Plainfield Township

2023 Mosquito Management Program Annual Report

Submitted by:
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clarke

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Clarke Environmental Mosquito Management
2023 Annual Report

Introduction

West Nile is endemic to northern Illinois – at any time, the right weather, precipitation and environmental factors can yield a significant year for West Nile. That fact that was reinforced in 2023, as cases far outpaced 2022, with transmission benefitting from warm weather and dry conditions punctuated by significant rainfalls – the perfect recipe for West Nile amplification.

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

Service Contracts

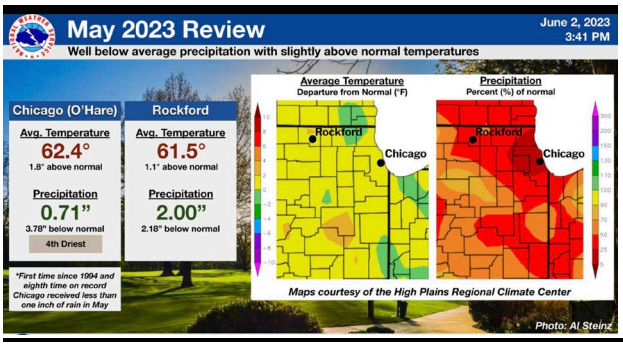
Customers of Clarke receive this annual report to outline control activity and provide an overview of mosquito control challenges around the country and throughout the state. As mosquito control is always weather-dependent, we review and analyze the impact that local weather had on mosquito breeding and the responsive control undertaken by Clarke. 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.

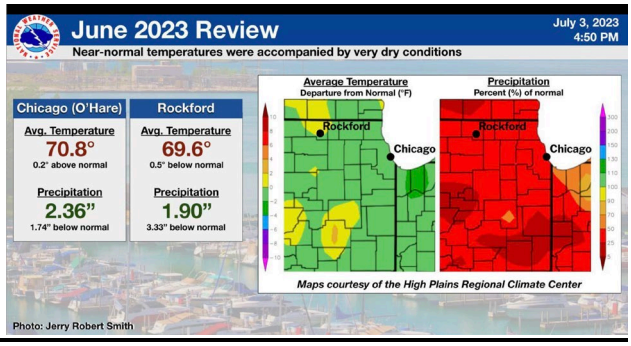
Using best practices and proven industry protocols, Clarke works in close consultation with the city to conduct mosquito surveillance and interventional methods to reduce mosquito populations, especially when the risk of disease is present.

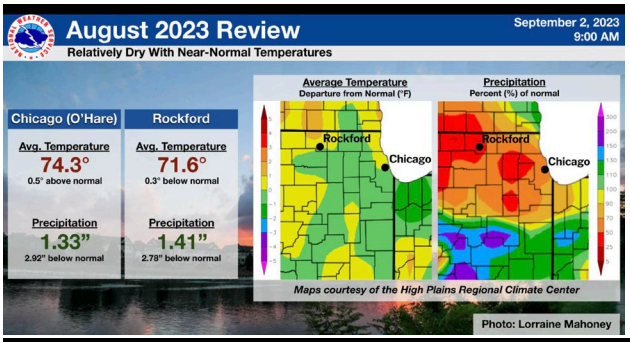
Seasonal Overview

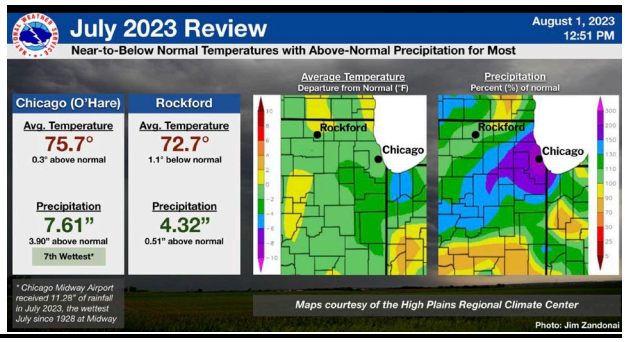
Textbook Weather – Near-normal Spring/Summer/Fall

