



# MOSQUITO SURVEILLANCE REPORT

**2024**

Southern Nevada Health District  
Environmental Health Division

TABLE OF CONTENTS

Summary .....	3	<i>Aedes aegypti</i> Surveillance .....	11
Background .....	4	<i>Map 4: 2024 Distribution and Density per Trap of Ae. aegypti</i>	
<i>Figure 1: West Nile Virus Activity Annual Trends</i>		Looking Ahead .....	12
Mission and Goals .....	5		
Methodology .....	6		
2024 Surveillance Results .....	8		
<i>Table 1: 2024 Mosquito Counts by Species and Arbovirus Results</i>			
<i>Table 2: 2024 Jurisdictional Distribution of Traps Set,</i>			
<i>Mosquitoes Tested and Positive Results for West Nile Virus</i>			
<i>and Saint Louis Encephalitis Virus</i>			
.....	9		
<i>Map 1: 2024 West Nile Virus Activity, Clark County</i>			
<i>Map 2: 2024 West Nile Virus Case Distribution, Clark County</i>			
<i>Map 3: 2024 Saint Louis Encephalitis Virus Activity, Clark County</i>			
.....	10		
<i>Figure 2: West Nile Virus Activity by Week, MMWR – 2019 and 2024</i>			



## SUMMARY

In 2024, Southern Nevada experienced a significant resurgence of arboviruses across Clark County and the second highest number of human case reports in the surveillance program's 20-year history.

West Nile Virus (WNV) was isolated in 388 mosquito submission pools, St. Louis Encephalitis found in 21 submission pools and 26 human WNV cases were reported. **This was the most arboviral activity in the county since the WNV outbreak of 2019**, when 43 human cases were reported and 268 mosquito submission pools across 43 zip codes tested positive.

**Aedes aegypti continued to entrench and expand into communities** as there continues to be no coordinated control intervention to combat the highly aggressive urban mosquitoes. Although not as dramatic as the massive increase of citizen calls in 2023, where 744 complaints were generated, 491 citizen complaints or mosquito activity were reported in 2024. This upward trend of citizens reporting mosquito activity will continue in the coming years and require the program to enhance its efforts to meet the challenge.

Throughout the mosquito season, the Southern Nevada Health District's Office of Communications **continued its efforts to educate the public about West Nile virus illness and mosquito breeding prevention measures**. Public health messaging was released through social media, traditional news releases, public health updates, media interviews and static monitors placed in public areas such as bus shelters.



# 2024

West Nile Virus present in

**388** submission pools

**26** human WNV cases

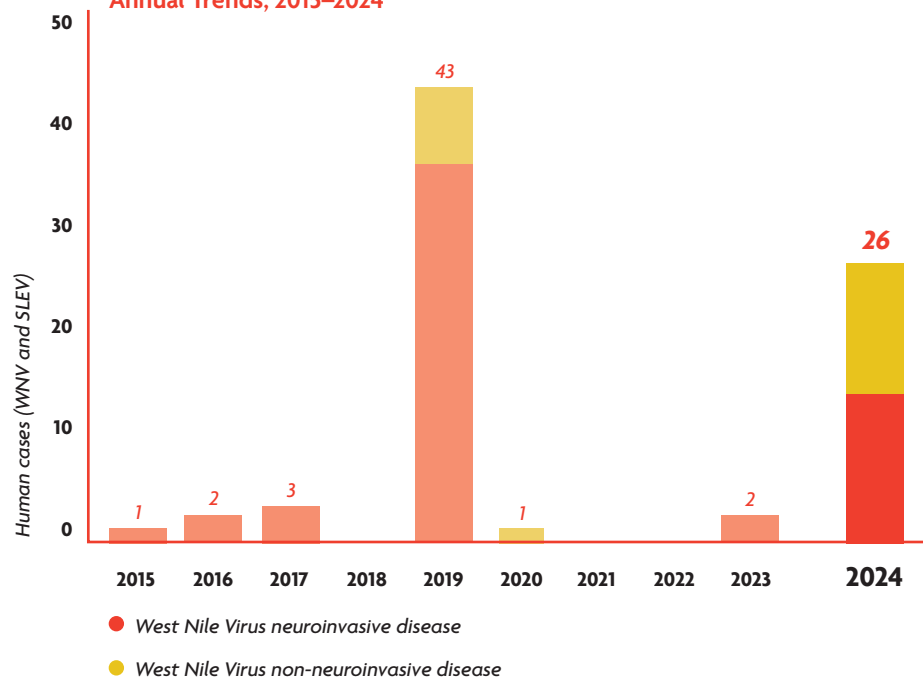
**491** citizen reports of mosquito activity

