



Richland Public Health Vector Program

Annual Vector Report

2018

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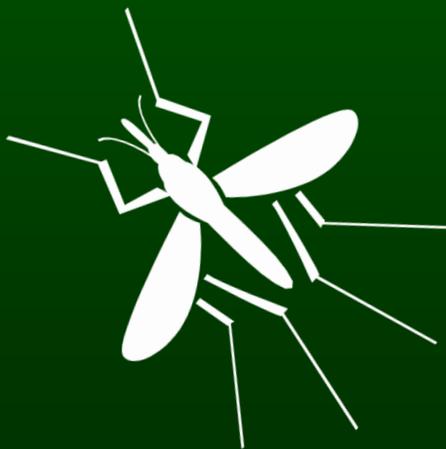
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Foreword

To the Residents of Richland County,

We are pleased to provide you the 2019 Richland Public Health Vector Annual Report. This report describes our integrated pest management strategy for protecting the residents of Richland County from mosquito borne diseases. In 2018, our office received six (6) cases of various vector-related confirmed diagnosis(es) among residents. This included two (2) Dengue cases (travel acquired), one (1) Lacrosse Encephalitis, one (1) Lyme disease, and one (1) Rocky Mountain Spotted Fever. There were also 39 submittals of mosquitoes to the Ohio Department of Health lab that tested positive for West Nile Virus (WNV).

Therefore, mosquito surveillance, education and prevention remains a priority for our community and this report serves as our update. Thank you for reviewing the enclosed information and please offer any feedback so that we can make improvement(s) going forward.



Martin Tremmel, R.S., MPA, JD
Health Commissioner



Joe Harrod, R.S., R.E.H.S.
Director of Environmental Health



Prevent. Promote. Protect.

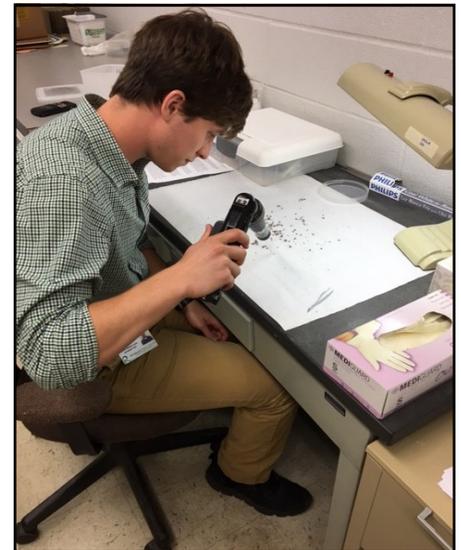


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Richland Public Health (RPH) is the local public health agency for Richland County, Ohio. The department is charged with opportunities to optimize the public’s health. Richland Public Health offers a range of programs providing clinical, environmental, health promotion, and population-based services. In particular, the vector control program includes part-time summer interns, a Sanitarian, a Sanitarian Supervisor and the Director of Environmental Health.



Richland Public Health Vector Program Community Partnerships

**Bellville Village
Blooming Grove Township
Butler Village
Camp Mowana
Happy Hollow Camp
Hidden Hollow Camp
Jackson Township
Light & Life Christian Camp
Mansfield Christian
Mansfield City
Mifflin Township
Monroe Township**

**Oakwood Crossing
Ontario City
Plymouth Village
Phillip's Cabin
River Trail Crossing
Sandusky Township
Shelby Country Club
Shiloh Village
Springfield Township
Washington Township
Weller Township**



These listed cities, municipalities, townships and other areas were treated or affected by Mosquito control activities conducted by Richland Public Health in 2018.

