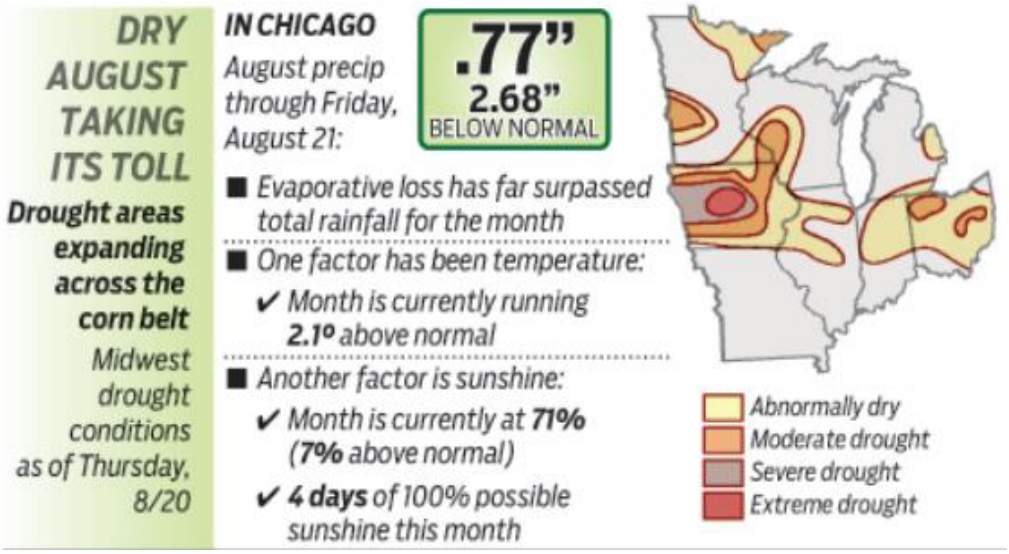


This series of May flooding rains triggered seven floodwater mosquito (*Aedes vexans*) brood hatches through early June, with associated rises in nuisance mosquito populations.

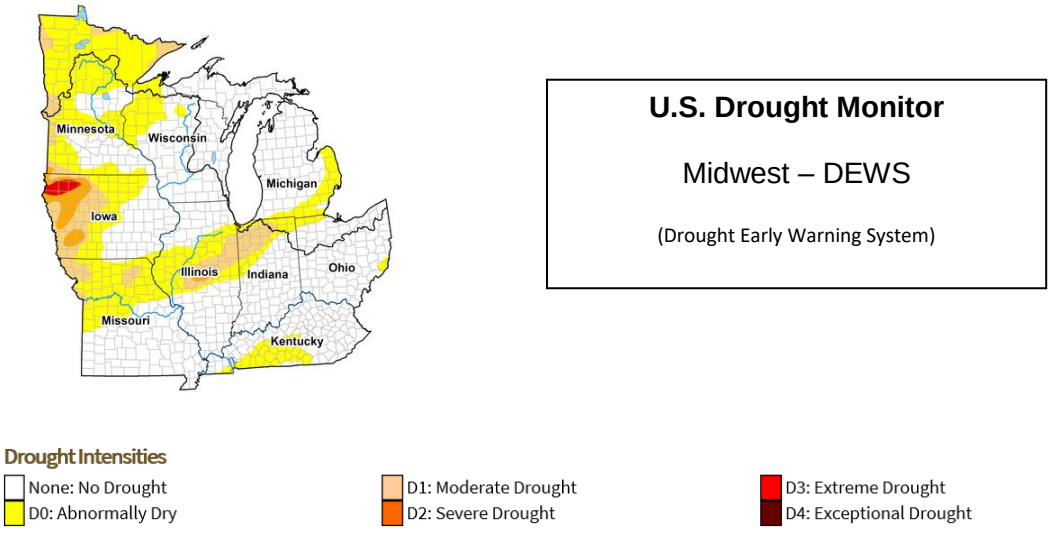
Throughout the rest of the 2020 season, warm and relatively dry conditions resulted in lower mosquito counts in traps and reduced nuisance calls to the Clarke hotline.

2020 was the third warmest summer on record and the hottest since 1955. As the summer transitioned to fall, extremely hot and dry weather conditions curtailed the seasonal floodwater mosquito population.

Overall, August 2020 was 4.6° above normal and the sixth warmest August on record. The following August weather information (through 8/21) summarizes the expanding drought conditions across northern Illinois, according to the WGN TV Weather Center.



The following map from the National Integrated Drought Information System (NIDIS - https://www.drought.gov/drought/dews/midwest) depicts the status of drought conditions in the immediate Chicagoland area and surrounding states, as of December 8, 2020.



After the wettest May on record, precipitation amounts plummeted and were followed by the hottest summer on record since 1955. Accordingly, the extremely hot and dry weather conditions curtailed the seasonal floodwater mosquito population. Since the start of 2020 mosquito season, rainfalls have hatched only 16 floodwater mosquito broods, compared to 30 in 2019. The harsh conditions diminished the impact of the predicted broods as indicated by very few citizen mosquito annoyance reports on the Clarke hotline and portal.

About West Nile Virus

West Nile virus is primarily a mosquito-borne disease, which can cause West Nile encephalitis (swelling of the brain) and West Nile fever in humans. Though the majority of humans infected will not show symptoms, those who develop West Nile virus risk debilitating effects and possibly death. While the most severe cases and the highest risk of West Nile occur traditionally in people over 50 years of age or with compromised immune systems, all people who spend time outside are at risk of contracting the virus. The disease also affects birds, horses, and other animals with higher mortality rates.