## BACKGROUND

West Nile Virus, a mosquito-borne disease, was first identified in mosquito and human populations of Clark County in 2004. In response to this public health threat, **the Southern Nevada Health District (SNHD) developed a Mosquito Disease Surveillance Program to survey mosquito populations for arboviral diseases** including West Nile Virus (WNV), Western Equine Encephalitis (WEE) and Saint Louis Encephalitis Virus (SLEV). Annual trends of human WNV and SLEV cases are found in **Figure 1**.

**SNHD is the only entity in Clark County capable of monitoring mosquito populations across the six distinct jurisdictions** within the county, including City of Las Vegas, unincorporated Clark County, City of Henderson, City of North Las Vegas, City of Mesquite and the City of Boulder City.

**Figure 1: West Nile Virus Activity (Neuroinvasive and Non-neuroinvasive)**  
Annual Trends, 2015–2024



## MISSION

**The principal mission of the Mosquito Disease Surveillance Program is to identify diseases in mosquitoes and provide public health messages prior to and after reports of human cases.**

Mosquito disease surveillance and prevention education are important components of the Environmental Health Division and supports SNHD's overall mission, "To assess, protect and promote the health, the environment and the well-being of Southern Nevada communities and visitors."

## GOALS

- 1. Monitor mosquito populations** and associated disease prevalence within Clark County.
- 2. Develop effective and timely public education messages** regarding mosquito breeding and disease prevention.
- 3. Identify and report breeding sources** to jurisdictions so they can manage their infrastructure utilizing Integrated Mosquito Management principles.
- 4. Conduct environmental investigations** related to arbovirus cases reported by the Office of Acute Communicable Disease Control (ACDC).
- 5. Maintain communication with state and federal agencies** to ensure WNV, SLEV and WEE surveillance activities are included on nationwide monitoring systems.



### FIGHT THE BITE *Awareness Campaign*

**60** *bus shelters*

**125** *in-bus display cards*

**8** *digital billboards*



## METHODOLOGY

### **Mosquito trapping and testing is the cornerstone of the disease surveillance program.**

This type of surveillance provides an up-to-date indicator of arbovirus vectors in an area and can be used as a trigger for control measures. In Southern Nevada, the primary mosquito breeding months are April through October, with submission for disease analysis beginning typically in April. Program staff primarily utilize three types of mosquito traps: CDC Light traps baited with CO<sub>2</sub>, Gravid traps and BG Sentinel traps. Each offers a different method of attracting mosquitoes while targeting specific mosquito vectors.

All traps were set overnight in potential mosquito breeding areas such as washes, drainage ditches, pools of standing water, cemeteries, plant nurseries and private residences. From the collection sites, mosquitoes were frozen on dry ice and transported to the SNHD's on site lab, where they were sorted by species and gender and then pooled for testing. A submission pool is defined as a collection of 50 or fewer female mosquitoes, from the same species and location, placed into a vial for testing. Once pooled, the mosquitoes were stored in a -40°C freezer until collected by the Southern Nevada Public Health Laboratory for testing.

The Mosquito Disease Surveillance Program subscribes to the concept of Integrated Mosquito Management (IMM), which is fundamentally Integrated Pest Management (IPM) tailored for mosquito control. Surveillance is the backbone of all IMM programs as it identifies problem species and population trends which are used to direct and evaluate control measures.

**SNHD is not an abatement agency and areas requiring control are referred to counterpart agencies including Public Works, Parks and Recreation and Code Enforcement offices within the six distinct jurisdictions.**

### TRAP

- *CDC Light traps*
- *Gravid traps*
- *BG Sentinel traps*



### COLLECT

- *Washes and parks*
- *Plant nurseries*
- *Private residences*



### POOL

- *>50 same-species female mosquitoes*
- *Submit to SNPHL for Arbovirus testing*





## **CDC LIGHT TRAP**

CDC light traps are designed to attract host seeking female mosquitoes using **carbon dioxide (dry ice) as the primary attractant**, captures mosquitoes of several species, including *Culex*, *Anopheles* and *Aedes*.



