

# **Annual Report 2016**

# **North Shore Mosquito Abatement District**

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**NORTH SHORE MOSQUITO ABATEMENT DISTRICT**

**2016 ANNUAL REPORT**

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## PREFACE

Though Zika virus was the subject of intense media coverage and public concern during 2016, West Nile virus remains the most important mosquito-transmitted disease in the area served by the NSMAD. During 2016, WNV activity in our region was relatively high compared to the prior three years, and was the highest level recorded since 2012, when 20 human cases occurred in the District. Indicators of WNV activity in our mosquito surveillance system started increasing in mid-July and peaked in late August. NSMAD responded by intensifying larval and adult mosquito control efforts throughout August and September. The Illinois Department of Public Health reported 173 WNV human cases statewide in 2016, with 90 of those cases occurring in Cook County. Fortunately, only three human WNV cases were reported among the 14 communities served by NSMAD during 2016.

Specimens of *Aedes albopictus*, commonly known as the Asian Tiger Mosquito, were collected in our surveillance program in 2016. This marks the first time this invasive species has been found in the District. Though *Ae. albopictus* is a competent vector of Zika, Chikungunya, Dengue, and several other mosquito-transmitted viruses, their abundance was very low and their distribution very limited. As a result, the human health risk from this species presence in the district remains exceedingly low. We will be enhancing our *Ae. albopictus* surveillance in 2017.

NSMAD embarked on several new projects during 2016. We transitioned from using paper-based maps and field records to a GIS-based electronic mapping system to indicate the location of all of our mosquito production sites and to document larval control and adult control operations. This system increases our efficiency and effectiveness by providing improved tracking of work assignments, site inspections and pesticide use. We also conducted an extensive evaluation of the effectiveness of several larval control formulations in our urban catch basins, which are important sources of *Culex pipiens*, the primary WNV vector in our area. The results will be used to refine and improve our larval mosquito control operations during 2017. Finally, in late 2016, we broke ground for a construction project to build a new pesticide storage facility and to renovate an existing room into a BSL-2 laboratory to support our mosquito-based WNV surveillance operations and expanded evaluations of control product effectiveness. Construction is scheduled to be complete by mid-April 2017, in time for the start of the 2017 mosquito surveillance and control season.

You will find further details of the 2016 mosquito season in this Annual Report, including surveillance data and a detailed description of the methods we use to control the local mosquito population.

## **Introduction To The North Shore Mosquito Abatement District**

The passage of the *Mosquito Abatement District Act* (Chap. 111 ½, Illinois Revised Act) by the Illinois legislature in September 1927, prompted a group of citizens to work for the establishment of a mosquito abatement program for the North Shore of Cook County. This led to the organization of the North Shore Mosquito Abatement District (NSMAD), which was officially chartered on December 8, 1927. With support from the citizens of our District, 2016 marked our 89<sup>th</sup> year of public health service. We are looking forward to continuing to serve the communities of the North Shore in 2017, our 90<sup>th</sup> year of public health service.

### **Area Served**

The District serves approximately 330,000 residents in the municipalities of Deerfield (east of Pfingsten and south of Lake Cook Road only) Evanston, Glencoe, Glenview (east of Pfingsten Road), Golf, Kenilworth, Lincolnwood, Morton Grove (east of Washington Street), Niles (east of Harlem Avenue), Northbrook (east of Pfingsten Road), Northfield, Skokie, Wilmette and Winnetka.

The area covered by the NSMAD consists of 70 square miles of Cook County's North Shore. This sprawling and diverse area includes more than 900 miles of streets, 40,000 catch basins, 26.9 miles of rivers, 31.8 miles of railroad rights of way, 2.9 miles of ravines, 21.8 miles of bike trails, 17.8 miles of Forest Preserve District horse trails and approximately 3,500 acres of Forest Preserve District land.

### **Organization**

A five-person Board of Trustees governs the North Shore Mosquito Abatement District. Trustees are residents of the District and are appointed by the Cook County Board President and serve without compensation. Operation of the District is supported by taxes levied on property located within the boundaries of the member townships.

The NSMAD employs seven full-time staff members and between 12-15 seasonal field technicians. Full time staff positions include: the Executive Director, a Chief Field Inspector, a Communications Manager, a Field Supervisor, an Internal Operations Manager, an Operations and Laboratory Manager and a Vector Biologist.

The District office, laboratory and maintenance facility is located at 117 Northfield Road, Northfield, Illinois.

### **Mission Statement**

The NSMAD controls mosquito populations in the District to:

1. Reduce the risk of disease from mosquito-borne illness
2. Minimize the negative impact mosquitoes have on quality of life

## **Public Health and Mosquitoes**

Mosquitoes are responsible for the transmission of many debilitating and potentially deadly diseases around the globe, such as malaria, yellow fever, dengue, Zika, filariasis and many forms of viral encephalitis. These diseases are transmitted through the bite of an infected female mosquito.

In the United States, mosquito-borne viral encephalitis is the primary health concern of public health agencies. West Nile Virus (WNV), St. Louis Encephalitis (SLE), Eastern Equine Encephalitis (EEE), Western Encephalitis (WE), and La Crosse Encephalitis (LAC), are serious diseases with symptoms ranging from mild or flu-like to severe, including paralysis, coma and death. In northern Illinois, WNV is the mosquito-transmitted virus of greatest concern. Recovery from these diseases can be a long and painful process, with some people never fully recuperating. Unfortunately, there are no vaccines for humans for any of these diseases at this time, and prevention relies on mosquito control and avoiding mosquito bites.

## **Operations: Integrated Pest Management**

Our abatement program is based on the principles of integrated pest management (IPM). IPM utilizes a thorough understanding of the biology and ecology of the mosquitoes and mosquito-transmitted viruses that occur in the District and employs a comprehensive surveillance program to provide the information needed to develop action thresholds and to make sound decisions about mosquito control activities. In addition, IPM utilizes the full range of mosquito control tools and procedures and applies them as appropriate for a given situation. There are four principal components of the NSMAD Integrated Pest Management Program:

- **Surveillance/Action Thresholds**
- **Larval Control/Source Reduction**
- **Adult Mosquito Control**
- **Public Outreach/Education**