According to the U.S. Geological Survey, West Nile virus has spread rapidly across North America since it was discovered in the Western Hemisphere. West Nile virus swept from the New York City region in 1999 to almost all of the continental U.S., seven Canadian provinces, and throughout Mexico and parts of the Caribbean by 2004. Of those infected, one in five will develop symptoms.

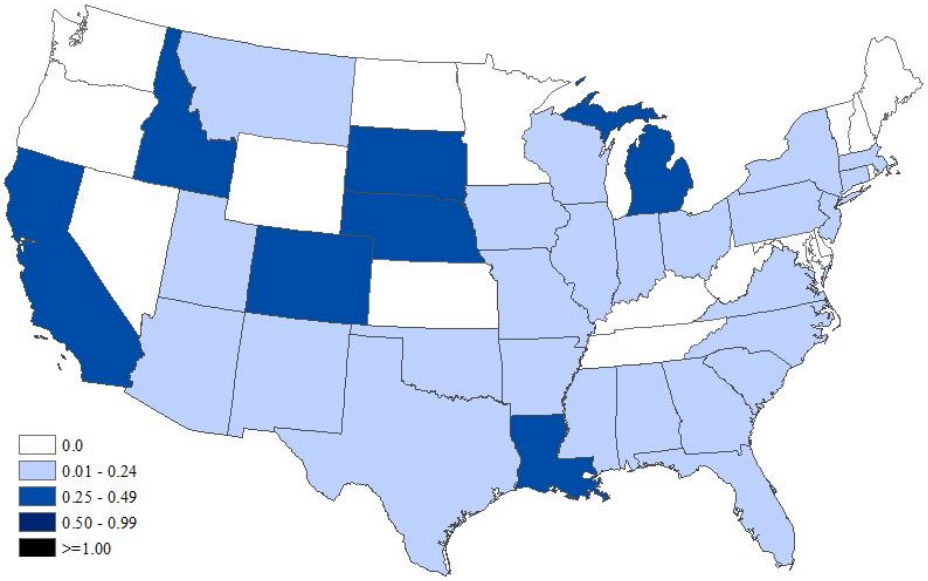
Currently, in 2020, 43 states have reported West Nile virus infections in people, birds, or mosquitoes. To date, 481 cases of West Nile disease in people have been reported to the CDC, less than half of the number of human cases at this time in 2019 (which was already sharply lower than the previous several years).

West Nile in the United States 2020

- 2015: 2,175 cases
- 2016: 2,149 cases
- 2017: 2,097 cases
- 2018: 2,647 cases
- 2019: 958 cases
- 2020: 481 as of November 24, 2020

West Nile in the United States 2020

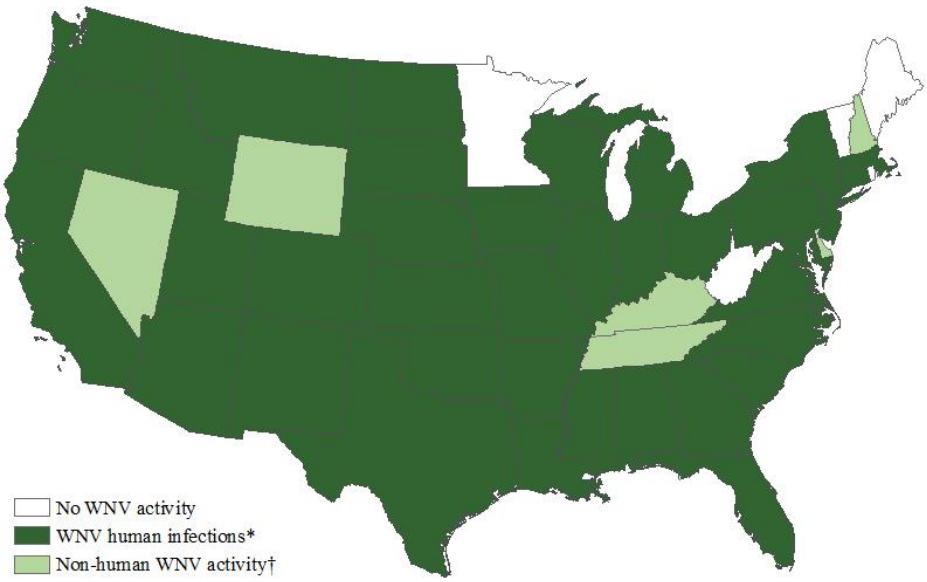
West Nile Virus Neuroinvasive Disease Incidence by State – United States, 2020 (as of November 24, 2020)



Retrieved from https://www.cdc.gov/westnile/statsmaps/preliminarymapsdata2020/incidencestate-2020.html on December 14, 2020

West Nile Virus Activity by State – United States, 2020 (as of November 24, 2020)