2018

Richland Public Health Vector Program

At a Glance

Number of Traps Set

370

Miles Sprayed

219.55

WNV Positive Pools
39

Mosquitoes Caught

13,730

Acres Treated
6616.41

Mosquito Spray Vehicles

2

Trap Locations

64

3 Trap Types Used





Public Information & Education

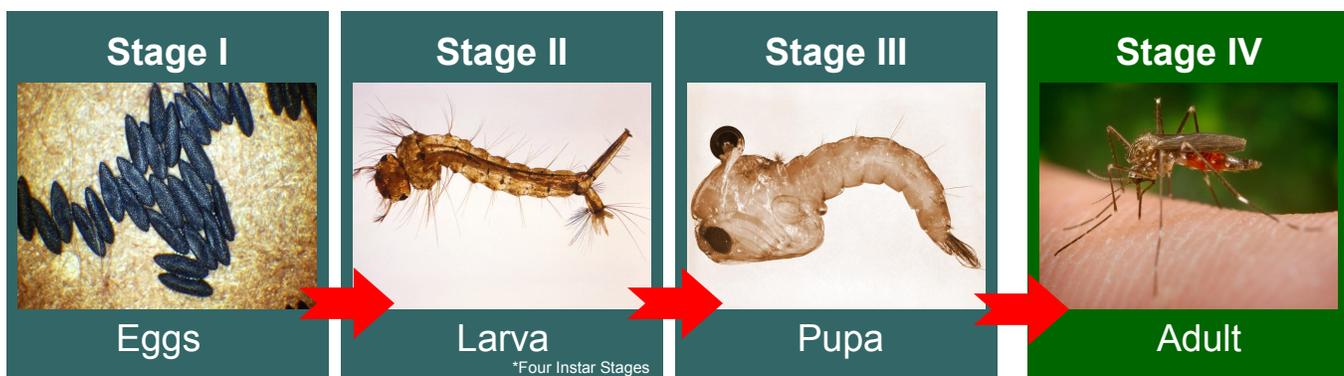
Mosquitoes are the most common and widespread insects and carriers of disease. They can make outdoor events unbearable and disrupt normal living and business activities. Importantly, some species of mosquitoes are able to spread a number of diseases to humans.



Mosquito Life Cycle

Mosquitoes have four (4) separate stages in their lifecycle. They begin as eggs laid on the surface of water both singly and in clusters called “rafts.” The eggs hatch underwater and become larvae. Larvae go through four (4) stages of their own growth phases called “instars” before molting into pupae. In the pupal stage the adult mosquito begins to form. Within a few days, the cycle will be complete with the adult emerging on the surface of the water. A mosquito can be fully developed in as little as five (5) days. With the exception of the adult, all stages need water to occur. (Life Cycle, 2013).

The Mosquito Life Cycle



These stages all occur in water.

Mating and Feeding Habits

After mating, the adult female needs the blood from an animal host for her eggs to develop. Different mosquito species feed at different times of the day, ranging from early morning to late evening hours. Male mosquitoes feed on plant nectar and do not take blood meals. Female mosquitoes typically live for one month and can produce up to 1,000 eggs in their lifetime. The adult female of some species lay eggs in masses on the surface of stagnant water. Mosquitoes can also lay their eggs on moist soil or in other locations that flood with water. Heavy rains and flooding quickly activate the eggs and produce large mosquito populations.



Ohio Disease Monitoring



Properly remove discarded tires.



Eliminate standing water.



Clean and chlorinate pools.

The photos provided above are non-identifiable mosquito-breeding locations within Richland County that the health department has worked to remediate with the assistance of location jurisdictions.

Stop mosquito breeding by following the tips provided:

-  Make sure that doors and windows have tight-fitting screens.
-  Repair or replace all torn screens in your home.
-  Remove all discarded tires from your property.
-  Dispose of tin cans, plastic containers, ceramic pots, or similar water-holding containers.
-  Make sure roof gutters drain properly. Clean clogged gutters in the Spring and Fall.
-  Clean and chlorinate swimming pools, outdoor saunas and hot tubs. If not in use, keep pools/saunas empty and covered.
-  Change the water in bird baths at least once a week.
-  Turn over plastic wading pools and wheelbarrows, etc. when not in use.
-  Clean ditches of obstructions so they drain properly.
-  Eliminate any standing water that collects on your property.
-  Check trees for cavities that hold water and fill them with soil, gravel, or sand.
-  Remind or help neighbors to eliminate breeding sites on their properties.
-  Drain pool covers.



Ohio Disease Monitoring

Mosquito Disease Monitoring

Mosquito identification and West Nile Virus (WNV) testing have been conducted by the Ohio Department (ODH) since the disease was introduced into the United States more than a decade ago, but was discontinued in 2013 due to budget issues. After much discussion with local health departments, the program was re-introduced in July of 2014. In 2018, ODH tested mosquitoes from 82 entities in Ohio. Submitting mosquito samples to ODH is not a requirement of local health departments, but is conducted on a voluntary basis.