## **GRAVID TRAP**

Gravid traps are designed to capture egg laden (gravid) female mosquitoes using a **baited water solution intended to simulate stagnant water** found in the environment. This trap is designed to primarily capture *Culex* mosquitoes.



## **BG SENTINEL TRAP**

BG Sentinel traps utilize **color cues, artificially generated air plumes and a scent lure** to attract mosquitoes. This trap was designed specifically for attracting *Aedes albopictus* and *Aedes aegypti*. These mosquitoes are capable of vectoring emerging diseases including Chikungunya and Dengue Fever.

## 2024 SURVEILLANCE RESULTS

**During March through November, staff set 3,454 traps at 800 distinct sites throughout Clark County.** Trap types comprised of 1,886 Gravid (55%), 1,516 BG Sentinel (44%) and 42 Light (1%). From these traps, 51,304 mosquitoes, representing 3,567 mosquito testing pools, were submitted to the SNPHL for WNV, SLEV and WEE analysis. Of these, 388 mosquito pools representing 12,033 mosquitoes, were WNV positive and 21 pools representing 583 mosquitoes were SLEV positive. Although not competent WNV vectors compared to *Culex* mosquitoes, 17 pools of *Ae. aegypti* tested positive for WNV. In 2024 SNPHL initiated Dengue virus testing on *Ae. aegypti*, however no mosquitoes were positive. **Table 1** details the mosquito counts by species and arbovirus results. **Table 2** details the jurisdictional distribution of traps set, mosquito samples and positive results for WNV and SLEV.

**Table 1: 2024 Mosquito Counts by Species and Arbovirus Results**

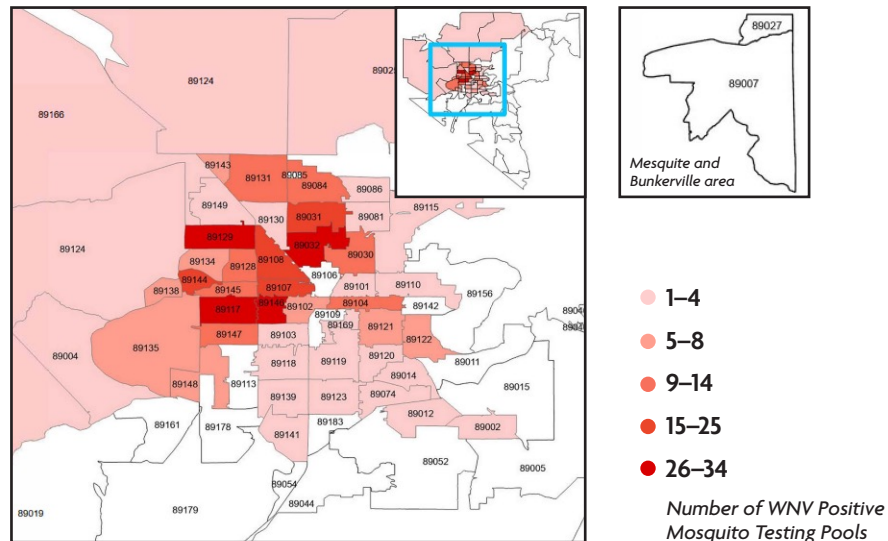
Mosquito Species	Mosquito Submission Pools	Mosquitoes Tested	WNV + Pools	SLEV + Pools
<i>Aedes aegypti</i>	625	2,842	17	0
<i>Aedes vexans</i>	20	211	0	0
<i>Anopheles franciscanus</i>	3	10	0	0
<i>Anopheles freeborni</i>	32	297	1	0
<i>Culex erythrothorax</i>	59	1,328	1	0
<i>Culex quinquefasciatus</i>	2,151	43,033	326	17
<i>Culex stigmatasoma</i>	373	1,622	40	4
<i>Culex tarsalis</i>	211	1,659	3	0
<i>Culiseta incidens</i>	3	3	0	0
<i>Culiseta inornata</i>	84	299	0	0
<b>Total</b>	<b>3,701</b>	<b>68,634</b>	<b>27</b>	<b>1,145</b>