Retrieved from



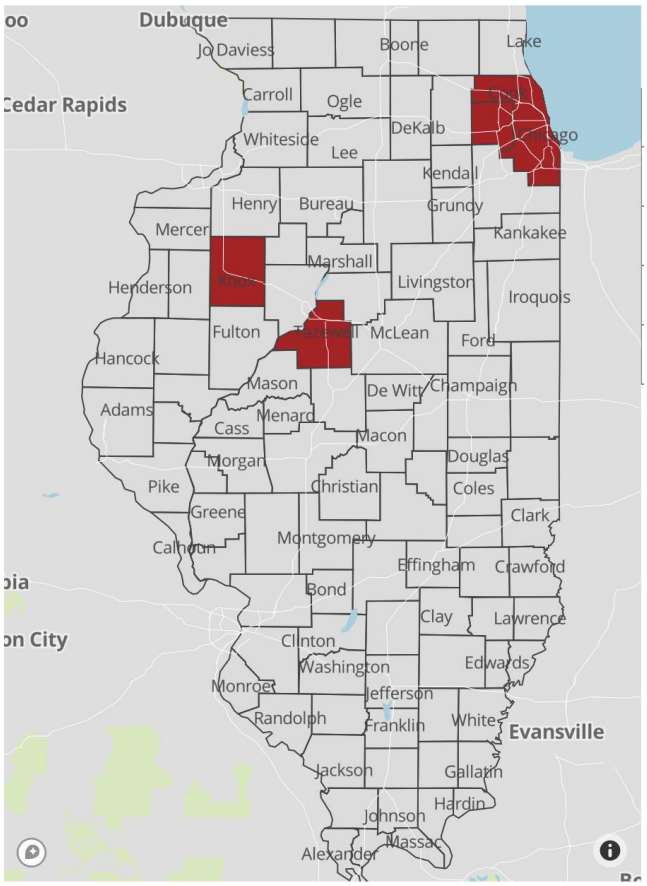
https://www.cdc.gov/westnile/statsmaps/preliminarymapsdata2020/activitybystate2020.html on December 14, 2020

West Nile in Illinois 2020

As of November 18, 2020, Illinois has reported 37 human cases of West Nile virus and 2 deaths.

- 2016 – 154 human cases
- 2017 – 90 human cases
- 2018 – 137 human cases
- 2019 – 28 human cases
- 2020 – 37 human cases

2020 Human Case Data



Illinois West Nile virus statistics in 2020 (reported to-date) are:

- 37 human cases (up from 28 in 2019)
- 2 fatalities (up from 1 in 2019)
- 4 counties reporting West Nile activity (down drastically from 46 in 2019)
- 10 positive birds (up from 4 in 2019)
- 2,345 positive mosquito batches (up from 1,202 in 2019)

Illinois identified the first human West Nile virus case in a resident of DuPage County on September 9.

2020 Positive Birds, Mosquitoes, Horses, Other Animals (as of 10/19/20) [1]

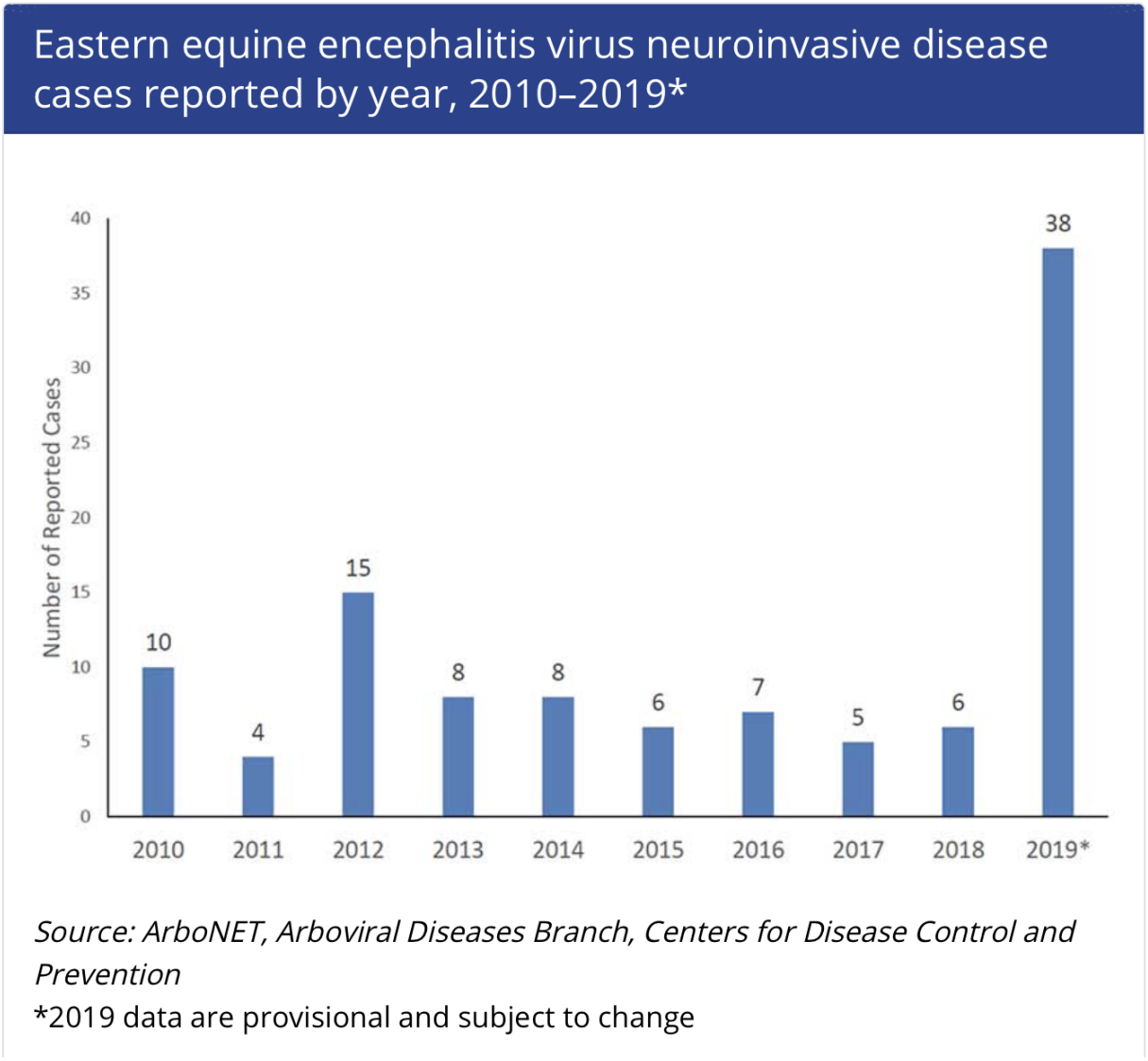
County	American Crow	Blue Jay	Other Birds	Mosquito Batches	Horse	Other Mammals
BOONE	0	0	0	2	0	0
BROWN	0	0	1	0	0	0
CHAMPAIGN	0	0	0	8	0	0
COOK	1	0	0	2005	0	0
DUPAGE	1	0	1	109	0	0
GREENE	0	0	0	2	0	0
GRUNDY	1	0	0	4	0	0
JACKSON	0	0	0	1	0	0
KANE	0	0	0	44	0	0
KANKAKEE	0	0	0	4	0	0
KENDALL	0	0	0	8	0	0
LAKE	0	0	0	92	0	0
LASALLE	0	0	0	1	0	0
LEE	0	0	0	2	0	0
MACON	0	0	0	4	0	0
MACOUPIN	0	0	0	3	0	0
MCHENRY	0	0	1	13	0	0
MCLEAN	2	0	0	2	0	0
MERCER	0	0	0	0	1	0
OGLE	0	0	0	4	0	0
STEPHENSON	0	1	0	4	0	0
WASHINGTON	0	0	0	4	0	0
WILL	0	0	0	26	0	0
WINNEBAGO	1	0	0	1	0	0
TOTAL	**6**	**1**	**3**	**2343**	**1**	**0**