In 2018, the presence of WNV carrying mosquitoes was found in 54 of 82 submitting jurisdictions in Ohio. Mosquitoes are tested in pools, which is a grouping from 1-50 mosquitoes of the same species collected from the same trap. Of the pools tested in Ohio - 3,281 were WNV positive. **For Richland County, 39 of those pools were WNV positive.** Richland Public Health places traps in areas that have a history of WNV so potential disease can be identified early and controlled within mosquito populations.

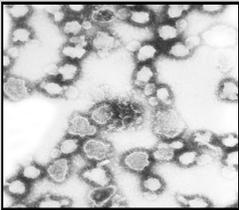
Did you Know...

“The average mosquito weighs about 2.5 milligrams.”

- The American Mosquito Control Association (AMCA)

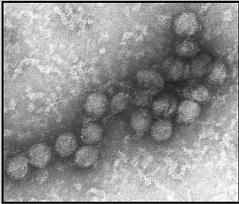


Table 1: Ohio Mosquito-borne Disease 2018 Data (as of November 26, 2018)

Locally-acquired mosquito-borne Cases	Notes
<p>La Crosse Virus (39 Human Cases)</p>  <p>An image of La Crosse encephalitis virus.</p>	<p>20 females, 19 males ranging in age 3-17 years (median 7 years) in Ashland (1), Coshocton (1), Crawford (1), Fairfield (1), Franklin (2), Hocking (3), Holmes (2), Knox (2), Licking (6), Lorain (1), Medina (1), Meigs (1), Miami (1), Morgan (1), Morrow (3), Muskingum (2), Perry (1), Richland (1), Ross (1), Stark (4), Union (1), Vinton (1), and Wayne (1) counties; Onset of symptoms 6/20/2018 - 10/16/2018.</p>
<p>Unspecified California Virus (3 Human Cases)</p>	<p>1 female, 2 males ranging in age 11-16 years (median 11 years) in Franklin (1), Medina (1) and Morrow (1) counties; Onset of symptoms 7/6/2018 - 8/6/2018.</p>



Ohio Disease Monitoring Continued...

West Nile Virus (WNV)	Notes
Mosquitoes Tested (501,366)	Collected by 82 agencies in 69 Ohio counties; pooled into 16,902 samples.
WNV Positive Mosquito Samples (3,281)	Adams (6), Ashland (4), Ashtabula (5), Athens (22), Belmont (1), Brown (5), Butler (8), Clark (9), Clermont (12), Columbiana (2), Coshocton (1), Cuyahoga (34), Delaware (7), Fairfield (4), Franklin (1,324), Geauga (1), Greene (5), Guernsey (2), Hamilton (9), Hancock (11), Henry (12), Hocking (13), Huron (8), Jefferson (2), Lake (98), Licking (75), Lorain (26), Lucas (293), Mahoning (10), Medina (1), Meigs (1), Miami (6), Montgomery (71), Morgan (2), Morrow (7), Noble (1), Ottawa (20), Pickaway (42), Portage (88), Richland (39) , Ross (10), Scioto (28), Seneca (16), Stark (103), Summit (646), Trumbull (3), Tuscarawas (29), Union (5), Vinton (4), Warren (94), Washington (13), Williams (5), Wood (34) and Wyandot (4) counties.
WNV Veterinary Cases (50)	50 equine cases in: Ashtabula (3), Carroll (1), Champaign (1), Coshocton (2), Cuyahoga (1), Geauga (3), Holmes (20), Knox (1), Licking (1), Lorain (2), Medina (2), Monroe (1), Pickaway (1), Seneca (1), Stark (1), Trumbull (2), Tuscarawas (1), Wayne (5) and Wyandot (1) counties, onset of systems 8/6/2018 - 10/25/2018.
WNV Asymptomatic Viremic Blood Donors (16)	7 females, 9 males ranging in age from 30-72 years (median: 55.5 years) in Ashland (2), Carroll (1), Columbiana (1), Coshocton (1), Cuyahoga (2), Darke (1), Delaware (1), Fairfield (1), Franklin (2), Hancock (1), Henry (1), Lucas (1), and Summit (1) counties.
West Nile Virus (64 Human Cases)	25 females, 39 males ranging in age from 5-89 years (median: 60.5 years) in Auglaize (2), Belmont (1), Clark (2), Clermont (1), Columbiana (1), Cuyahoga (9), Defiance (1), Erie (1), Franklin (2), Fulton (1), Guernsey (1), Hamilton (5), Hardin (1), Holmes (2), Lake (3), Lorain (1), Lucas (2), Mahoning (1), Medina (1), Montgomery (3), Paulding (1), Preble (1), Ross (2), Stark (6), Summit (3), Trumbull (4), Warren (2), Wayne (2), Williams (1) and Wyandot (1) counties; Onset of symptoms 6/23/2018 - 10/19/2018.
 <p data-bbox="488 1644 727 1692">West Nile Virus virions under high magnification.</p>	
Ohio Counties with WNV Activity Reported (68)	Includes counties with WNV positive mosquitoes, equine WNV cases, human WNV cases and human WNV asymptomatic viremic blood donors.



