

# 2017 ARBOVIRUS SURVEILLANCE SUMMARY



## Executive Summary

In 2017, West Nile virus (WNV) was detected in 6 dead birds and 1 mosquito sample in Marin and Sonoma Counties. There were no human cases of West Nile virus from Marin County or Sonoma County.

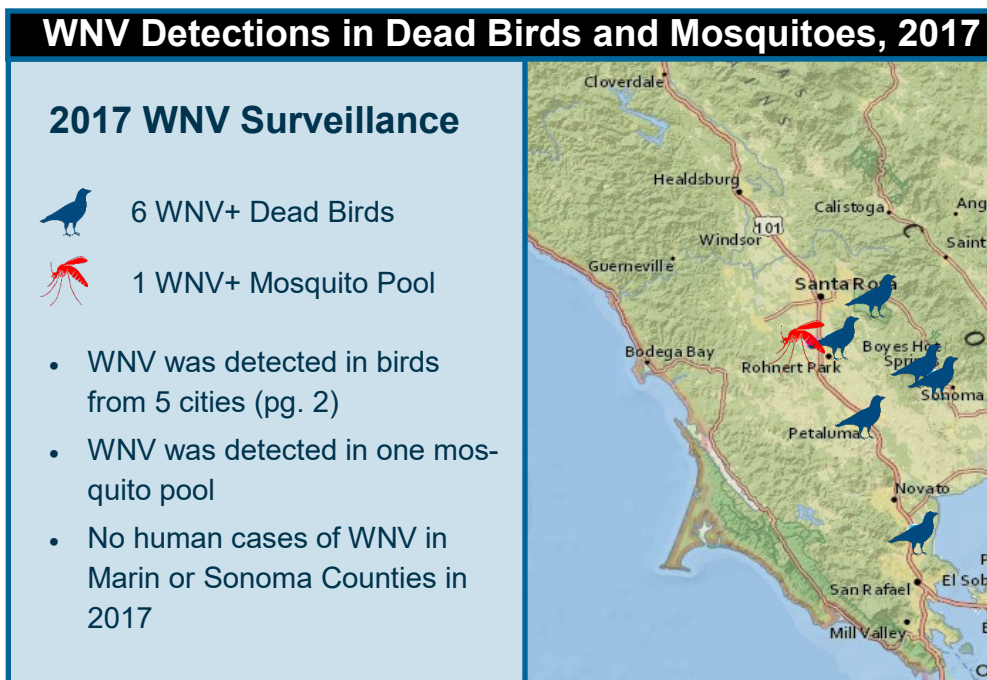
In 2017, the California Department of Public Health (CDPH) reported a total of 2 travel-associated cases of Zika virus in Marin County and 5 in Sonoma County. No mosquitoes trapped in the vicinity of these human cases tested positive for Zika virus.

## Program Objectives

The Marin/Sonoma Mosquito and Vector Control District (the District) maintains an active surveillance program for arboviruses, including West Nile virus (WNV). The District takes a multifaceted approach, utilizing both active (mosquito trapping) and passive (dead bird and human reports) monitoring techniques to detect and quantify the intensity of virus transmission in a region in order to predict areas of elevated disease risk. This assessment is then used by the District to direct critical vector control interventions to effectively protect human health.

Marin/Sonoma WNV Detections, 2004-2017				
Year	Humans	Dead Birds	Mosquito Pools	Sentinel Chickens
2004	0	72	1	0
2005	1	92	0	0
2006	1	29	5	3
2007	1	23	1	0
2008	0	12	2	0
2009	0	Not Tested	0	0
2010	0	Not Tested	0	0
2011	0	Not Tested	2	0
2012	0	28	3	1
2013	2	46	5	3
2014	0	43	12	3
2015	1	14	12	0
2016	0	13	2	Not Tested
<b>2017</b>	<b>0</b>	<b>6</b>	<b>1</b>	<b>Not Tested</b>

In 2017, the District continued enhanced invasive mosquito surveillance efforts. In addition to conducting larval and adult surveillance for invasive mosquito species, the District also investigated local areas that may have been affected by travel-related Zika cases and tested any potential vector species present in these areas for Zika, dengue and chikungunya viruses.