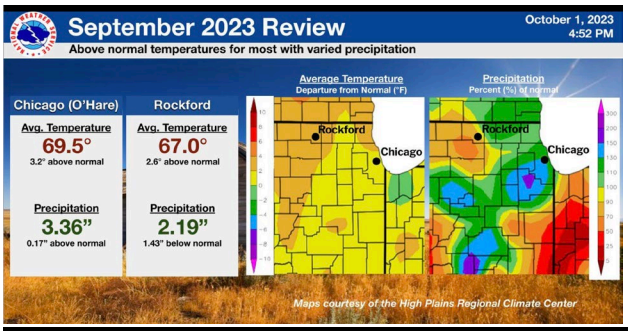
Both Spring and Summer 2023 saw near normal temperatures and precipitation, despite localized heavy precipitation events. Rockford had the ninth snowiest springs, but precipitation in the Chicago area remained below normal. The summaries below provided by the National Weather Service showcase the headlines from each month for weather.

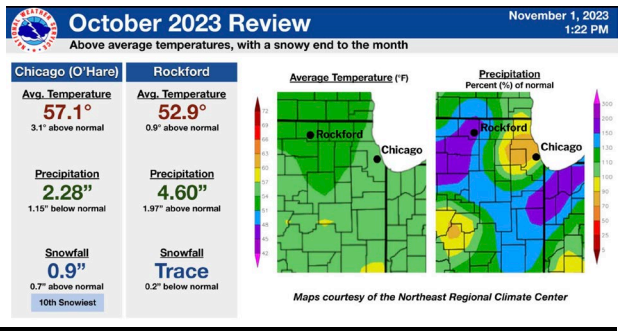












About West Nile Virus

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.

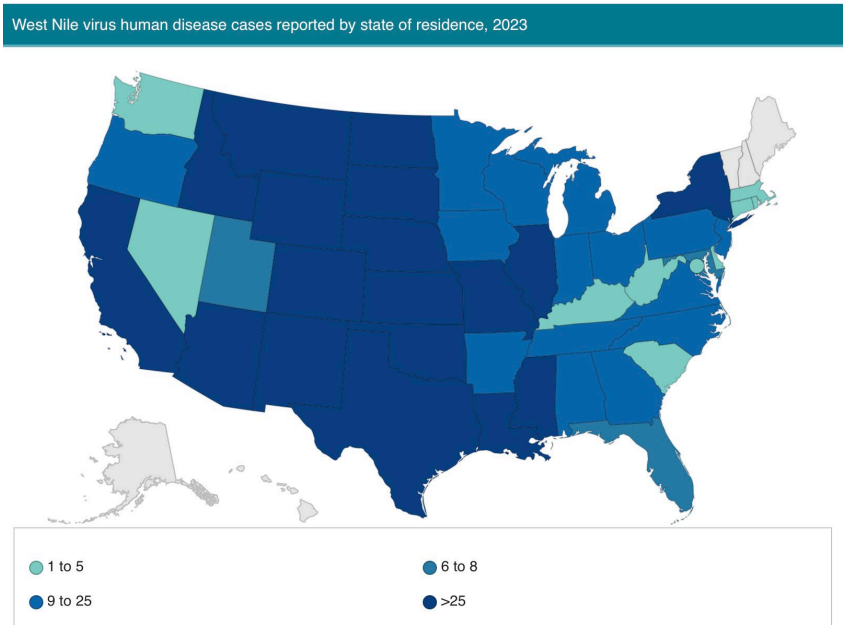
West Nile Virus has spread rapidly across North America since it was discovered in the Western hemisphere, reports the U.S. Geological Survey. West Nile Virus swept from the New York City region in 1999 to almost all of the continental U.S., seven Canadian provinces and throughout Mexico and parts of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