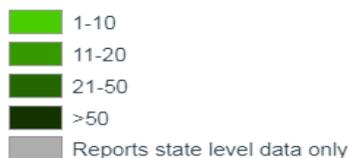
Human Disease Monitoring

West Nile Virus

In 2018, Ohio reported a total of Sixty-four (64) human disease cases of West Nile Virus (WNV). Of the 64 Ohio human cases, twenty-five (25) were females and thirty-nine (39) were males. The median age for cases was 60.5 years old with an age range of 5-89. Richland County did not have any human cases of WNV reported in 2018. (ODH 2018 - Ohio Stats, Gary R).

Human disease cases

Reported to CDC ArboNET by county of residence



CDC ArboNet West Nile Virus 2018 Provisional Data (As of 12/11/2018)

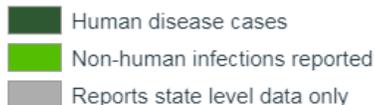


La Crosse Encephalitis Virus

In 2018, Ohio reported a total of thirty-nine (39) human disease cases of La Crosse Virus (LACV), one (1) of which occurred in Richland County. Of the thirty-nine (39) human Ohio cases, twenty (20) were females and nineteen (19) were males. The median age for cases was 7 years old with an age range of 3 – 17 years (ODH 2018 - Ohio Data, Gary, R).

Disease cases

Reported to CDC ArboNET by county of residence



CDC ArboNet La Crosse Virus (Human) 2018 Provisional Data (As of 12/11/2018)



Did you Know...

“Mosquitoes fly an estimated 1 to 1.5 miles per hour.”

- The American Mosquito Control Association (AMCA)

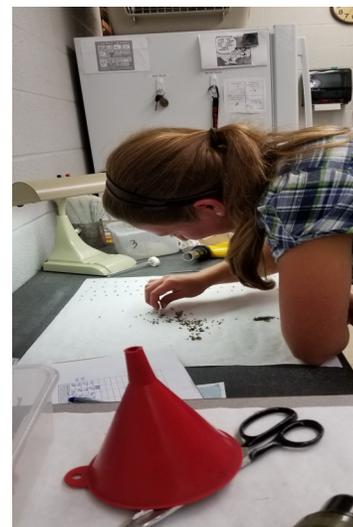
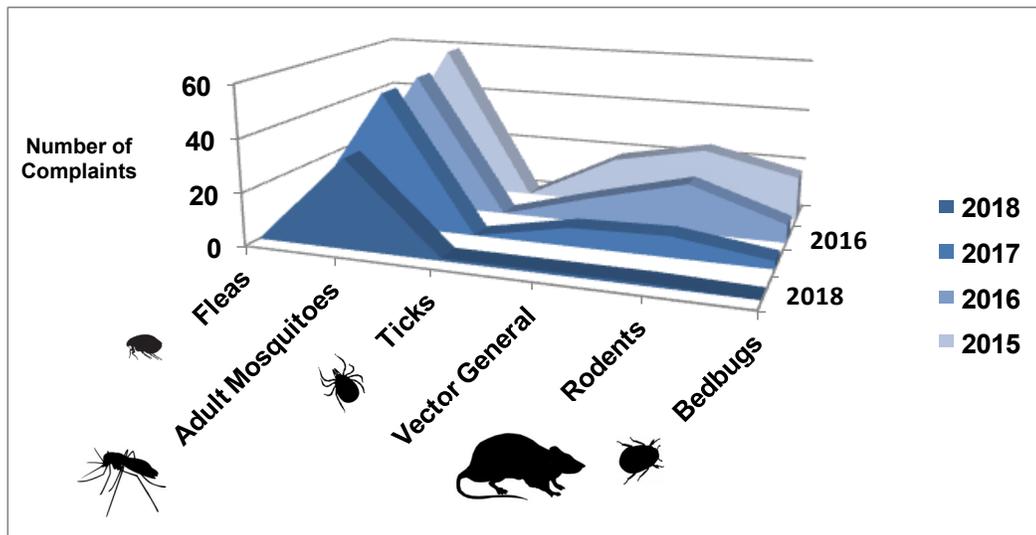




Investigating Complaints and Enforcement

The Richland Public Health Vector Control Program includes investigations and providing educational information. A total of 34 complaints/requests for adult mosquito control services were investigated and/or addressed by RPH in 2018; compared to 70 in 2017.