[1] http://public.dph.illinois.gov/wnvpublic/wnvsurveillance_data.aspx, retrieved December 14, 2020

Eastern Equine Encephalitis in the United States 2020

Eastern equine encephalitis is a mosquito-borne disease primarily vectored by the *Culiseta melanura,* which lives in freshwater hardwood swamps, generally on the Atlantic coast and around the Great Lakes. The disease is one of the most dangerous mosquito-borne diseases; one in three patients diagnosed will die from Eastern equine encephalitis.

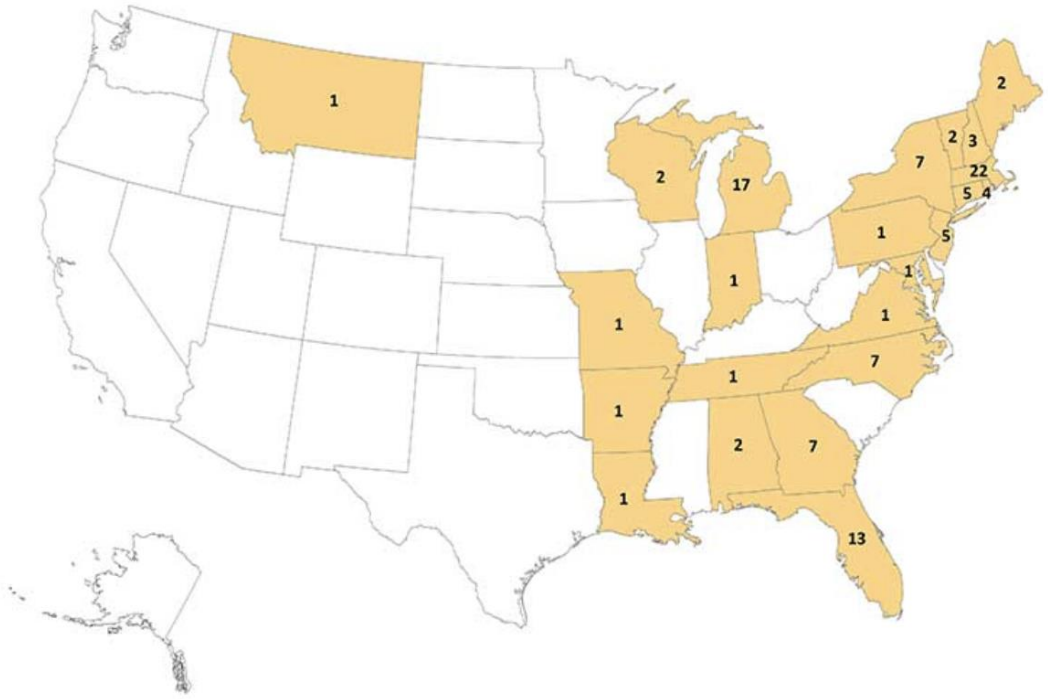
While the U.S. averages about seven (7) cases of EEE each year, last year (2019) had 38 cases reported, with significant outbreaks in Massachusetts, Michigan, Indiana, New Jersey, and Connecticut. As of October 20, 2020, 9 confirmed cases of EEE virus have been reported to the CDC from Indiana (1), Massachusetts (4), Michigan (2), and Wisconsin (2).