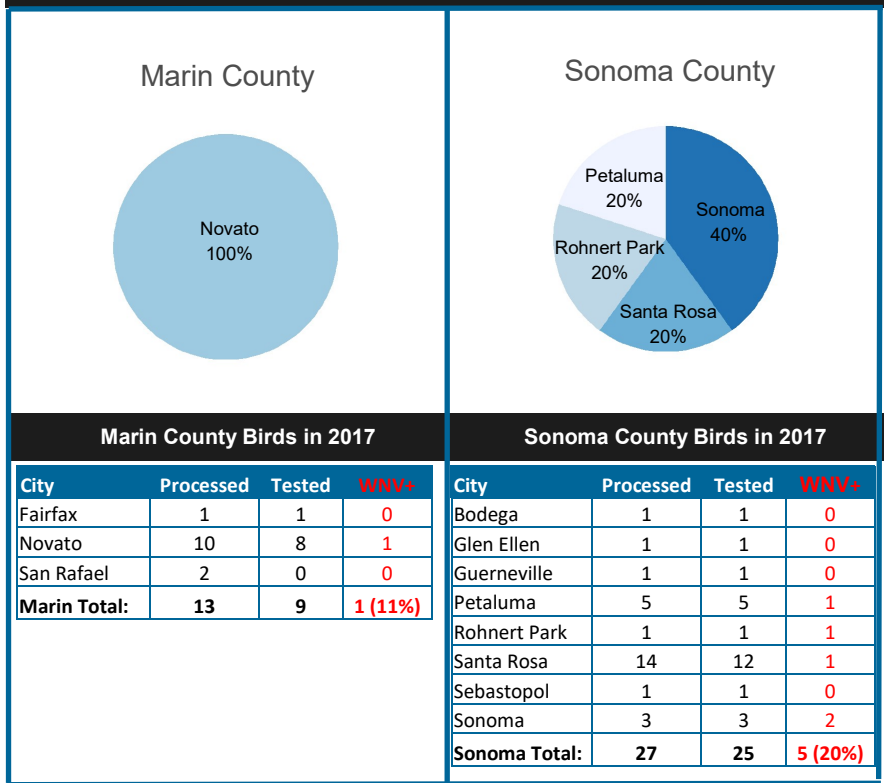


# Dead Bird Surveillance

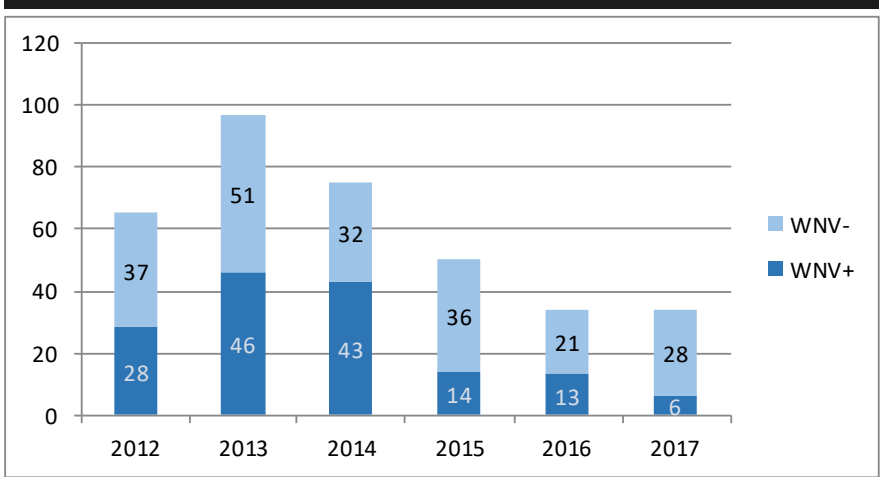
In 2017, 40 birds were collected from Marin and Sonoma Counties. Of these, 34 were suitable for testing, with 6 testing positive for WNV. The number of birds tested was the same as 2016.