2018 Vector Control Program Complaints



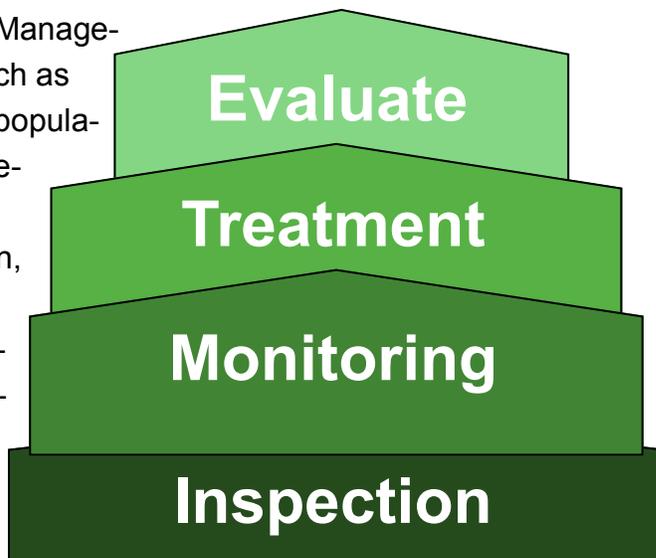
Above: RPH employee, Madison, counts and identifies mosquitoes in the lab.

Richland Public Health’s program receives many different types of complaints throughout the year. (Note: Not all of these types are vectors causing disease but they are classified within the vector control program.) In addition, RPH may provide educational materials depending on the complaint type to encourage prevention and compliance. Regarding the 34 adult mosquito complaints reported in 2018, 31 of those complaints were abated.



Integrated Pest Management

Richland Public Health uses an Integrated Pest Management (IPM) approach to affectively reduce pests such as mosquitoes. The IPM strategy manages mosquito populations through the use of all appropriate pest management methods, such as: managed habitat mapping, active adult and larval surveillance, source reduction, public education programs and targeted adulticide applications, when necessary. This approach is environmentally sensitive, effective, reduces public exposure to pesticides and is recommended by the U.S. Environmental Protection Agency and the Center for Disease Control, CDC.





Mosquito Larviciding and Adulticiding Control

Overview

The purpose of the Vector Control Program is to reduce the public's exposure to diseases carried by insects such as mosquitoes. RPH employees are particularly trained to identify mosquitoes throughout their lifecycle and responsibly apply pesticides when it is not possible to remove the mosquito source.

RPH takes great care in using pesticides responsibly. This means treatments are selected and used to control targeted pests without having a substantial impact on other beneficial animals and the environment. Examples include: Duet™ that is used as an adulticide which is dual action (Anvil and Prallethrin); these two (2) products combined cause a benign agitation which in turn improves mosquito kill rates. For larviciding, Natular™ is used which received the 2010 U.S. EPA Presidential Green Chemistry Challenge Award. Furthermore, all local properties with known state registered apiaries, or beehives are attempted to be avoided when spraying occurs to reduce the chance pesticides will come into contact with the hives. Residents are informed about RPH pesticide applications through media releases to the local radio stations, newspaper and social media such as Twitter™ and Facebook™. Partnering agencies are encouraged to assist in the process of notification to residents through the use of their websites and communication abilities.



Madison, a 2018 Richland Public Health Employee, sets a Gravid Mosquito Trap.



Larval Mosquito Monitoring and Control

Mosquitoes are easiest to control during their early life stages because they develop in contained bodies of water. When stagnant water sites cannot be otherwise modified or removed, larvicide can be applied to prevent further mosquito development. Various local stagnant water locations are monitored each season from April through October to protect human populations from biting mosquitoes during the active season.