## **Surveillance Program and Determining Action Thresholds**

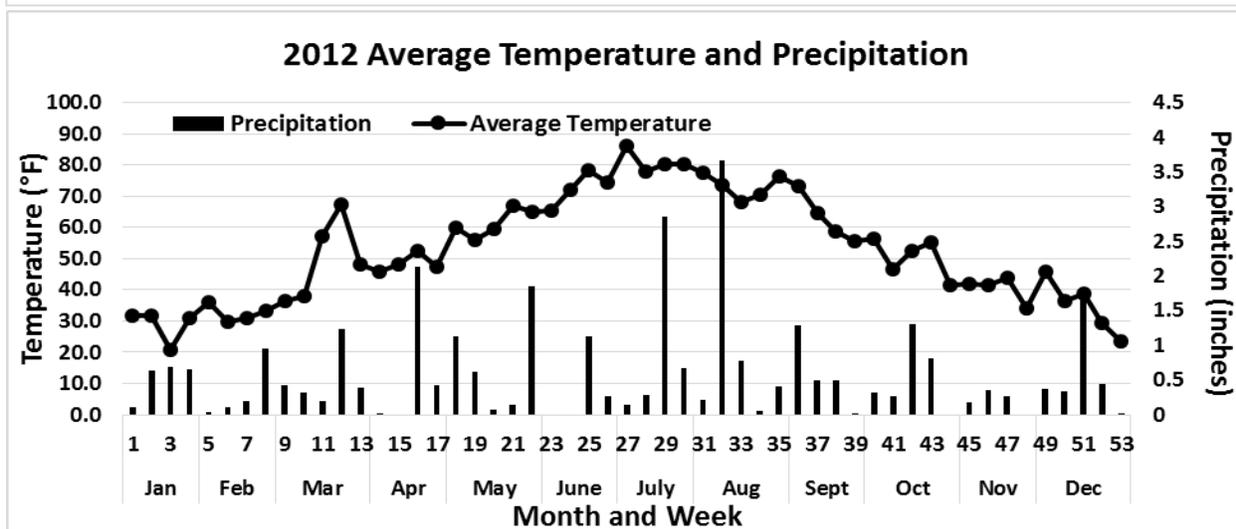
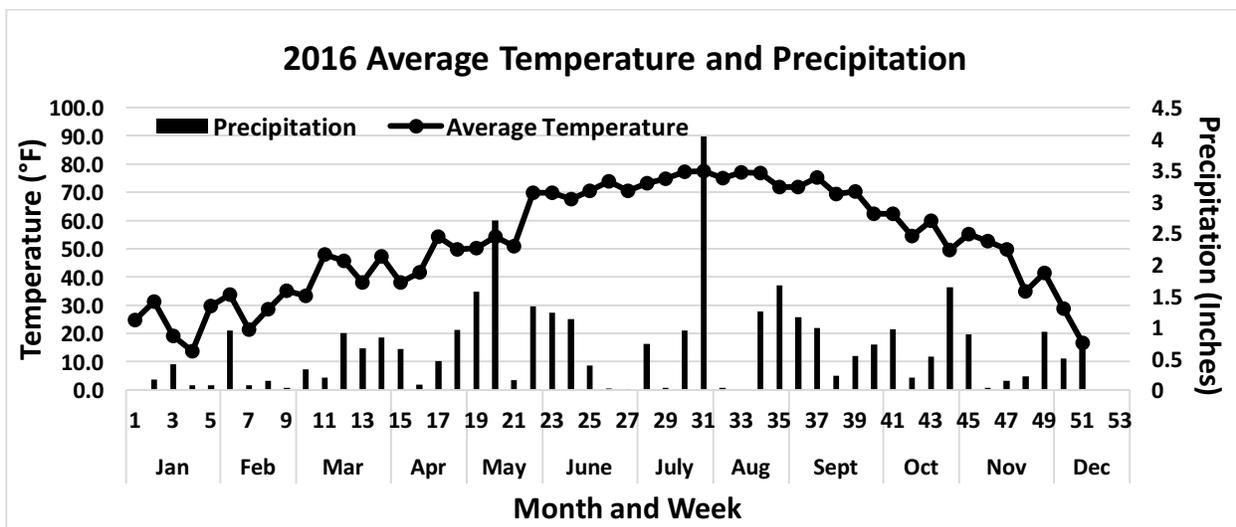
The surveillance program monitors local mosquito population abundance and the prevalence of WNV-infected mosquitoes in the area. We also collect data about weather patterns that are associated with mosquito abundance and WNV activity levels. This information is evaluated against our evidence-based action thresholds and helps us make decisions regarding appropriate control methods.

## **Environmental Surveillance**

Weather conditions have a significant influence on the type and number of mosquitoes produced in NSMAD. Temperature and rainfall patterns are monitored throughout the year, and help determine when we initiate our surveillance and control efforts and to anticipate the type of mosquito problems we will encounter. Heavy, flooding rains early in the year tend to create large broods of nuisance mosquitoes that can affect the quality of life in the area, while warm and dry early-season conditions tend to create a favorable environment for increased *Culex* mosquitoes and a greater risk of WNV transmission during the latter part of the summer.

### **Weather Monitoring**

The graphs below show the weekly precipitation and average temperature for the 2016 season (top graph) and 2012 (bottom graph) through October. Compared to 2012, spring in 2016 was wetter and slightly cooler (average temperatures exceeded 50 degrees in week 11 during 2012 but not until week 17 in 2016) and mid to late summer was hotter during 2012, which likely accounted for the earlier and higher increase in WNV activity during 2012 compared to 2016.



### Monitoring Mosquito Populations

We utilize mosquito traps, strategically placed throughout the District to monitor mosquito abundance and WNV infection rates. Nine New Jersey light traps are placed in residential yards. These traps are used primarily to monitor the abundance of nuisance mosquitoes in the area. Mosquitoes are attracted to a light source in the trap and a fan blows the mosquitoes into a jar where they are killed and held until picked up by one of the NSMAD field technicians. New Jersey Light Traps are run 4 nights/week and the collections are picked up once per week.

Gravid traps are placed at 19 sites throughout the District. Gravid traps are used to capture *Culex* mosquitoes, the vector of WNV and other potential diseases in this area. The gravid traps are run seven days a week and the collections are returned to the laboratory for processing three times per week. Gravid traps provide a measure of the abundance of *Culex* mosquitoes. In addition, these mosquitoes are tested for the presence of WNV. Mosquitoes collected from the gravid traps are identified, then grouped into batches of 50-60 mosquitoes and are tested in our laboratory for WNV via Rapid Analyte Measurement Platform (RAMP®) Test. This information provides an estimate of the WNV risk in the area. In addition to being used by the NSMAD, the mosquito monitoring information is provided to the Illinois Department of Public Health (IDPH) for use in developing statewide WNV risk evaluations.

In response to the first detection of *Aedes albopictus* in the District in 2016, NSMAD enhanced surveillance efforts using two types of traps specifically targeting this species. The

BG Sentinel Trap is designed to collect host-seeking *Ae. albopictus*. The BG Gravid *Aedes* Trap (GAT) is designed to collect *Ae. albopictus* that have already taken a blood meal and are looking for a container in which to lay eggs. Both traps are portable and are easily moved to locations where *Ae. albopictus* populations are suspected. The BG Sentinel trap is usually kept in place for a 48-hour trapping period, and the BG GAT traps are usually kept in place for a seven-day trapping period.