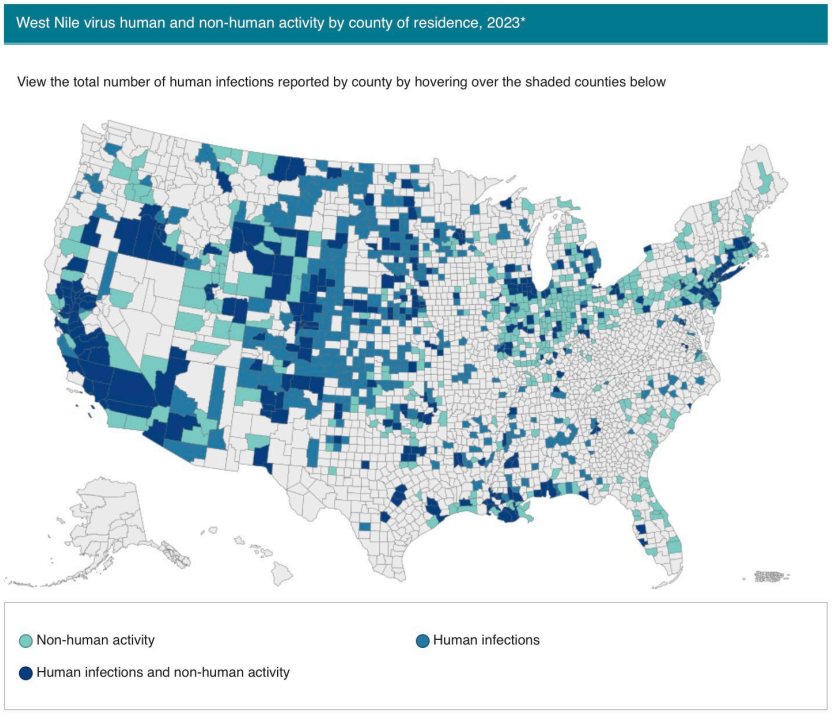
As of October 31, 2023, a total of 2,073 cases of West Nile virus disease have been reported to the CDC – nearly doubling the 2022 case count of 1,132 cases.[1] To date, 45 states have reported West Nile virus infections in people, birds or mosquitoes. West Nile cases have far outpaced last year's case counts but are still below the 2021 spike.

[1] https://www.cdc.gov/westnile/statsmaps/current-season-data.html , Retrieved Nov. 6, 2023

West Nile in the United States 2023

- 2019: 958 cases
- 2020: 664 cases
- 2021: 2,695 cases
- 2022: 1,132
- 2023: 2,073 (as of October 31, 2023)



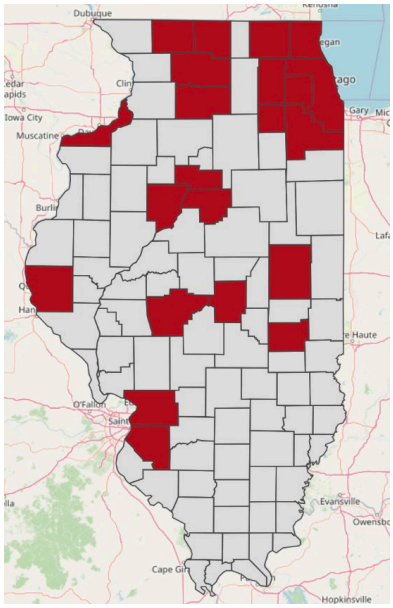


West Nile in Illinois 2023

Far outpacing recent years, as of November 6, 2023, Illinois has reported 113 human cases of West Nile virus and 5 deaths.[3]

- 2019 – 28 human cases
- 2020 – 42 human cases
- 2021 – 64 human cases
- 2022 – 33 human cases
- 2023 – 113 human cases (as of November 6, 2023)

2023 Human Case Data



Illinois West Nile Virus statistics in 2023 (as of November 6, 2023) are:

- 113 human cases (up sharply from 33 in 2022)
- 5 fatalities (on pace with 7 deaths in 2022)
- 65 counties reporting West Nile activity (up from 44 in 2022)
- 45 positive birds (up from 21 in 2022)
- 3,388 positive mosquito batches (up from 2,409 in 2022)

Illinois identified the first human West Nile virus case for the year in on August 23, 2023.

[3] https://idph.illinois.gov/wnvpublic/wnvglance.aspx?year=2023, Retrieved Nov. 6, 2023

2023 Positive Birds, Mosquitoes, Horses, Other Animals (as of 11/6/23)

County	American Crow	Blue Jay	Other Birds	Mosquito Batches	Horse	Other Mammals
BOONE	2	0	0	10	0	0
BUREAU	3	0	0	1	0	0
CARROLL	0	0	0	2	0	0
CHAMPAIGN	0	0	0	17	0	0
CHRISTIAN	0	0	1	10	0	0
CLAY	0	1	2	6	0	0
CLINTON	0	0	0	28	0	0
COLES	1	0	0	0	0	0
COOK	0	0	1	2602	0	0
DEKALB	0	0	2	24	0	0
DOUGLAS	0	0	0	0	4	0
DUPAGE	0	0	0	170	0	0
FAYETTE	1	0	0	6	0	0
FORD	2	0	0	6	0	0
GALLATIN	0	0	0	2	0	0
GREENE	0	0	0	5	0	0