The photo above is *Culex* sp. mosquito larvae. Mosquito larvae of most species have a prominent breathing siphon. The larvae rest suspended diagonally from the water surface with the end of the siphon tube penetrating its surface, enabling the larvae to access their air supply. Mosquitoes in this stage can be controlled with properly applied larvicide.



Adulticide Use

Adult mosquito control is conducted by contract throughout Richland County to reduce the number of mosquitoes that can spread disease to humans. During the 2018 season, 219.55 miles were treated. Truck-mounted equipment sprays tiny droplets of treatment into the air which interrupts the mosquito's nervous system. In 2018, a total of 6616.41 acres of adulticide was applied in the county. RPH application rates from the adulticide range from 0.43 - 1.28 fluid ounces per acre. Richland Public Health operates two (2) trucks with mounted spray systems active throughout the vector season.



Above: A Richland Public Health truck with mounted ULV spray equipment prepared to apply adulticide at an application rate of 0.43 to 1.25 fluid ounces per acre.



Adult Mosquito Monitoring and Control

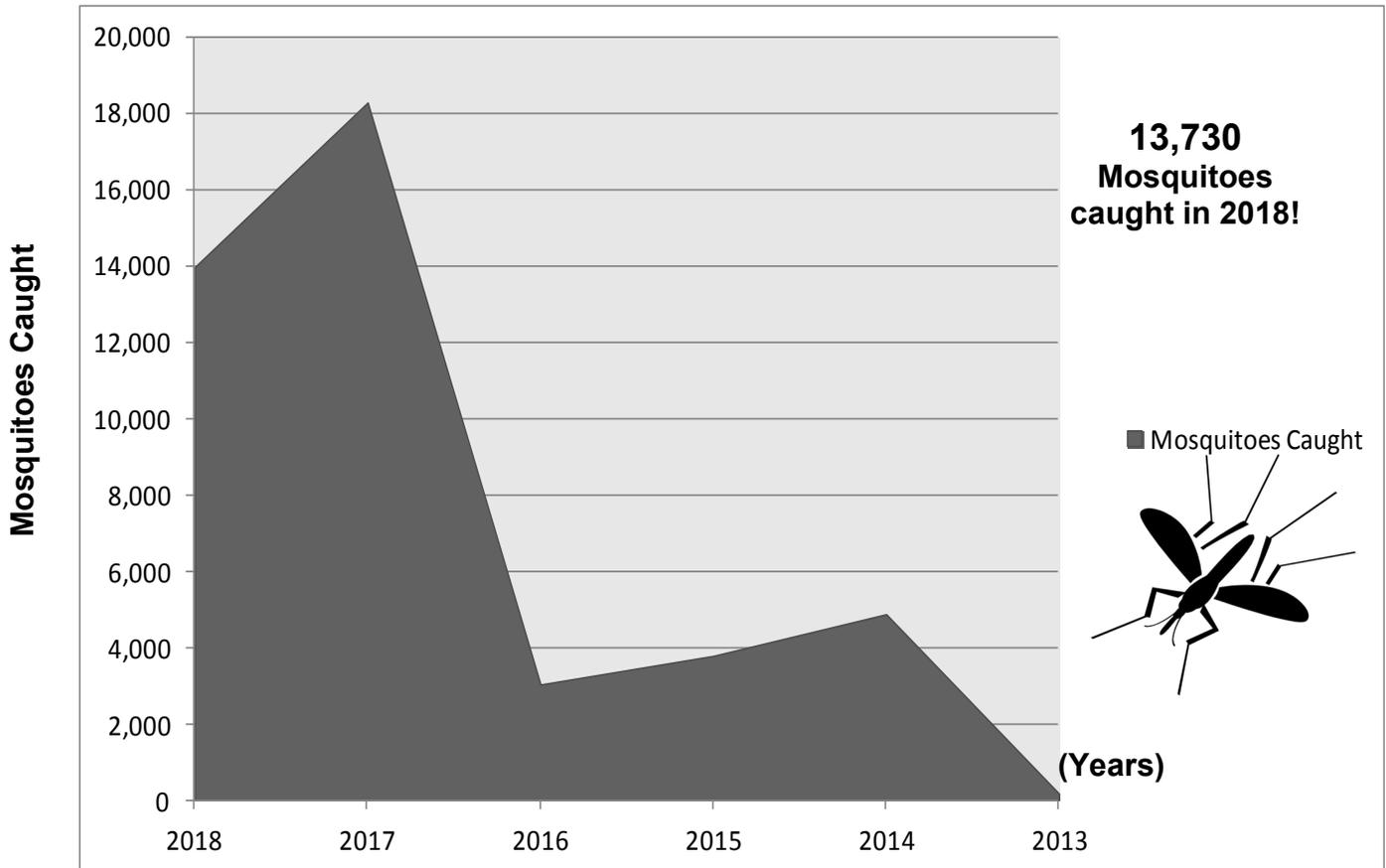
Richland Public Health adult mosquito surveillance (monitoring) and control begins by identifying where disease-carrying mosquitoes are located. Richland Public Health initiates this process by setting mosquito traps every season in late April/early May. Trapping locations are based upon trapping data from previous years. When a trap is set, it remains at a location overnight until it is collected the following morning. After the trap is collected, the type of mosquitoes, the quantity of mosquitoes and the presence of WNV are documented and analyzed to develop a control plan (if necessary). In 2018, RPH was notified of 48 WNV positive mosquito pools in Richland County along with one (1) case of La Crosse Virus. RPH verified that the areas where WNV positive traps were set had been adulticided (since the trapping date) to discourage the spread of disease. Educational material was also delivered to homeowners where WNV positive trap locations were located. Further, RPH conducted surveillance and provided educational material those affected by the La Crosse Virus.