Source: ArboNET, Arboviral Diseases Branch, Centers for Disease Control and Prevention

*2019 data are provisional and subject to change

Eastern equine encephalitis virus neuroinvasive disease cases reported by state of residence, 2010–2019*



Source: ArboNET, Arboviral Diseases Branch, Centers for Disease Control and Prevention

*2019 data are provisional and subject to change

Eastern Equine Encephalitis in Illinois

While Illinois does not have a recent history of EEE cases, the proximity of the cases in Indiana, Michigan, and Wisconsin call for continued vigilance.

About Zika Virus

Zika virus is a mosquito-borne disease that is transmitted primarily by the *Aedes aegypti* mosquito and through sexual transmission. While Zika symptoms are generally mild in adults (fever, rash, joint pain, conjunctivitis), pregnant women who contract Zika virus can pass the virus to their unborn children, increasing the risks of serious birth defects like microencephaly.

When Zika debuted in the U.S. in 2016, more than 5,100 travel-related cases of Zika were confirmed nationwide, including 139 locally transmitted cases in areas of south Florida. Since that time, cases have steadily decreased. This year, the number of traveler-contracted Zika cases has dwindled to two.

Zika Virus in the United States 2020

Cases by State and Territory

Zika virus disease cases** reported to ArboNET by states and territories – United States, 2020 (as of December 3, 2020)

**Includes reported confirmed and probable Zika virus disease cases

Source: https://www.cdc.gov/zika/reporting/2020-case-counts.html Retrieved December 14, 2020

Zika Virus in Illinois

Illinois does not have a significant population of *Aedes aegypti* mosquitoes, so local transmission risk is small. Illinois reported no travel-related human cases in 2020.

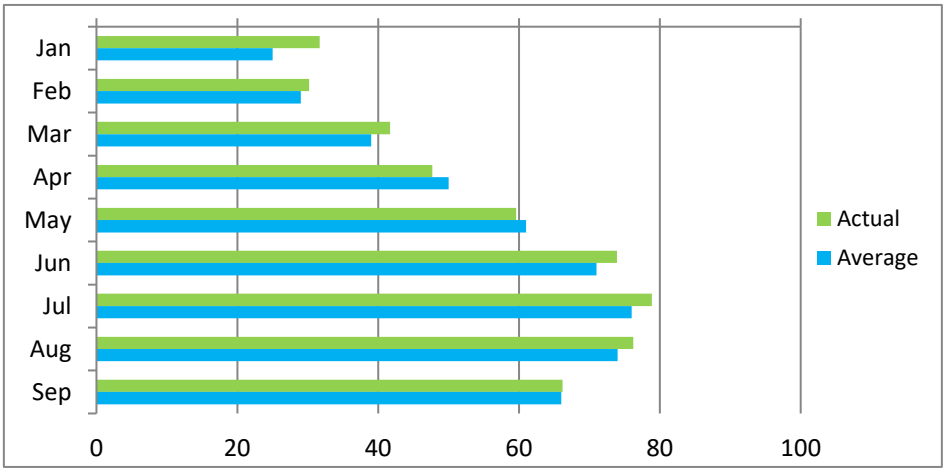
Climatology and Mosquito Overview

The weather dramatically impacts mosquito breeding and population. Special attention should be paid to weather conditions, as weather has a huge impact on mosquito populations. With floodwater mosquitoes, rainfall determines if mosquito eggs will hatch, fierce storms can wash away egg rafts, and variations in temperature can affect mosquito activity and larval development. In periods of hot, dry weather, water sources dwindle for vector species, and virus transmission can amplify, creating a greater percentage of infected mosquitoes.

2020 O'Hare International Airport (Chicago) Weather Survey

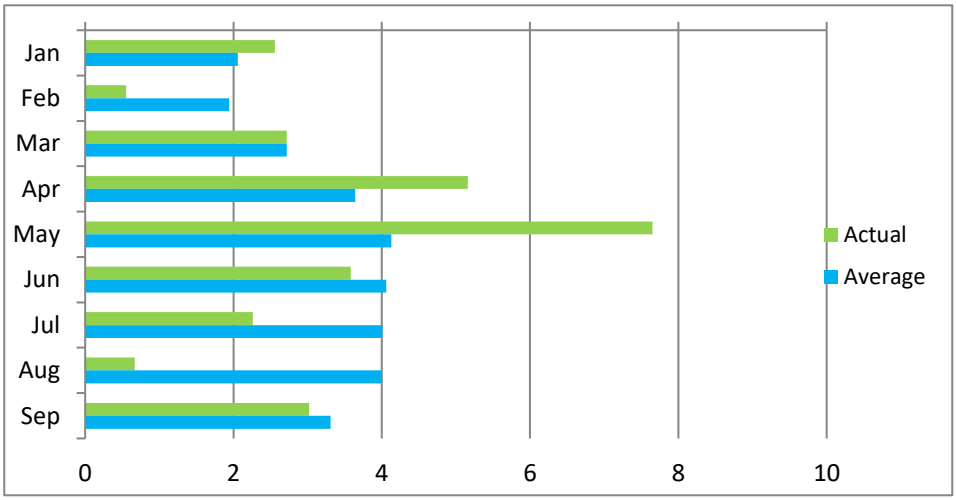
Temperature (degrees Fahrenheit)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Actual	31.69	30.18	41.7	47.69	59.58	73.89	78.85	76.25	66.19
Average	25	29	39	50	61	71	76	74	66