Larval mosquito populations are monitored either by directly observing the larval habitat for the presence of mosquito larvae and pupae in the water if possible, or by taking water samples from the aquatic habitats using a standard volume dipper and examining the sample for the presence of larvae or pupae.

### **2016 West Nile Virus Surveillance Summary**

West Nile virus activity in 2016 was higher than the average level observed during non-outbreak years. Though WNV activity in mosquitoes approached levels seen in 2012, it did not reach the peak level seen that year. Also, the increased activity occurred several weeks later and lasted a shorter duration than during 2012.

As of the date of this report, the Illinois Department of Public Health is reporting 136 human WNV cases have occurred statewide, 90 of which are from Cook County. Of the human cases reported in Cook County, three are from communities served by the NSMAD. Symptom onset of the three cases in the NSMAD occurred during weeks 33, 35 and 40.

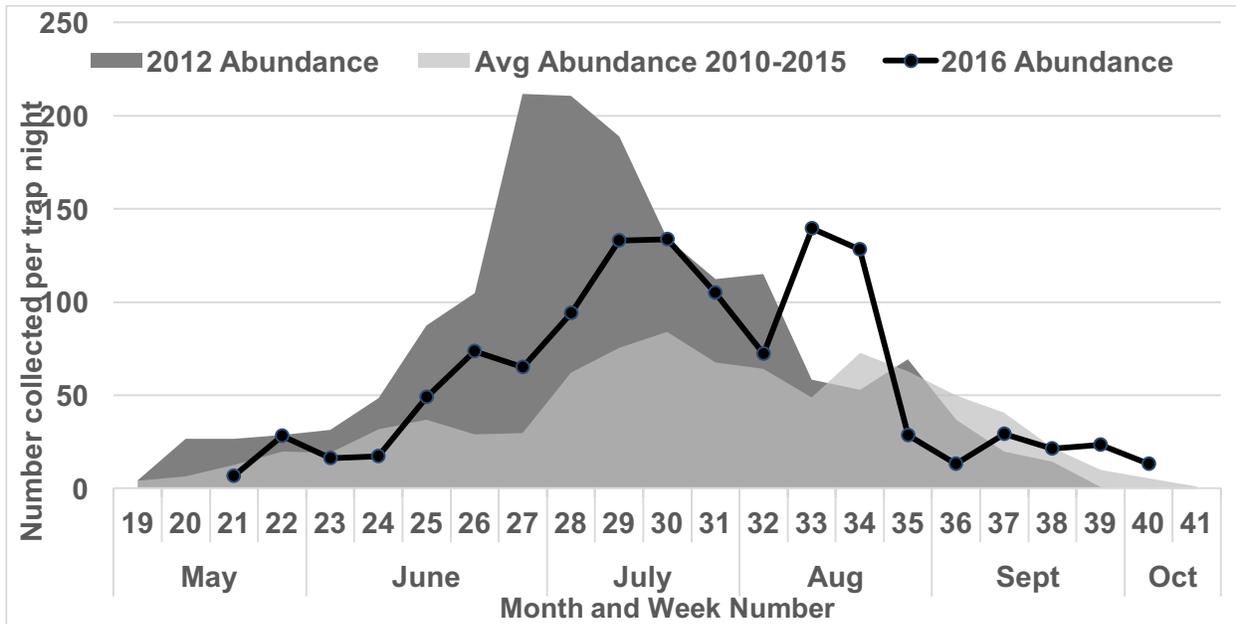
### **2016 NSMAD WNV Test Results**

During 2016, a total of 152,224 *Cx. pipiens/restuans* mosquitoes were collected in Gravid Traps. Of these, 75,184 were tested for WNV in a total of 1,513 pools. Evidence of WNV was detected in a total of 485 pools, and positive pools were found in all of the municipalities where gravid traps are placed (see table below).

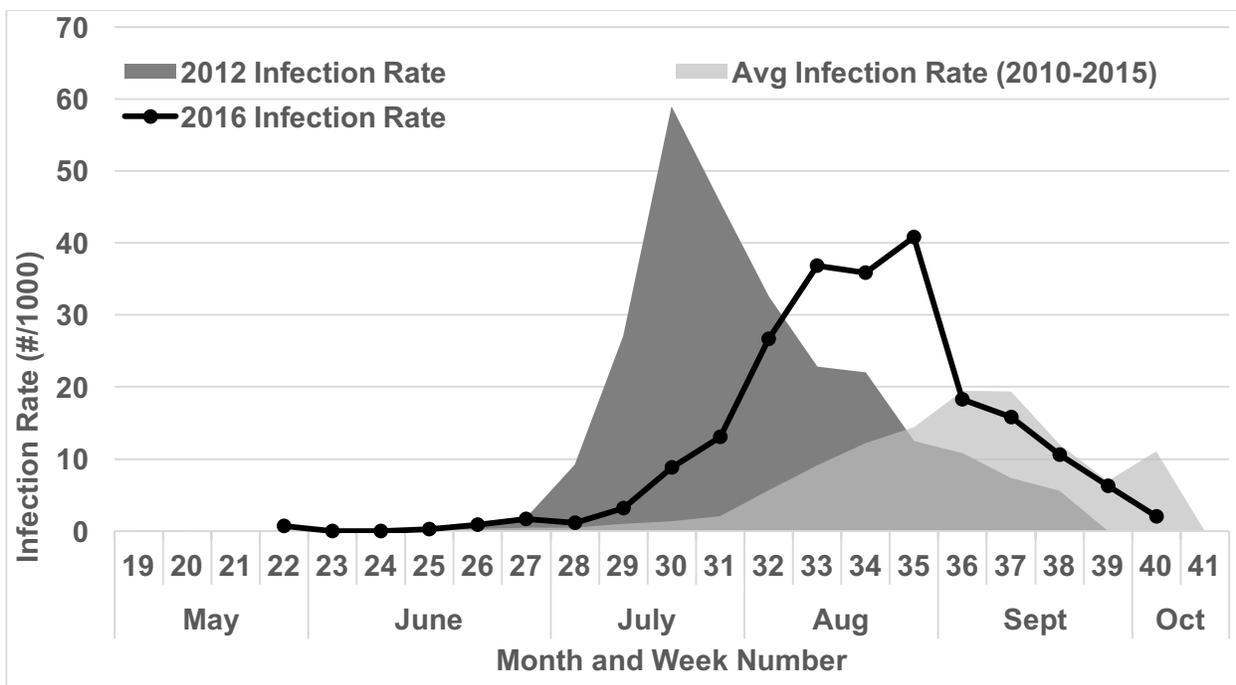
<b>Municipality</b>	<b># Positive Batches</b>	<b># Batches Tested</b>	<b># of Mosquitoes Tested</b>
<b>Evanston</b>	130	365	18,057
<b>Glencoe</b>	30	116	6,111
<b>Glenview/Golf</b>	68	189	9,543
<b>Kenilworth</b>	17	68	3,180
<b>Lincolnwood</b>	19	74	3,757
<b>Morton Grove</b>	9	66	3,061
<b>Niles</b>	13	43	1,859
<b>Northbrook</b>	29	72	3,526
<b>Northfield</b>	17	67	3,173
<b>Skokie</b>	106	279	14,487
<b>Wilmette</b>	23	79	3,753
<b>Winnetka</b>	24	95	4,677
<b>Totals</b>	<b>485</b>	<b>1513</b>	<b>75,184</b>