County	Processed Birds	Tested Birds	WNV+ Birds	% WNV + Birds
Marin	13	9	1	11%
Sonoma	27	25	5	20%
<b>Total</b>	<b>40</b>	<b>34</b>	<b>6</b>	<b>18%</b>

## Birds Tested in 2017 by City



## WNV test results of birds from Marin and Sonoma Counties (combined), 2012—2017

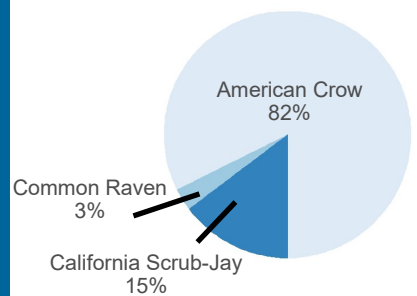


## WNV Testing: Corvids

In 2017, the District monitored for WNV in certain species of dead birds in conjunction with the California Department of Public Health's West Nile virus hotline. Residents reported dead birds by calling 1-877-WNV-BIRD, or online at [westnile.ca.gov](http://westnile.ca.gov).

The District tested birds from the family Corvidae, which includes American crows, common ravens, California scrub-jays, and Steller's jays. Corvids are an important surveillance tool because they are highly susceptible to WNV.

### Bird Species Tested 2017



Oral swab samples from corvids were collected onto RNA preservation cards by biologists at the District, then sent to the Davis Arbovirus and Research Training (DART) laboratory at UC Davis for virus testing.

### Taking an oral swab from a dead crow



## WNV Testing: Vector Species and Mosquito Pools

West Nile virus and other mosquito-borne encephalitis viruses are only known to be carried, or “vectored”, to humans by a few species of mosquitoes in our area.

The two most important vector species in our counties are *Culex pipiens* and *Cx. tarsalis*. *Culex erythrothorax* and *Cx. stigmatosoma* do not often bite people, but are also considered vectors of WNV because they may occur in large numbers and can amplify disease in the wild bird population.



### Pooling mosquitoes

When vector species are detected in mosquito traps, District lab staff separate them into samples, or “pools”, of up to 50 mosquitoes each. These pools are sent to DART to be tested for WNV, as well as Western Equine Encephalitis (WEEV) and St. Louis Encephalitis (SLEV) viruses, which may also occur in California.

# Mosquito Surveillance

In order to direct mosquito control efforts to areas where they are most needed, the District monitors mosquito populations for both high numbers and disease risk. Weekly trapping in areas of concern provides staff with a view of population changes over time, as well as West Nile virus detection. District lab staff set traps along four weekly routes covering Marin and Sonoma Counties, for a total of 57 weekly traps in 2017. Additional weekly traps are set by field technicians in any areas of concern that staff encounter in the field.

In 2017, District biologists identified and counted adult mosquitoes collected from more than 1,700 traps set by laboratory and field staff. Over 14,000 mosquitoes were sent to DART for virus testing. One mosquito sample tested positive from Sonoma County, and no WNV detections were made in Marin County mosquitoes in 2017.