**Table 2: 2024 Jurisdictional Distribution of Traps Set, Mosquitoes Tested and Positive Results for West Nile Virus and Saint Louis Encephalitis Virus**

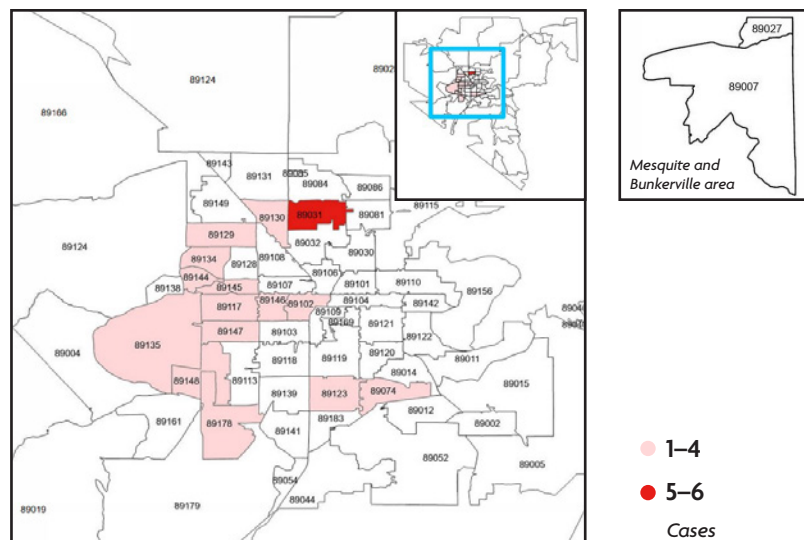
Jurisdiction	Traps Set	Mosquitoes Tested	Mosquito Pools	WNV+ Pools	Mosquitoes in WNV+ Pools	SLEV+ Pools	Mosquitoes in SLEV+ Pools
City of Las Vegas	1,217	19,920	1,366	208	6,035	1	19
Unincorporated Clark	1,157	18,856	1,249	92	3,084	5	168
City of N. Las Vegas	512	7,932	541	82	2,683	1	7
City of Henderson	460	3,655	313	6	231	14	389
City of Mesquite	58	836	78	0	0	0	0
Boulder City	48	105	20	0	0	0	0
<b>Total</b>	<b>3,452</b>	<b>51,304</b>	<b>3,567</b>	<b>388</b>	<b>12,033</b>	<b>21</b>	<b>583</b>