Collections for WNV surveillance started May 16, 2016 (week 21). In the graphs on the following page, 2016 surveillance results are shown as the black line, results obtained during 2012 (the most recent WNV outbreak year with 20 human cases in the District) are shown in the dark-grey area, results obtained between 2010 and 2015 (excluding 2012) represent non-outbreak years (2-4 cases per year) and are shown in the light-grey shape area.

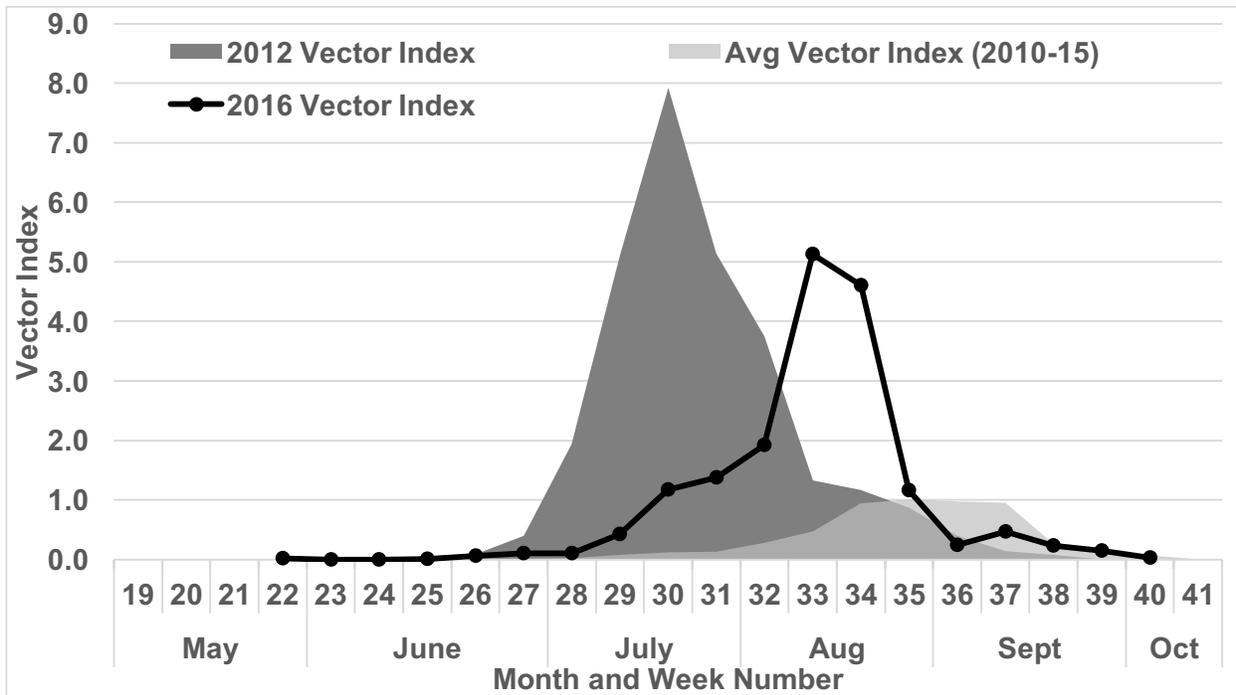
**Vector Species Abundance:** *Cx. pipiens* abundance in gravid traps was intermediate between average levels and 2012 levels from week 25 through week 31. There was a late season peak in abundance lasting two weeks (weeks 33-34) which declined sharply to below-average levels by week 35 and remained at those levels for the remainder of the season. WNV surveillance ended Sept. 30, 2016.



**WNV Infection Rate:** WNV infection in *Cx. pipiens* (shown as the Maximum Likelihood Estimate of the Infection Rate per 1000 mosquitoes) was first detected during week 22. The infection rate remained at approximately average levels until week 30 when it first exceeded 5/1000, a level which has been associated with increased risk of human infections previously in NSMAD. The mosquito infection rate continued to rise for several weeks, peaked during weeks 33-35, then declined rapidly to approximately average levels and remained at these levels through the rest of the season.



**WNV Vector Index:** The Vector Index combines the *Cx. pipiens* abundance and infection rate data to produce an estimate of the number of WNV infected mosquitoes in the area, which helps us characterize human WNV risk. In the NSMAD surveillance program, a vector index >1.0 is associated with increased risk, particularly if it occurs early in the season. During 2016, the Vector Index exceeded 1.0 at week 30 and remained at above average levels through week 35.



**NSMAD Human WNV Cases  
Per Year by Community**

Year	Evanston	Glencoe	Glenview	Golf	Kenilworth	Lincolnwood	Morton Grove	Niles	Northbrook	Northfield	Skokie	Wilmette	Winnetka	Total
2002	30	3	16	0	4	3	12	8	3	2	49	22	6	158
2003	1	0	0	0	0	0	0	0	0	0	3	0	0	4
2004	1	0	0	0	0	0	0	0	0	0	1	0	0	2
2005	8	0	4	0	1	0	4	3	2	0	8	6	3	39
2006	3	0	0	0	0	1	0	0	2	0	2	1	1	10
2007	1	0	1	0	0	0	0	0	0	0	1	1	0	4
2008	1	0	1	0	0	0	0	0	0	0	1	0	0	3
2009	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	1	0	0	0	0	0	0	0	1	0	0	0	0	2
2011	0	0	1	0	1	0	0	0	1	0	0	0	0	3
2012	10	0	3	0	0	0	2	0	0	1	3	1	0	20
2013	0	0	0	0	0	0	0	3	0	0	1	0	0	4
2014	1	0	1	0	0	0	1	0	0	0	0	0	0	3
2015	0	0	0	0	0	0	0	0	1	0	2	0	0	3
2016	1	0	1	0	0	0	0	0	0	1	0	0	0	3
<b>Total</b>	<b>58</b>	<b>3</b>	<b>28</b>	<b>0</b>	<b>6</b>	<b>4</b>	<b>19</b>	<b>14</b>	<b>10</b>	<b>4</b>	<b>71</b>	<b>31</b>	<b>10</b>	<b>258</b>