Precipitation (inches)

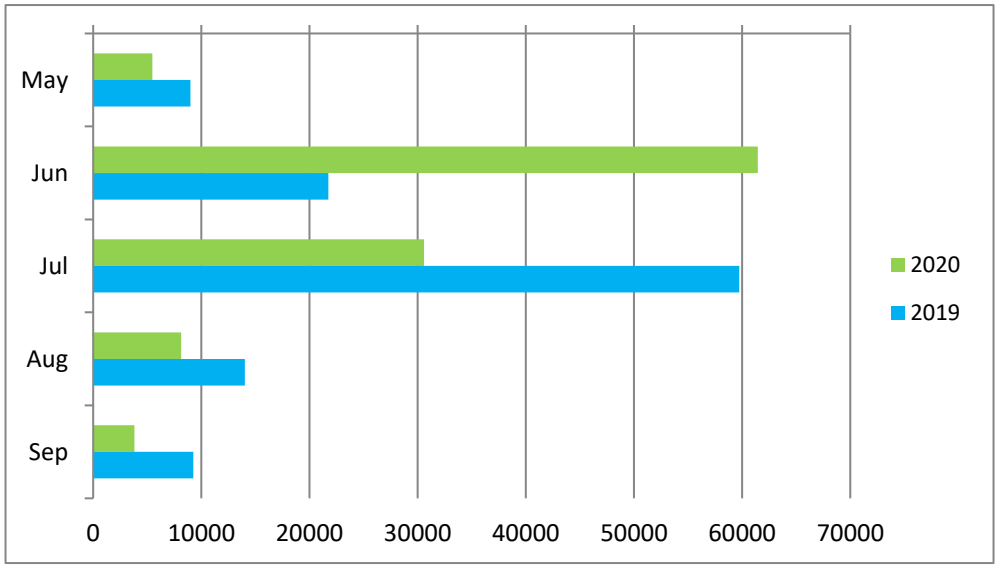
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Actual	2.56	0.55	2.72	5.16	7.65	3.58	2.26	0.67	3.02
Average	2.06	1.94	2.72	3.64	4.13	4.06	4.01	3.99	3.31



2020 Mosquito Light Trap Network Target Species Comparison

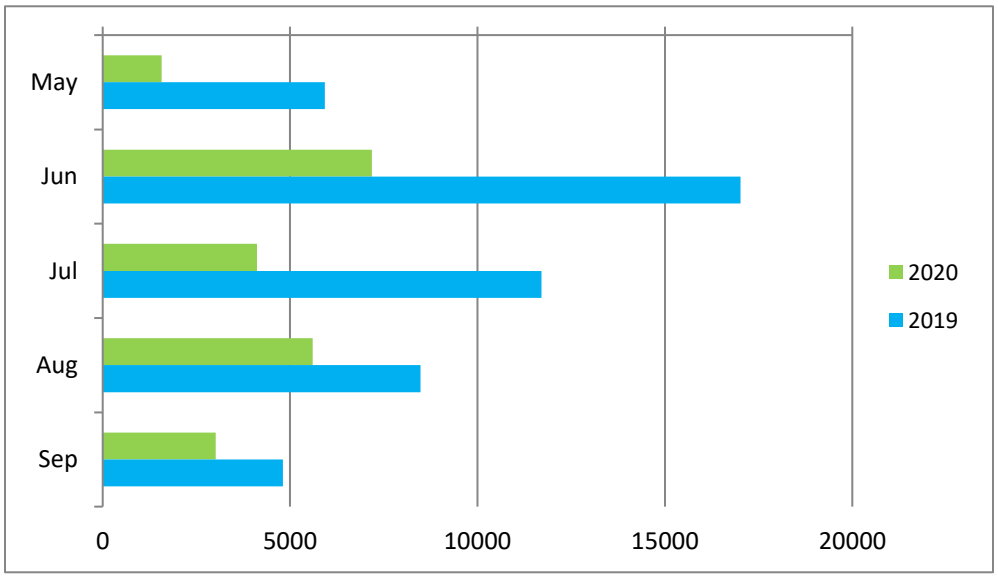
Aedes vexans

	May	Jun	Jul	Aug	Sep
2019	9005	21742	59736	14030	9252
2020	5457	61447	30583	8136	3824



Culex pipiens* and *Culex restuans

	May	Jun	Jul	Aug	Sep
2019	5927	17018	11703	8477	4808
2020	1571	7183	4118	5604	3015



Surveillance Network

New Jersey Light Trap Network

An important supplement to any mosquito control program is a New Jersey Light Trap. Developed in the 1930s, the trap helps determine species diversity and monitors mosquito populations. These traps are located in residential areas and are operated between dusk and dawn (the peak activity period for many species) and should be maintained each year to identify historic and habitual mosquito sites.

A 25-watt bulb in the trap attracts mosquitoes, which are drawn into the trap via an electric fan. Data generated by the trap catches serve several purposes: it confirms the arrival of predicted floodwater mosquito migrations, reflects the effectiveness of mosquito control efforts and identifies fluctuations in adult mosquito populations.