GRUNDY	0	0	0	5	0	0
HANCOCK	0	0	0	2	0	0
HENDERSON	0	0	1	0	0	0
JACKSON	0	0	0	0	1	0
JERSEY	0	1	0	0	0	0
KANE	0	0	0	29	0	0
KANKAKEE	1	0	0	18	0	0
KENDALL	0	0	0	16	0	0
KNOX	0	0	0	2	0	0
LAKE	0	0	0	172	0	0
LASALLE	2	0	0	15	0	0
LAWRENCE	0	0	0	0	1	0
LEE	0	0	0	1	0	0
LIVINGSTON	1	1	0	2	0	0
LOGAN	1	0	0	1	0	0
MACON	0	0	1	25	0	0
MACOUPIN	0	0	0	2	0	0
MADISON	0	0	0	8	0	0
MARSHALL	0	1	0	1	0	0

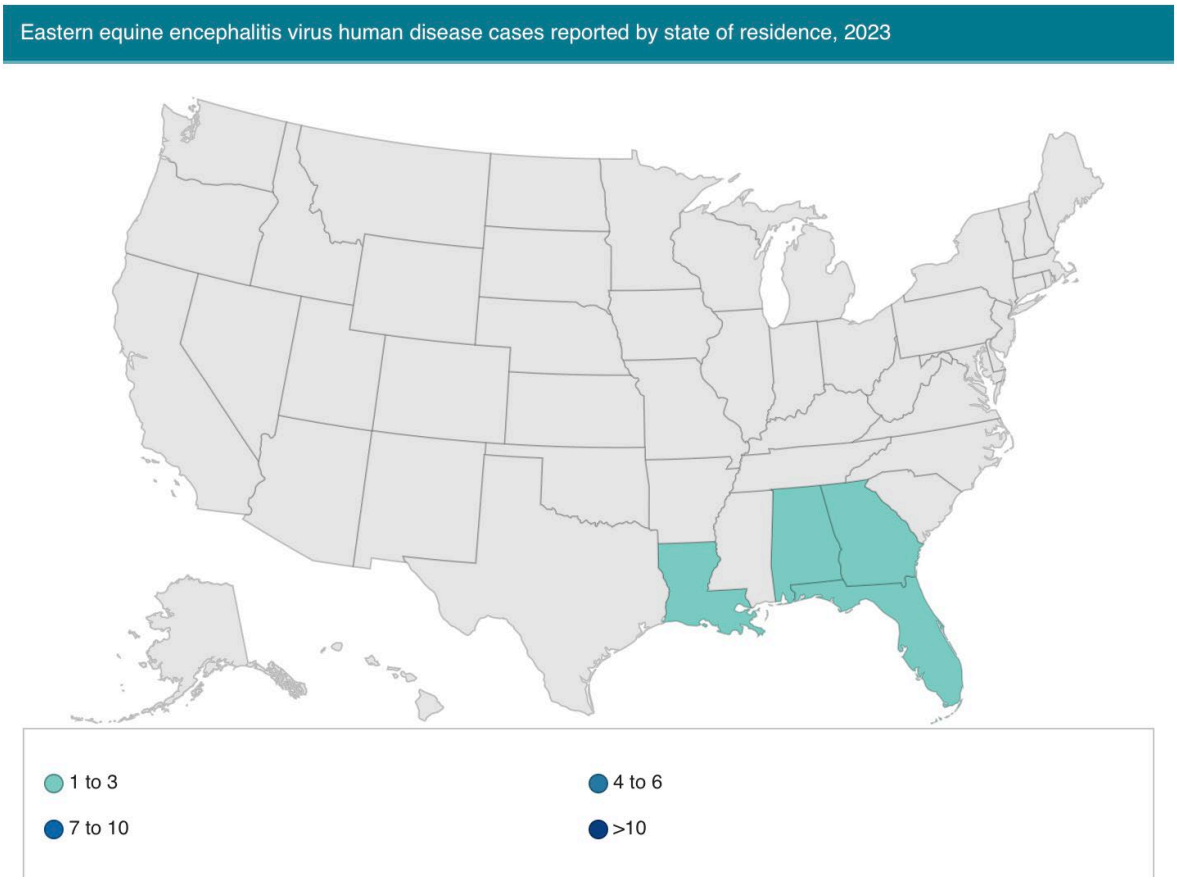
MASON	0	0	1	0	0	0
MASSAC	0	0	0	0	1	0
MCDONOUGH	0	0	0	1	0	0
MCHENRY	0	1	2	56	0	0
MCLEAN	2	0	0	10	0	0
MENARD	0	0	0	7	0	0
MERCER	0	0	0	2	0	0
MONROE	0	0	0	6	0	0
MONTGOMERY	0	0	0	2	0	0
MORGAN	0	0	0	5	0	0
MOULTRIE	0	0	0	0	3	0
OGLE	1	0	0	1	0	0
PEORIA	0	0	0	6	0	0
PIATT	1	0	0	0	0	0
PUTNAM	0	0	0	1	0	0
ROCK ISLAND	1	0	1	9	0	0
SAINT CLAIR	0	0	0	11	0	0
SALINE	0	0	1	0	0	0
SANGAMON	1	0	0	3	0	0