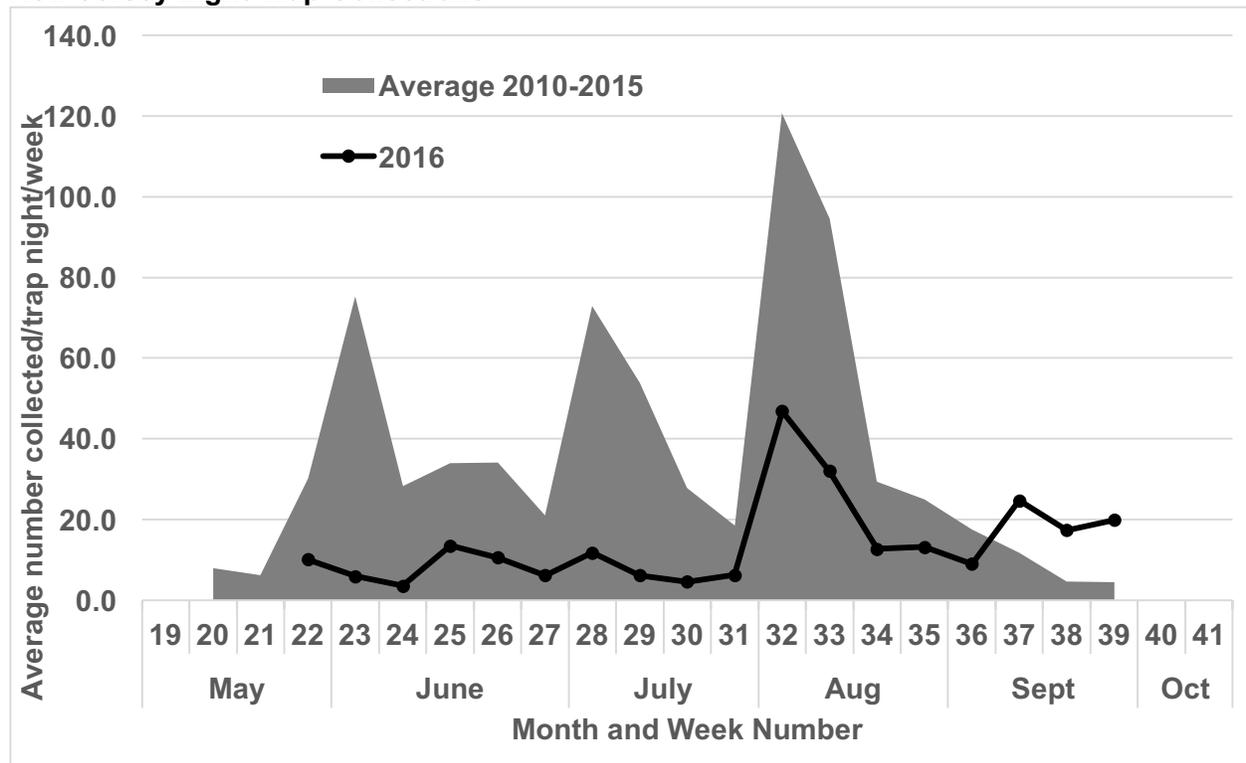
The first West Nile virus outbreak in NSMAD occurred in 2002. Human WNV cases have occurred in the district each subsequent year with the exception of 2009. Following 2002, outbreaks have occurred in 2005, 2006 and most recently in 2012. Human cases of West Nile virus have been reported from every town served by NSMAD, with half of the reported cases in the district occurring in Skokie and Evanston.

## Nuisance Mosquito Surveillance

New Jersey Light Traps are placed in nine locations throughout the district to sample biting adult mosquitoes that affect quality of life. Specimens are collected four nights per week, identified, and counted to provide an estimate of the biting mosquito abundance in the district. This information is used to plan larval and adult control activities. The graph below shows the average number of mosquitoes (all species) collected per trap night, per week, in the grey area while the black line indicates the number collected during 2016.

Sampling using New Jersey Light Traps began May 23 (week 22). For much of the season, nuisance mosquito abundance was relatively low compared to historical averages. There were small, local increases in abundance as a result of local rainfall patterns. A large peak occurred during weeks 32-33, following a heavy, widespread rainfall. There was a small, late-season spike during weeks 37-39.

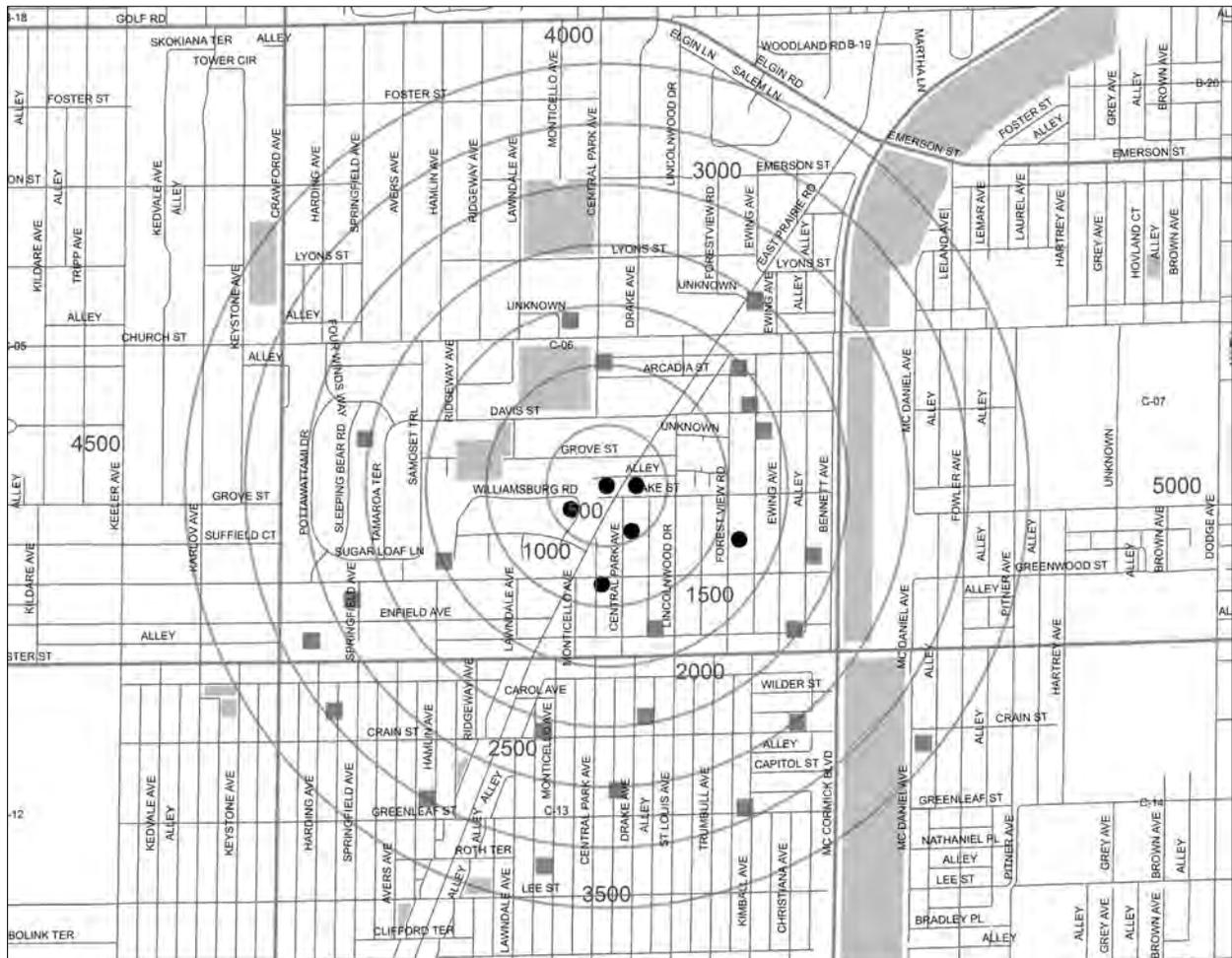
### **New Jersey Light Trap Collections**