West Nile Virus Surveillance Trap

A vital tool in adult mosquito and arbovirus surveillance is the West Nile virus, or gravid, trap. Developed by the Centers for Disease Control and Surveillance, the trap primarily collects gravid (*Culex)* mosquitoes (principal vectors of West Nile virus), which makes it particularly effective in tracking the disease. A gravid female mosquito has taken a blood meal and is ready to lay her eggs. Typically, (*Culex)* mosquitoes search for water rich in organic material to lay their eggs. If they've obtained their blood meal from an infected animal, they can transmit the virus to their eggs. The mosquitoes are captured live, which allows us to test them for arboviruses and get an early indicator that the virus is present in the area.

Centers for Disease Control and Prevention (CDC) Trap

Mosquitoes looking for a blood meal are mainly attracted by carbon dioxide, exhaled by humans and animals. The CDC trap provides carbon dioxide as bait, though dry ice (frozen carbon dioxide), and a light source to attract female mosquitoes. This trap is set out at prime activity hours for the species targeted. A fan draws mosquitoes into a net and the live mosquitoes are trapped for arbovirus testing. CDC traps often show a very high species diversity and large overall mosquito numbers, indicating the presence of a mosquito-borne virus and relative indices of adult mosquito species.

Light Trap Species Summary

The following table summarizes the species composition from the light trap network operating in northern Illinois.

Light Trap Species Summary				
Species	**Females**	**Percent**	**Males**	**Percent**
Ae cinereus	272	0.13%	70	0.22%
Ae vexans	109447	53.85%	8252	26.38%
Ae misc	4429	2.18%	3450	11.03%
An punctipennis	887	0.44%	74	0.24%
An quadrimaculatus	5309	2.61%	221	0.71%
An walkeri	196	0.10%	0	0.00%
An species	269	0.13%	67	0.21%
Cq perturbans	36917	18.16%	1171	3.74%
Cx erraticus	2695	1.33%	222	0.71%
Cx pipiens	988	0.49%	3	0.01%
Cx restuans	1493	0.73%	14	0.04%
Cx species	19011	9.35%	14674	46.90%
Cx tarsalis	24	0.01%	2	0.01%
Cx territans	207	0.10%	10	0.03%
Cs inornata	608	0.30%	94	0.30%
Cs minnesotae	23	0.01%	0	0.00%
Cs species	34	0.02%	13	0.04%
Mosquito, Misc.	178	0.09%	33	0.11%
Oc excrucias	2	0.00%	0	0.00%
Oc grossbecki	3	0.00%	0	0.00%
Oc japonicus	381	0.19%	213	0.68%
Oc canadensis	185	0.09%	19	0.06%
Oc sollicitans	13	0.01%	1	0.00%
Oc triseriatus	434	0.21%	1915	6.12%
Oc trivittatus	17314	8.52%	87	0.28%
Oc. species	19	0.01%	4	0.01%
Or signifera	20	0.01%	1	0.00%
Ps ciliata	11	0.01%	2	0.01%
Ps ferox	101	0.05%	2	0.01%
Ps columbiae	1	0.00%	0	0.00%
Ps misc	0	0.00%	2	0.01%
Ur sapphirina	1783	0.88%	671	2.14%
Total	**203,254**	**100.00%**	**31,287**	**100.00%**

Total Number of Mosquitoes: 234,541

Light Trap Species Summary

The following table summarizes the species composition from the light trap network operating in Plainfield Township.

Light Trap Species Summary				
Species	**Females**	**Percent**	**Males**	**Percent**
Ae cinereus	0	0.0%	0	0.0%
Ae species	15	2.0%	49	25.5%
Ae vexans	576	77.7%	52	27.1%
An punctipennis	1	0.1%	0	0.0%
An quadrimaculatus	54	7.3%	0	0.0%
An species	3	0.4%	1	0.5%
Cq perturbans	2	0.3%	3	1.6%
Cx erraticus	5	0.7%	2	1.0%
Cx pipiens	6	0.8%	1	0.5%
Cx restuans	5	0.7%	0	0.0%
Cx salinarius	0	0.0%	0	0.0%
Cx species	48	6.5%	73	38.0%
Cx tarsalis	0	0.0%	0	0.0%
Cx territans	2	0.3%	2	1.0%
Cs inornata	2	0.3%	1	0.5%
Cs species	0	0.0%	0	0.0%
Mosquito, Misc.	0	0.0%	0	0.0%
Oc canadensis	0	0.0%	0	0.0%
Oc fitchii	0	0.0%	0	0.0%
Oc grossbecki	0	0.0%	0	0.0%
Oc japonicus	3	0.4%	1	0.5%
Oc stimulans	0	0.0%	0	0.0%
Oc triseriatus	0	0.0%	0	0.0%
Oc trivittatus	7	0.9%	1	0.5%
Oc. species	0	0.0%	0	0.0%
Or signifera	0	0.0%	0	0.0%
Ps ciliata	0	0.0%	0	0.0%
Ps columbiae	0	0.0%	0	0.0%
Ps ferox	0	0.0%	0	0.0%
Ur sapphirina	12	1.6%	6	3.1%
Total	**741**	**100.0%**	**192**	**100.0%**