STEPHENSON	2	0	0	0	0	0
TAZEWELL	1	0	0	1	0	0
VERMILION	0	0	1	6	0	0
WARREN	0	0	0	5	0	0
WASHINGTON	0	0	0	2	0	0
WHITESIDE	0	0	0	1	0	0
WILL	0	0	1	64	0	0
WILLIAMSON	0	1	0	0	0	0
WINNEBAGO	0	1	0	1	0	0
TOTAL	**23**	**7**	**15**	**3388**	**10**	**0**

About Eastern Equine Encephalitis

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 Illinois does not have a recent history of EEE cases, the proximity of recent cases in Indiana, Michigan and Wisconsin call for continued vigilance. In 2023, 7 EEE cases habe been reported as of November 6, 2023, all centered in the southeastern states of Louisiana, Alabama, Florida and Georgia.[4]



[4] https://www.cdc.gov/easternequineencephalitis/statistics-maps/current-season-data.html Retrieved Nov 6.2023

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 US, more than 5,100 travel-related cases of Zika were confirmed nationwide, including 139 locally transmitted cases of transmission in areas of south Florida in 2016. Since that time, cases have steadily decreased. The last cases of local Zika transmission by mosquitoes in the continental United States were in Florida and Texas in 2016-17.

Illinois does not have a significant population of *Aedes aegypti* mosquitoes, so local transmission risk is small.

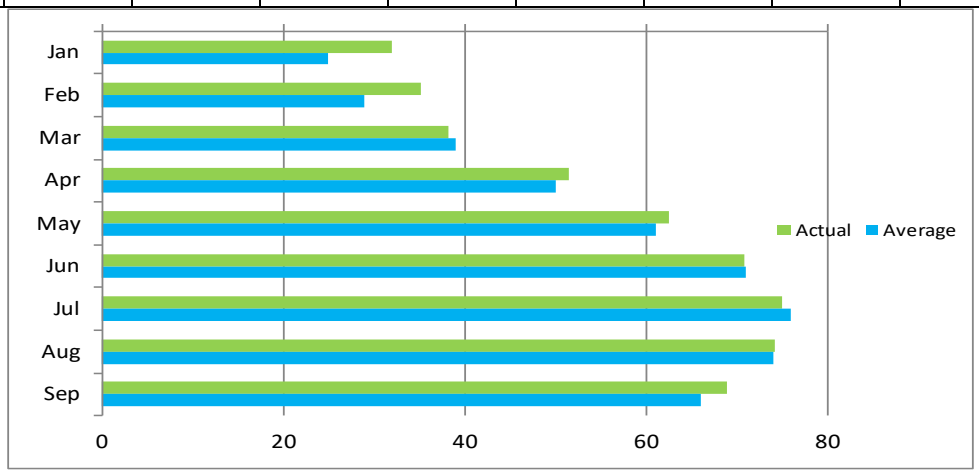
Climatology and Mosquito Overview

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 storm 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.