## Aedes albopictus in NSMAD

On September 2, 2016 (week 36) two *Ae. albopictus* female mosquitoes were found in one of the CDC Gravid traps in located in Skokie. According to our records, this was the first record of this species occurring in the NSMAD. Following this discovery, BG Sentinel traps and BG Gravid *Aedes* Traps (GAT) were deployed in the area to determine the extent of the distribution of this infestation and to get an indication of their abundance. The map below shows the general area in the District where the *Ae. albopictus* were found, the trap sites at which *Ae. albopictus* were collected (black dots) and where trapping was preformed but none were collected (grey squares). By the end of the season, we had trapped out to 3500 feet from the original collection site and found that the *Ae. albopictus* appeared to be limited to an area extending approximately 1200 feet southeast and 800 feet south of the original collection. A total of only 64 *Ae. albopictus* were collected and suggested that this was a relatively low abundance population.

We will resume collecting with BG Sentinel and BG GAT traps in the spring of 2017 to determine if this population survived the winter, if so, we will again monitor its distribution and abundance, search for containers holding larvae, and implement expanded community awareness/container removal and control programs.



## 2016 Female Mosquitoes Collected by Species

Illinois is home to approximately 75 different mosquito species. Of these, 20 species are routinely collected in NSMAD's surveillance system. The two most commonly collected species are *Aedes vexans*, the primary floodwater/nuisance species found in NSMAD and *Culex pipiens/restuans*, the primary West Nile virus vectors in the region. The number of each species collected in NSMAD surveillance during 2016 is shown below. *Aedes albopictus*, a potential vector of dengue, Chikungunya and Zika viruses, was collected for the first time in NSMAD during 2016.

Mosquito Species		Trap Type			Totals
		New Jersey	BG & GAT <sup>1</sup>	Gravid	
<b>Aedes</b>	<b><i>albopictus</i><sup>2</sup></b>	0	44	20	64
<i>Aedes</i>	<i>canadensis</i>	5			5
<i>Aedes</i>	<i>grossbecki</i>	17			17
<i>Aedes</i>	<i>japonicus</i>	131		1,168	1,299
<i>Aedes</i>	<i>sticticus</i>	3		5	8
<i>Aedes</i>	<i>triseriatus</i>	62		165	227
<i>Aedes</i>	<i>trivittatus</i>	158		107	265
<b>Aedes</b>	<b><i>vexans</i><sup>3</sup></b>	<b>5,484</b>		<b>188</b>	<b>5,672</b>
<i>Anopheles</i>	<i>barberi</i>			1	1
<i>Anopheles</i>	<i>punctipennis</i>	71		20	91
<i>Anopheles</i>	<i>quadrimaculatus</i>	83		17	100
<b>Culex</b>	<b><i>pipiens/restuans</i><sup>4</sup></b>	<b>1,584</b>		<b>152,224</b>	<b>153,808</b>
<i>Culex</i>	<i>salinarius</i>	1		0	1
<i>Culex</i>	<i>tarsalis</i>	2		2	4
<i>Culiseta</i>	<i>inornata</i>	13		8	21
	<i>melanura</i>				0
<i>Coquillettidia</i>	<i>perturbans</i>	37		2	39
					0
<i>Orthopodomyia</i>	<i>signifera</i>	0		9	9
<i>Psorophora</i>	<i>ciliata</i>	15		2	17
	<i>ferox</i>	44		9	53
	<i>howardii</i>	7			7
<i>Uranotaenia</i>	<i>sapphirina</i>	88		8	96
	<b>Totals</b>	<b>7,805</b>	<b>44</b>	<b>153,955</b>	<b>161,804</b>

1 BG Sentinel Traps and Gravid *Aedes* Traps combined

2 *Aedes albopictus* is a potential vector of Chikungunya, and Zika virus

3 *Aedes vexans* are the primary nuisance/floodwater species found within the NSMAD

4 *Culex pipiens/restuans* are the primary WNV vector species found within the NSMAD

## **Mosquito Control**

Mosquito larvae develop in water, and are found in a variety of water-holding habitats including numerous types manmade structures. **Larval Control** is aimed at killing mosquitoes while in their larval stages when they are the most concentrated and accessible. **Source reduction** is the physical elimination and/or reduction of the aquatic breeding sites. Our employees are trained to identify potential breeding sources and remove and properly discard them when possible. This pertains particularly to containers that tend to hold water that the *Culex* mosquito favors for egg laying. When the physical elimination of a breeding site is not possible, we utilize larval control products.

***During an average season, approximately 90% of the District's field program is focused on controlling mosquito larvae.*** We treat approximately **3,600** off-road sites and more than **40,000** stormwater catch basins every year. Swampy lowland areas, new construction sites, ditches along roadways, railroad right-of-ways, flooded yards, storm sewers, and other small, temporary impoundments of water, are potential sources that can produce a brood of mosquitoes in 6-10 days. Fishponds and ornamental pools are also potential mosquito sources. These and other similar habitats are mapped and inspected periodically for the presence of mosquito larvae and are treated when natural predators are not present. Inspection and treatment of these types of areas continues throughout the summer on a weekly basis.

NSMAD utilizes three categories of larval control products: growth regulators, bacterial insecticides, and surface oils. Growth regulators contain methoprene, an insect hormone that is similar to that found naturally in mosquito larvae. Extended release formulations (either pellets or briquettes) containing methoprene are used to treat small enclosures of water such as poorly maintained ornamental ponds, abandoned swimming pools and catch basins that frequently produce *Culex* mosquitoes. When placed in these sites, the briquettes or granules slowly release the active ingredient into the water and prevent mosquito larvae from developing past the pupal stage. These are categorized as bio-rational products that have limited effects on non-target organisms.