Trapped mosquitoes are brought back to Richland Public Health where they are identified and prepared for shipment to the Ohio Department of Health lab for testing. Identification of these mosquitoes allows RPH to determine the different types of species of mosquitoes prevalent in Richland County.



Adult Mosquito Monitoring and Control Cont...

Richland Public Health Surveillance Mosquitoes Caught 2013 - 2018



Richland Public Health WNV Positive Mosquito Pools 2013 - 2018						
	2018	2017	2016	2015	2014	2013
Positive Pools*	39	49	1	1	1	0**

*Pools may have up to 50 mosquitoes.

**Ohio Department of Health lab stopped testing for 2013

Did you Know...

“Mosquitoes find hosts by sight (they observe movement); by detecting infra-red radiation emitted by warm bodies; and by chemical signals (carbon dioxide and lactic acid) at distances of 82 to 115 feet.”



- The American Mosquito Control Association (AMCA)



Education and Communications

A key factor in controlling mosquito-borne diseases is accomplished by members of the community eliminating mosquito breeding habitats on their property. Richland Public Health strives to educate and empower the public to protect themselves from mosquito bites, eliminate mosquito habitats found on their property and to report sources of standing water. Providing detailed mosquito control information to the public is accomplished through a number of techniques which include: speaking at public meetings, social media updates, local television announcements, educational vignettes at local theatres prior to movie showings and field consultations.



Above: A birdbath that contains mosquito larvae at an unsuspecting homeowner's property. Homeowner education creates awareness of potential issues and empowers individuals to abate breeding sites independently.



Protecting Yourself From Mosquito Bites

- When possible, wear long-sleeved shirts, pants, hats and shoes to cover your skin so mosquitoes will find it difficult to bite.
- Minimize the time spent outside in the early morning and late evening hours when mosquitoes are most active.
- Use EPA-registered repellents such as DEET™, Picaridin, Oil of Lemon Eucalyptus or IR3535 (repellent) to be less attractive to biting mosquitoes.



Above: Applying a mosquito repellent that contains DEET™ will protect from mosquito bites. Always apply repellent according to the label.