2023 O'Hare International Airport (Chicago) Weather Survey

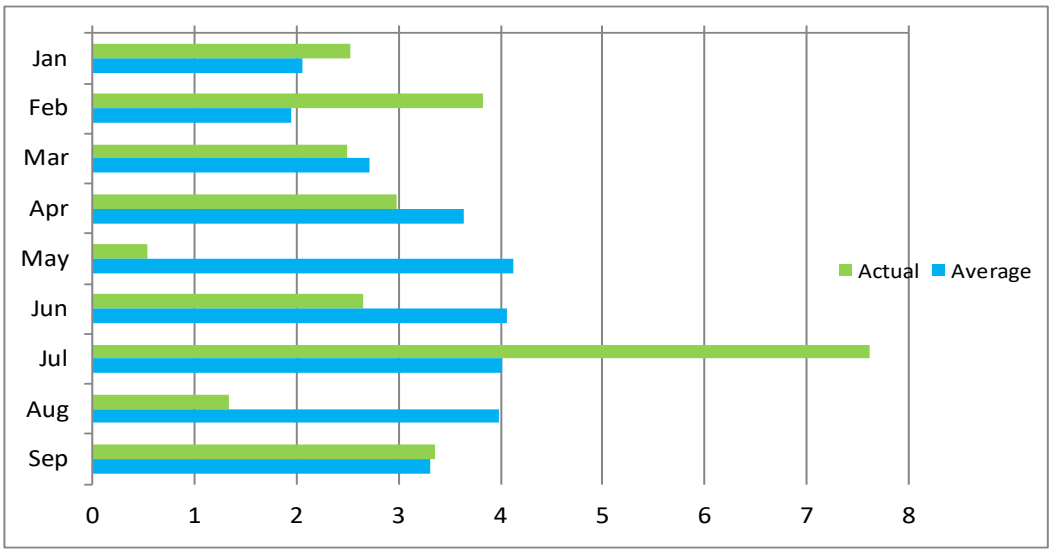
Temperature (degrees Fahrenheit)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Actual	32	35.23	38.2	51.45	62.47	70.85	75.03	74.17	68.91
Average	25	29	39	50	61	71	76	74	66



Precipitation (inches)

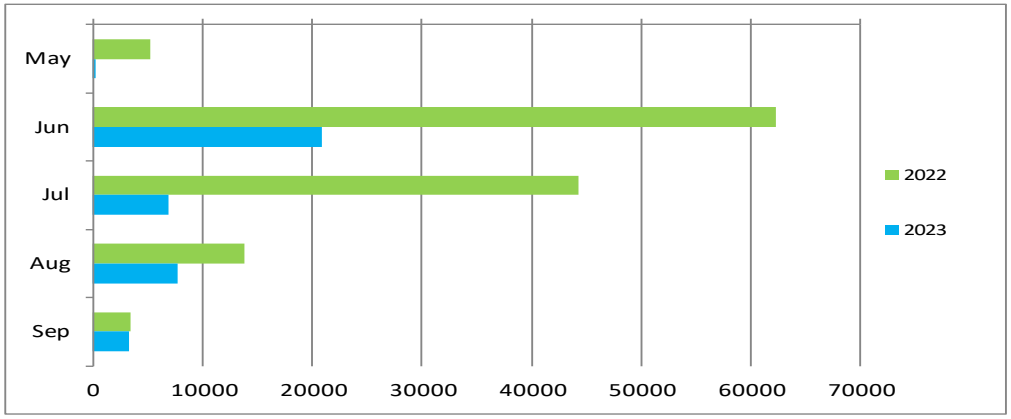
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Actual	2.53	3.83	2.5	2.98	0.54	2.65	7.61	1.33	3.36
Average	2.06	1.94	2.72	3.64	4.13	4.06	4.01	3.99	3.31