The bacterially derived larval control products used by NSMAD contain active ingredients produced by naturally occurring, soil inhabiting, bacteria species: *Bacillus sphaericus* (*B.s.*), *Bacillus thuringiensis var. israelensis* (*Bti*) and *Saccharopolyspora spinosa* (*Spinosa*). These larvicides pose very little risk to humans and other animals. In order to treat small marshes, wastewater, drainage systems, tire dumps, and natural or manmade aquatic sites and catch basins, we apply these bacterial larvicides in either briquette, granular or liquid formulations. *Bti* and *B.s.* granules are used in a variety of habitats ranging from temporary floodwater sites to permanent water sites. *Bacillus sphaericus* performs very well in stagnant and polluted water-areas where the encephalitis transmitting *Culex sp.* breed. *Spinosa* is derived from a naturally occurring bacterium and is a reduced risk, larval control product formulated as both short-duration and extended release products for use in a variety of larval habitats.

Surface oils are used when late-stage larvae or pupae are present. These products prevent pupae and larvae from attaching to the surface to breathe, resulting in their death. Surface oils are quick acting, short duration products.

The NSMAD **adult mosquito control** program is comprised of barrier applications or truck mounted, ultra-low-volume (ULV) insecticide applications. Barrier control consists of applying a mosquito insecticide to vegetation (shrubs and bushes, tall grasses, hedges) and surfaces where mosquitoes rest. Care is taken to avoid applying barrier treatments to flowers to provide protection to pollinators. It is utilized to protect a limited size area for a relatively short period of time. Under ideal weather conditions, these applications can provide up to four weeks of adult mosquito control. The NSMAD uses barrier control to reduce mosquito biting for events in public areas, such as picnics, movies in the park, and other special municipal events. We use Flit™ for barrier control treatments.

NSMAD's truck mounted ULV sprayers are an essential tool when controlling adult mosquitoes is required. It is used only when action thresholds are met and is applied only in the evening when host-seeking mosquitoes are active. The ULV adult mosquito control operations are used to immediately reduce the adult mosquito population to reduce the number of WNV-infected mosquitoes in an area, to interrupt WNV transmission and to limit the production of new mosquitoes in the area. The ULV technology uses specially designed spray devices to deliver less than 1.28 ounces of insecticide per acre in a fine aerosol mist that impacts and kills flying mosquitoes. The NSMAD currently uses Duet™, at a rate of 0.64 ounces per acre, for ULV applications. This insecticide contains the active ingredients Sumithrin and Prallethrin, and a Piperonyl Butoxide synergist, providing a quick knockdown of adult mosquitoes with no residual effect.

**The NSMAD only conducts ULV adult mosquito control operations at night when mosquitoes are most active and other insects are not. This minimizes exposure to non-target insects such as bees, butterflies and other pollinators.**

As part of the adult mosquito control program, the NSMAD maintains a Prior Notification List for residents who wish to be informed before adult mosquito control operations occur in their neighborhood. Residents can sign up for notification via our website to receive either an email or text message alerting them to scheduled adult mosquito control operations, as well as other important mosquito related news. When operations in the immediate neighborhood of these residents are scheduled, an email or SMS message will be sent to the resident typically with a 24-hour advance notice. Persons unable to receive email or SMS notification should contact our office to arrange to be notified via telephone. Residents who wish to have their property skipped during adult mosquito control operations provide the NSMAD with a physician's note supporting a medical reason for such action.

The NSMAD also maintains a list of beehives in the area and avoids applying adult mosquito control products in areas where active beehives are present. This, in addition to spraying at night when bees are inactive, provides an added measure of pollinator protection.

## **2016 Control Activities Summary**

### **Larval mosquito control**

During the 2016 season, the NSMAD treated the following with larval control products:

- 210 floodwater sites
- 1,224 permanent water sites
- 40,000 catch basins

### **Adult mosquito control**

During the 2016 season, the NSMAD treated the following with adult mosquito control products:

- Three barrier treatments
- 16 ULV applications nights
- 87,325 acres
- 2,412 road miles

## NSMAD Integrated Pest Management Protocol Summary

The table below is excerpted from the NSMAD Pesticide Discharge Management Plan (PDMP) and summarizes the management options, associated surveillance and action thresholds, and the application methods used in the NSMAD integrated pest management program.

Pest Management Options	Surveillance / Threshold	Application Method
Pesticide Application (Larval)	<ul style="list-style-type: none"> <li>• Weather or environmental conditions</li> <li>• Rainfall producing standing water in forested areas</li> <li>• Larval surveillance conducted by dip samples of standing water and containers holding water containing 1-5 larvae per dip on average</li> <li>• Seasonal temperature and precipitation changes warrant the beginning of larval control in catch basins and off road sites</li> <li>• Inspecting catch basins and other sources of stagnant water for breeding and larval activity</li> <li>• Institutional knowledge and experience</li> <li>• Inspecting known mosquito breeding habitats</li> </ul>	Hand application of either granular or briquette product using the application rates stipulated on the product labels.
Source Reduction - Urban	<ul style="list-style-type: none"> <li>• Property checks for mosquito breeding and larvae in pools, ponds, fountains and any other container with the ability to hold water</li> <li>• Larval dip counts looking for presence of mosquito larvae in containers</li> </ul>	Removing and or emptying containers that hold water.
Source Reduction - Forested	<ul style="list-style-type: none"> <li>• Weather conditions</li> <li>• Environmental conditions</li> <li>• Rainfall producing standing water in forested areas</li> <li>• Institutional knowledge and experience</li> <li>• Inspecting known mosquito breeding habitats</li> </ul>	Flood prevention, removing and or emptying containers that hold water, ditch clearing, debris removal, increasing flow of water.
Pesticide Application ULV (Adult Control)	<ul style="list-style-type: none"> <li>• WNV positive mosquito pool found via RAMP test resulting in an infection rate <math>\geq 5/1000</math></li> <li>• WNV, SLE, EEE, or other vector/mosquito borne virus positive human, bird or other animal reported within the district or its border</li> <li>• High count or significant increase of public health risk mosquitoes (<i>Cx. pipiens</i>) in trap collection (daily average greater than 45 mosquitoes per trap for <math>\geq 2</math> weeks)</li> <li>• Resident complaints of mosquitoes</li> <li>• High count or significant increase of nuisance mosquitoes in trap collection (daily average greater than 25 mosquitoes per trap)</li> <li>• Combination of precipitation and temperature per institutional knowledge and experience</li> </ul>	Ultra Low Volume (ULV) application of insecticide via hand or truck mounted spray equipment applied as stipulated on the product labels.
Pesticide Application Barrier (Adult Control)	<ul style="list-style-type: none"> <li>• Resident complaints of mosquitoes</li> <li>• Public gatherings and events</li> <li>• Any combination of light trap counts, gravid counts, WNV or other positive pools of mosquitoes, dip samples or environmental and weather conditions</li> <li>• Areas inaccessible to truck ULV</li> </ul>	Insecticide applied to vegetation using a handheld or backpack sprayer as stipulated on the product labels.