### Three common adult mosquito traps set by District lab staff



#### Encephalitis Vector Survey Trap (CO<sup>2</sup>)

CO<sup>2</sup> traps use CO<sup>2</sup> and light to attract adult mosquitoes



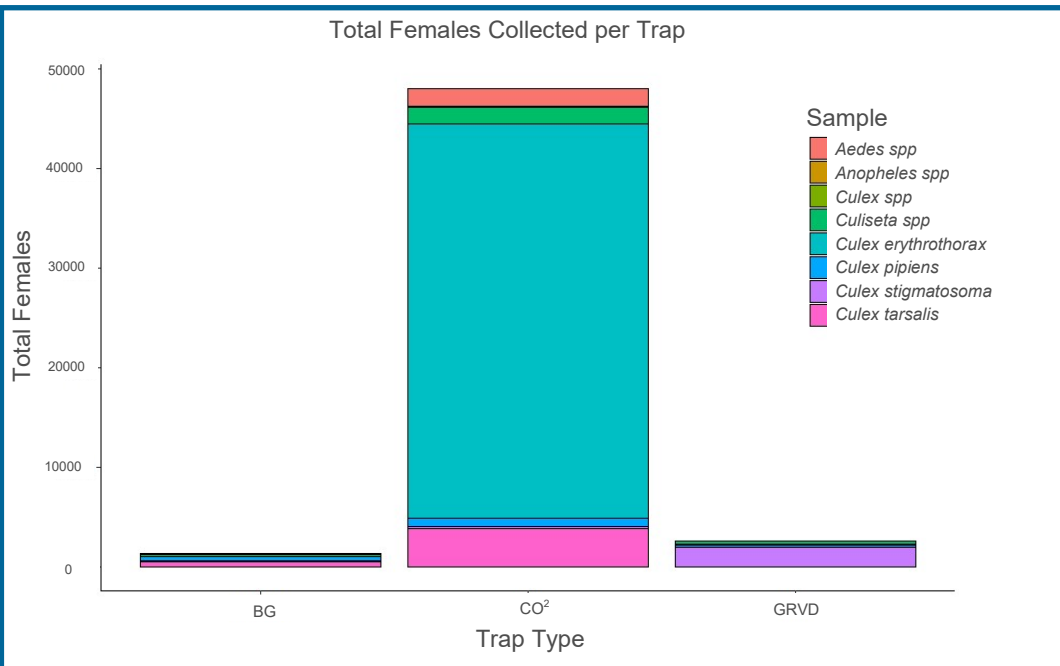
#### Gravid Trap (GRVD)

Gravid traps use nutrient rich water to attract female mosquitoes that are looking to lay eggs



#### BG Sentinel Trap (BG)

BG traps use both CO<sup>2</sup> and a scented lure to attract adult mosquitoes



# Monitoring for invasive *Aedes* mosquitoes in Marin and Sonoma Counties

In addition to monitoring native mosquito species, the District conducts targeted invasive mosquito species surveillance within Marin and Sonoma Counties. This surveillance effort uses traps that have been proven to be the most effective for detecting *Aedes aegypti* and *Aedes albopictus*, two invasive mosquitoes that have become established in other parts of California in recent years. One of these traps, the BG Sentinel, contains a lure that attracts adult female mosquitoes searching for a host. Though these traps are placed around the counties as part of the invasive *Aedes* surveillance program, they do attract other native mosquito species that the District tests for WNV, SLEV and WEEV.

The second trap, known as an Autocidal Gravid Ovitrap (AGO), targets adult female mosquitoes looking for a place to lay their eggs. Unlike the gravid trap used for native mosquito species, this trap can be set out for several days at a time without maintenance or collection. Female mosquitoes fly in to attempt to lay their eggs, and get stuck to the side of the container. District lab staff collect the containers and identify mosquitoes stuck to them.

A total of 424 invasive *Aedes* targeted trap collections were made from 10 sites in Marin and Sonoma Counties in 2017. Although several species of native mosquitoes were found in these traps, no *Ae. aegypti* or *Ae. albopictus* mosquitoes were collected.



**Autocidal Gravid Ovitrap (AGO)**  
The AGO trap is deployed to detect invasive *Aedes* adults female mosquitoes that are looking for a place to lay their eggs.

## Contact Us

For more information about our services and programs:

**Marin/Sonoma Mosquito & Vector Control District**  
595 Helman Lane  
Cotati, CA 94931

(707) 285-2200

Visit us on the web at [www.msosquito.com](http://www.msosquito.com)



## Invasive *Aedes* transmitted viruses

In 2017, there were two confirmed cases of Zika in Marin County and five cases in Sonoma County. All of these cases were related to travel, and there is currently no indication of local Zika virus risk.

The District works with county health departments to investigate confirmed or probable Zika virus cases. Upon notification, the District conducts enhanced mosquito surveillance in the area around the case, to determine what mosquito species are in the area. Candidate adult mosquitoes are identified and submitted to DART to be tested for chikungunya, dengue and Zika viruses. Recent studies have shown that *Culex tarsalis*, a common vector of WNV, is not a competent vector of Zika virus.

When reported, the District also conducts targeted surveillance around travel-related dengue and chikungunya virus cases in Marin and Sonoma Counties, as these viruses are vectored by the same species of invasive *Aedes* mosquitoes.

**Travel-related Cases of Dengue in Marin and Sonoma Counties, 2007-2017**

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Marin	0	0	0	1	0	0	4	1	1	4	2
Sonoma	1	0	1	2	0	3	3	5	0	2	1