2023 Mosquito Light Trap Network Target Species Comparison

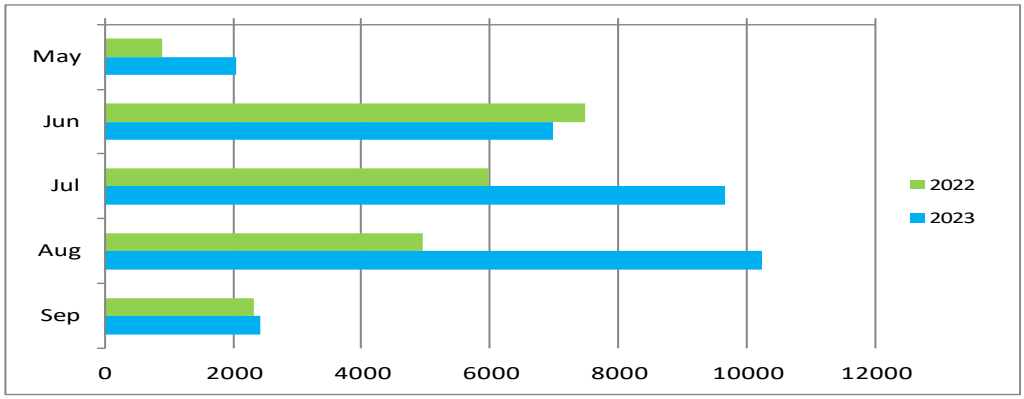
Aedes vexans

	May	Jun	Jul	Aug	Sep
2023	187	20893	6921	7765	3300
2022	5153	62289	44225	13849	3430



Culex pipiens and *Culex restuans*

	May	June	July	Aug	Sep
2023	2049	6978	9665	10238	2425
2022	895	7485	5982	4948	2320



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

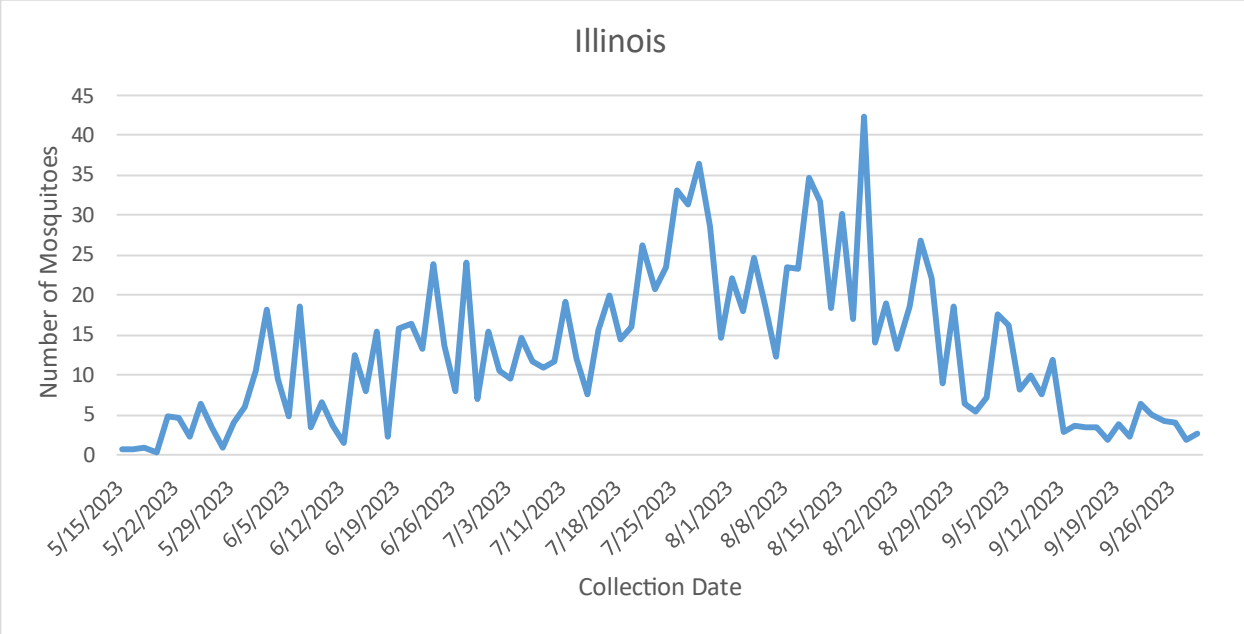
The following table summarizes the species composition from the light trap network operating in Northern Illinois.