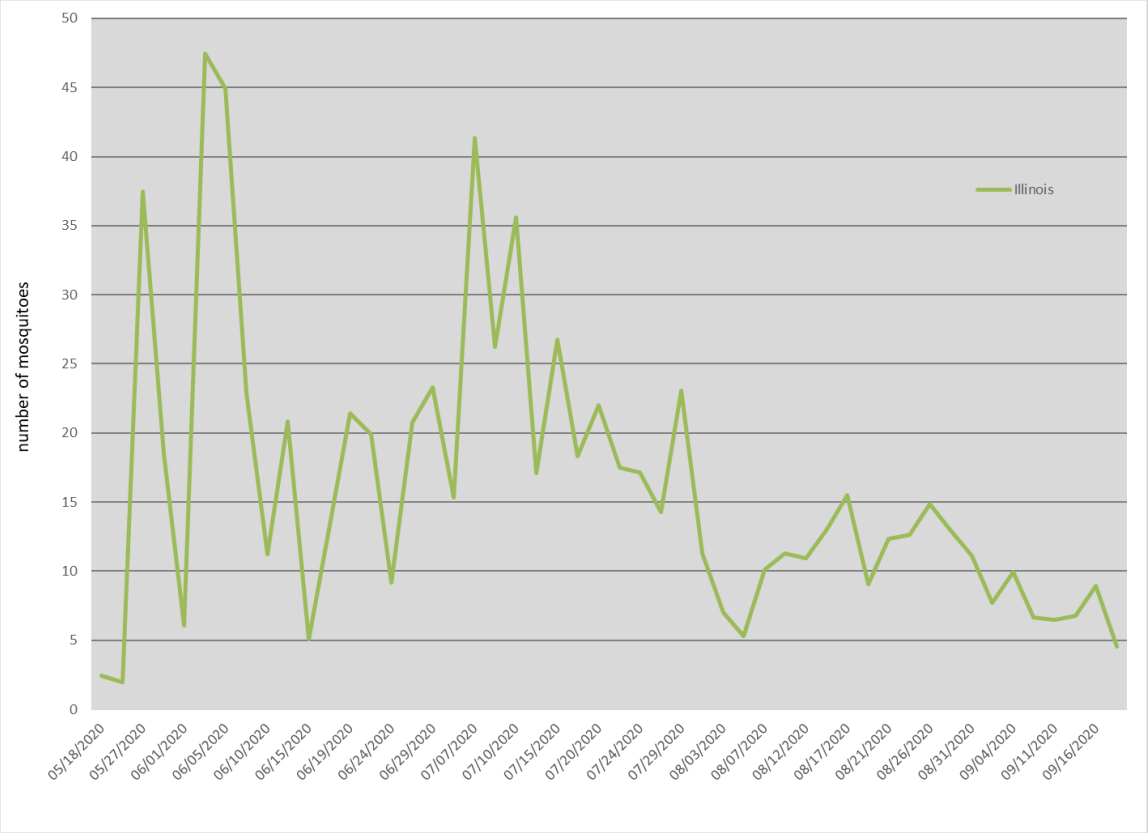
Total Number of Trap:1 Average Number of Females/Trap Night: 12.53

Total Number of Trap Nights: 57

Total Number of Mosquitoes: 933

Light Trap Counts by Region, County, and Community

Light Trap Comparison Chart



Operations and Surveillance Reports

Below is a report outlining all services performed year-to-date. These services may include the following:

- **0956 N J Light Trap Service (5 Days/Wk-WMAD):** *Seasonal New Jersey Light Trap service for adult mosquito population monitoring (5 day per week operation).*
- **1252 Complete Site Larval Inspection Service:** *Inspection service of all potential mosquito larvae development sites*
- **1302 Targeted Site Larval Inspection:** *Inspection of all targeted larval development sites*
- **1305 Culex Site Inspection Service:** *Inspection of Culex mosquito larval development sites for the prevention of West Nile Virus and other mosquito-borne diseases.*
- **1352 Larval Site Service Call:** *Special inspection of standing water for mosquito breeding per hot line request*
- **1718 Hand Larvicide:** *Hand equipment application for control of mosquito larvae*
- **1719 Backpack Larvicide Trmt.:** *Backpack application for control of mosquito larvae*

- **2002 Catch Basin Treatment.:** *Catch basin treatment with a sustained-release biological insecticide for larval control*
- **2004 30 day Altosid Briq CB Treatment:** *Catch basin treatment for larval control*

Services Performed Year-to-Date

Service Item	Start Date
ROS0952 - N.J. Light Trap Seasonal Serv	05/07/2020
ROS1999 - Natular G 5#/Acre Hand	05/18/2020
ROS1302 - Targeted Site Larval Insp Serv	05/18/2020
ROS1302 - Targeted Site Larval Insp Serv	06/01/2020
ROS2009 - Natular XRT CB Bike	06/04/2020
ROS1302 - Targeted Site Larval Insp Serv	06/15/2020
ROS2888 - Biomist 3+15 Truck ULV	06/27/2020
ROS1302 - Targeted Site Larval Insp Serv	06/29/2020
ROS1302 - Targeted Site Larval Insp Serv	07/15/2020
ROS2888 - Biomist 3+15 Truck ULV	07/22/2020
ROS1302 - Targeted Site Larval Insp Serv	07/27/2020
ROS1302 - Targeted Site Larval Insp Serv	08/10/2020
ROS1302 - Targeted Site Larval Insp Serv	08/24/2020
ROS2888 - Biomist 3+15 Truck ULV	08/30/2020
ROS1302 - Targeted Site Larval Insp Serv	09/09/2020

Services Invoiced Per Contract

Services Invoiced Year-to-Date: $48,328.00