## **Education and Communications**

The NSMAD website ([www.nsmad.com](http://www.nsmad.com)) provides residents a user-friendly interface with easy access to a wealth of information and links. Residents are encouraged to visit our website to find out where and when adult mosquito control operations will be taking place (we utilize embedded Google Maps to provide a better visual reference), report biting activity, standing water and any other concerns regarding mosquitoes. Residents can sign up for email and/or SMS text message blasts to provide the most current information regarding our adult mosquito control operations, the risk of infection and other important mosquito news. Additionally, minutes from the NSMAD Board of Trustee's meetings can be found on our website.

The NSMAD Twitter feed (@NorthShoreMAD) is used to provide information on adult mosquito control operations and other important news items and information.

In addition to our website and Twitter feed, the NSMAD has a 24-hour hotline that residents can call to determine the status of our adult mosquito control program, inform us of matters that we can address (i.e. increased adult mosquito activity in a specific area) and report standing water sites.

## **Media and Community Relations**

Zika virus was the dominant mosquito related news story during most of 2016. While the disease has not been transmitted locally in Illinois, there were travel related cases. We worked with several news media outlets to help the public understand their risk for contracting Zika was extremely low while emphasizing the risk posed by West Nile virus was much greater in our area.

The Executive Director and the Communications Manager visited with public health officials from within our District and the state to keep them apprised of our activities. During the season, a weekly status report is delivered via email with updates about our surveillance and operations. This report is delivered to numerous stakeholders and news media members and is also posted on the front page of our website. Media interviews are conducted to cover timely topics such as repellent usage, WNV, trap counts, testing data, and when adult mosquito control operations are to be conducted in the District. The NSMAD was consulted on numerous news stories this past year. We provided information for news items about mosquitoes, mosquito-borne illness and personal protection measures to the Chicago Tribune, Chicago Sun-Times, Pioneer Press, 22<sup>nd</sup> Century Media, The Daily Northwestern and other community newspapers throughout the season. WMAQ-TV, WLS-TV, WBBM-TV, WGN-TV, WBEZ-FM and WBBM-News Radio spoke with us numerous times during 2016 regarding mosquito news items.

We presented informational overviews about the NSMAD and mosquitoes to The Glencoe and Glenview League of Women Voters, the Niles Township Board and the New Trier Board of Trustees. Dr. Nasci was invited to participate in Senator Durbin's press conference regarding Zika funding, Congresswoman Jan Schakowsky visited with us at our office in Northfield to learn more about our operations. The Executive Director and Communications Manager attended the American Mosquito Control Association's Washington Conference to meet with several of our elected officials to engage in dialogue regarding issues pertinent to mosquito control and disease prevention.

The NSMAD public information booth makes numerous visits to public events throughout the year. The Communications Manager, along with other staff members, attends these events to educate residents regarding personal protection methods and answer questions about mosquitoes and our control program. This season, the public information booth visited Northbrook's Earth Day celebration, Glenview Park District's Get Out and Go, and the Glencoe Public Works Open House. We also participated in the Fourth of July parades in Evanston and Skokie. The NSMAD information booth is available to appear at community events upon request.

## 2016 Combined Budget and Appropriations

Purchase Of Equipment & Supplies	\$ 126,300.00
Mosquito Control Products	\$ 250,000.00
Building Maintenance & Repairs	\$ 20,000.00
Capital Improvements Fund	\$ 188,000.00
Utilities	\$ 23,400.00
Legal & Audit	\$ 61,000.00
Salaries & Wages (8 Full-Time & 17 Seasonal)	\$ 715,151.00
Social Security	\$ 45,650.00
IMRF	\$ 40,800.00
Liability Insurance & Surety Bonds	\$ 55,700.00
Health Insurance	\$ 96,000.00
Contingency	<u>\$ 15,199.00</u>
	\$ 1,637,200.00

## **2016 PESTICIDE USAGE**

### **Larval Control Products**

Altosid <sup>®</sup> Pellets	20.0 lbs.
Altosid <sup>®</sup> XRT Briquets	35.4 lbs.
Altosid <sup>®</sup> XRG	40.0 lbs.
BVA Oil	67.0 gallons
FourStar <sup>®</sup> 180	8.5 lbs.
FourStar <sup>®</sup> CRG	280 lbs.
Natular <sup>™</sup> XRT	3,044.1 lbs.
Natular <sup>™</sup> T30	84.6 lbs.
Natular <sup>™</sup> G30	0.31 lbs.
VectoLex <sup>®</sup> FG	1,925.28 lbs.

### **Adult Mosquito Control Products**

Duet <sup>™</sup> ULV	440.9 gallons
Flit <sup>™</sup> 13.3	0.5 gallons

## **2016 VEHICLES AND EQUIPMENT**

### **VEHICLES**

- 1 2001 GMC Sierra Pick-Up Truck
- 2 2004 GMC Canyon Pick-Up Trucks
- 1 2006 GMC Canyon 4x4 Pick-Up Truck
- 1 2007 GMC Canyon 4x4 Pick-Up Truck
- 1 2008 GMC Canyon 4x4 Pick-Up Truck
- 1 2010 Ford F250 4x4 Pick-Up Truck w/ Snow Plow
- 1 2011 Ford Escape SUV
- 1 2012 Ford F150 Pick-Up Truck
- 1 2012 Toyota Tacoma Pick-Up Truck
- 1 2014 Ford F150 Pick-Up Truck
- 1 2015 GMC Sierra K1500 4x4 Pick-Up Truck
- 1 2015 GMC Canyon Crew Cab Pick-Up Truck
- 2 2016 GMC Canyon Pick-Up Truck
- 1 2016 GMC Sierra K1500 4x4 Pick-Up Truck

### **EQUIPMENT**

#### Application Equipment

- 6 Cougar Ultra Low Volume Sprayers (Gas Engine)
- 2 ProMist Dura Ultra Low Volume Sprayers (Electric)
- 4 Stihl Backpack Sprayers
- 5 Maruyama Backpack Sprayers
- 1 LECO Handheld Ultra Low Volume Sprayer
- 1 Vortex Granular Spreader

#### Trap Equipment

- 10 BG Sentinel Traps
- 10 CO<sub>2</sub> Traps
- 30 Gravid Traps
- 18 New Jersey Light Traps
- 8 Encephalitis Virus Traps (EVS)
- 11 Gravid Aedes Traps (GAT)