Light Trap Species Summary				
Species	*Females*	*Percent*	*Males*	*Percent*
Ae cinereus	2346	2.70%	197	0.57%
Ae vexans	39066	44.96%	5661	16.35%
Ae misc	1644	1.89%	545	1.57%
An punctipennis	1829	2.10%	287	0.83%
An quadrimaculatus	5547	6.38%	510	1.47%
An walkeri	25	0.03%	0	0.00%
An species	117	0.13%	39	0.11%
Cq perturbans	1691	1.95%	444	1.28%
Cx erraticus	274	0.32%	29	0.08%
Cx pipiens	9955	11.46%	5192	15.00%
Cx restuans	7647	8.80%	3688	10.65%
Cx species	13753	15.83%	13384	38.66%
Cx tarsalis	7	0.01%	5	0.01%
Cx territans	327	0.38%	363	1.05%
Cs inornata	86	0.10%	32	0.09%
Cs minnesotae	1	0.00%	0	0.00%
Cs species	56	0.06%	60	0.17%
Mosquito, Misc.	272	0.31%	137	0.40%
Oc fitchii	273	0.31%	208	0.60%
Oc grossbecki	88	0.10%	1	0.00%
Oc japonicus	220	0.25%	123	0.36%
Oc canadensis	78	0.09%	100	0.29%
Oc triseriatus	397	0.46%	3138	9.07%
Oc trivittatus	785	0.90%	168	0.49%
Oc. species	129	0.15%	11	0.03%
Or signifera	27	0.03%	5	0.01%
Ps ciliata	5	0.01%	4	0.01%
Ps ferox	40	0.05%	52	0.15%
Ps howardii	24	0.03%	23	0.07%
Ps columbiae	9	0.01%	0	0.00%
Ps misc	2	0.00%	1	0.00%
Ur sapphirina	180	0.21%	209	0.60%
Total	**86,900**	**100.00%**	**34,616**	**100.00%**

Total Number of Mosquitoes: 121,516

Light Trap Counts

Illinois



Operations and Surveillance Reports

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

- **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).
- **WNV Gravid Trap Service (2 traps/Wk-WMAD):** Seasonal West Nile Virus monitoring trap service.
- **Complete Site Larval Inspection Service:** Inspection service of all potential mosquito larvae development sites.
- **Targeted Site Larval Inspection:** Inspection of all targeted larval development sites.
- **Culex Site Inspection Service:** Inspection of culex mosquito larval development sites for the prevention of West Nile Virus and other mosquito-borne diseases.
- **Larval Site Service Call:** Special inspection of standing water for mosquito breeding per hot line request
- **Hand Larvicide:** Hand equipment application for control of mosquito larvae
- **Backpack Larvicide Treatment.:** Backpack application for control of mosquito larvae
- **Vectolex FG Heli Larviciding:** Helicopter larvicide application for biological control of mosquito larvae.
- **NatularG30 Helicopter Prehatch:** Helicopter prehatch application for larval control.
- **Catch Basin Treatment:** Catch basin treatment with a sustained-release biological insecticide for larval control
- **Natular XRT BYCB Bike:** Backyard catch basin treatment for larval control.
- **Natular XRT CB Bike:** Catch Basin treatment for larval control.
- **Vectolex WSP CB Bike – 30 day:** Treatment of catch basins with Vectolex WSP for larval control.

Services Performed Year-to-Date

Service Item	Start Date
N.J. Light Trap Seasonal Serv	05/09/2023
Complete Site Larval Insp Serv	05/18/2023
Natular G 5#/Acre Hand	05/30/2023
Targeted Site Larval Insp Serv	05/30/2023
Natular XRT CB Bike	06/12/2023
Targeted Site Larval Insp Serv	06/15/2023
Natular G 5#/Acre Hand	06/26/2023
Complete Site Larval Insp Serv	06/26/2023
Biomist 3+15 Truck ULV	06/30/2023
Natular G 5#/Acre Hand	07/10/2023
Targeted Site Larval Insp Serv	07/10/2023
Biomist 3+15 Truck ULV	07/17/2023
Natular G 5#/Acre Hand	07/24/2023
Targeted Site Larval Insp Serv	07/24/2023
Complete Site Larval Insp Serv	08/07/2023
Natular G 5#/Acre Hand	08/21/2023
Targeted Site Larval Insp Serv	08/21/2023
Biomist 3+15 Truck ULV	08/22/2023
Targeted Site Larval Insp Serv	09/11/2023

Services Invoiced Per Contract:

Services Invoiced Year-to-Date: $44,570.00