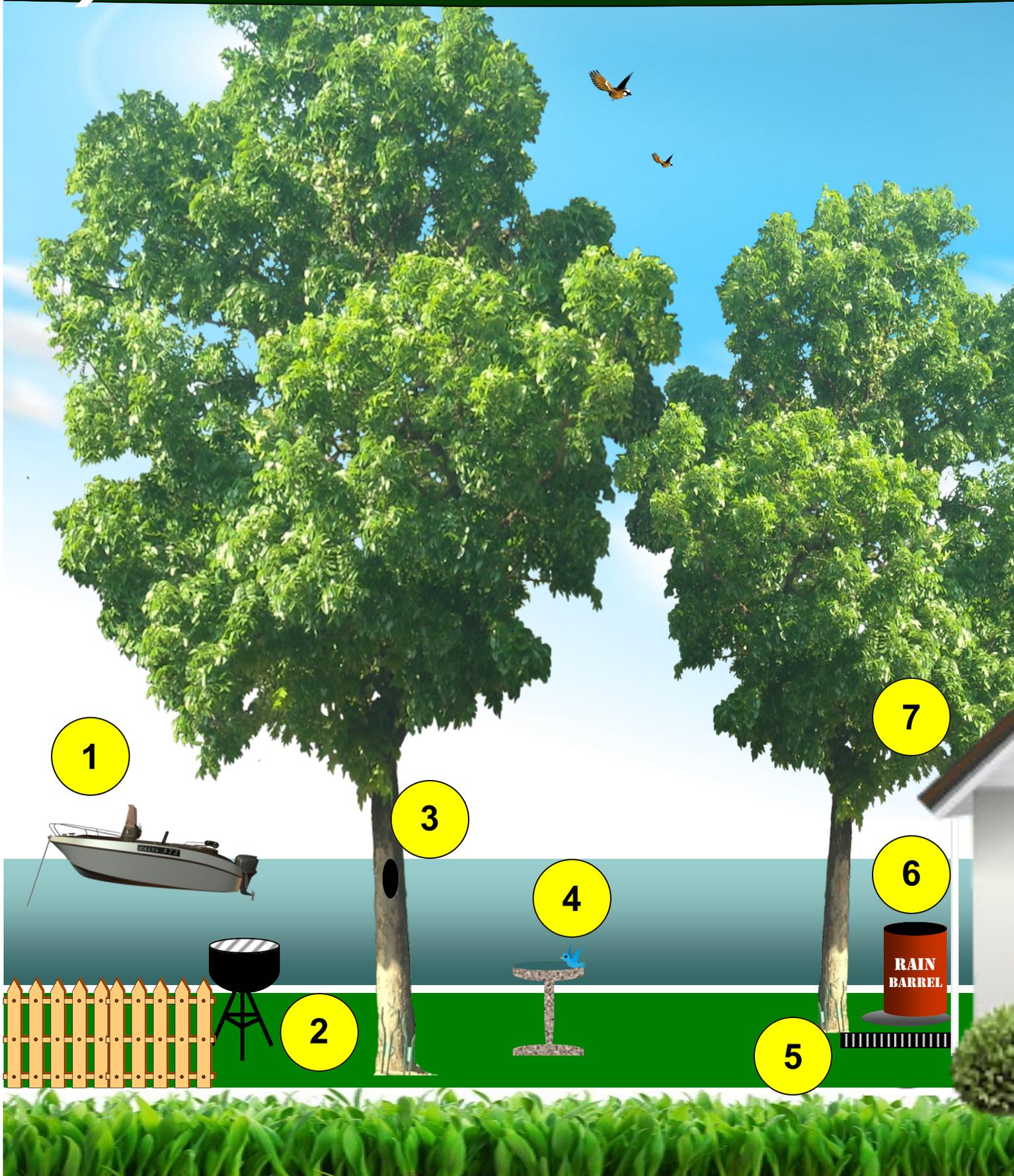
2019 Vector Surveillance and Control Outlook

In 2019, Richland Public Health will continue to use an Integrated Pest Management approach to help monitor and control mosquito populations. Data gathered in 2018 will be used in planning for the 2019 mosquito season to focus on areas with prior high mosquito populations and areas with evidence of disease carrying mosquitoes. Another key component to 2019 surveillance is source reduction. This includes compliance with scrap tire clean ups and reducing stagnant bodies of water that become breeding grounds for mosquitoes.

For 2019, Richland Public Health will continue to provide education to the public for eliminating breeding sites and protecting the public from being bitten. Please look for us on Facebook™, Twitter™ and local billboards.



How Can You Help to Discourage Mos



mosquito Breeding?

Remove standing water from the following locations:

1. Uncovered Boats
2. Uncovered Grills
3. Tree Holes
4. Bird Baths
5. Corrugated Drain Tile
6. Rain Barrel
7. Gutters
8. Flower Pots
9. Garbage Cans
10. Treat Swimming Pools
11. Tarps
12. Pet Food Bowls
13. Children's Toys





Sources

Gary, R (2018, October). West Nile Virus Ohio

Life Cycle. (2013). Retrieved January 12, 2015 from American Mosquito Association:
<http://www.mosquito.org/life-cycle>

Center for Disease Control and Prevention, Public Health Image Library (PHIL)

Maps (USGS Disease Maps)



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Prevent. Promote. Protect.