**Map 1: 2024 West Nile Virus Activity, Clark County**



**Map 2: 2024 West Nile Virus Case Distribution, Clark County**

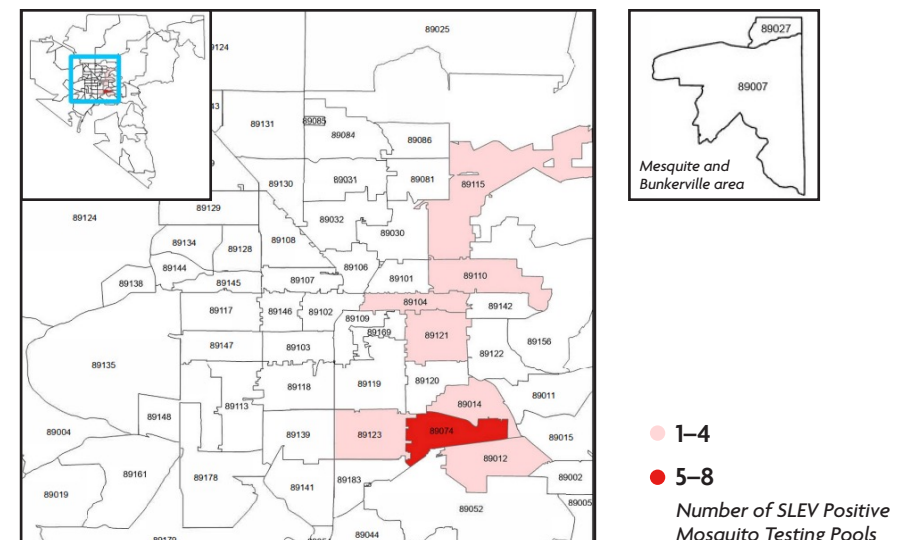


## 2024 SURVEILLANCE RESULTS (CONTINUED)

**West Nile Virus activity was detected in early May and the first human case was reported in late June.** This prompted SNHD to issue a Health Alert Notice to health care practitioners regarding the increased arboviral activity for diagnoses purposes. Southern Nevada Health District's Office of Epidemiology and Disease Surveillance confirmed 26 human WNV cases (14 neuroinvasive) and 11% of total mosquito sample pools were WNV positive (388 / 3,567 pools) across 46 zip codes. **Map 1** shows a geographical distribution of WNV positive mosquitoes across Clark County. **Map 2** shows WNV case distribution across Clark County.

St. Louis Encephalitis was isolated in 21 submission pools, which is the first time it was identified since 2019. **Map 3** shows the geographical distribution of SLE positive mosquitoes across Clark County.

**Map 3: 2024 Saint Louis Encephalitis Virus Activity, Clark County**

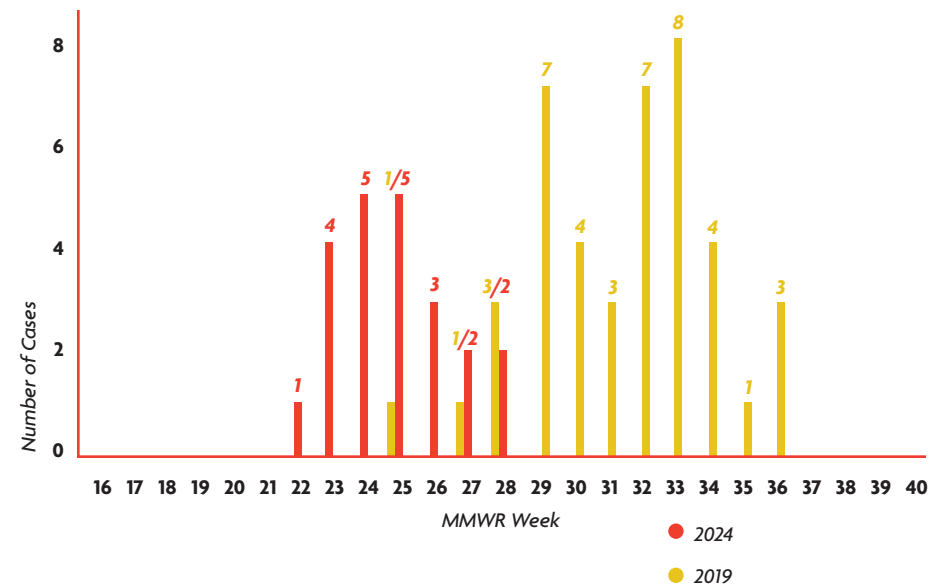


## 2024 SURVEILLANCE RESULTS (CONTINUED)

The Las Vegas Valley had the hottest summer on record, with extreme temperatures throughout the summer with 112 days consistently reaching above 100°F, including temperatures reaching an all-time high of 120°F. This intense heat, in addition to a dry summer monsoon season, had a significant impact on the mosquito population and WNV transmission as fewer mosquitoes were captured in July, August and September, and only four human cases were reported after July. **With no mosquito abatement program in Southern Nevada, the heat provided a critical control measure to reduce the ongoing and widespread transmission. However, this should not be relied upon as a consistent control measure in future mosquito seasons.**

The early onset of human cases in June and July, with a subsequent drop off in the remaining months, was a stark contrast to the case distribution of the 43 reported cases in the 2019 WNV outbreak. In 2024 the cases were reported during the CDC's Morbidity and Mortality Weekly Report (MMWR) weeks 22 through 28 whereas in 2019 cases were reported in MMWR weeks 25 through 36. **Figure 2** details the number of cases reported during 2019 and 2024. This overlapping case distribution highlights the **potential to have an overwhelming WNV transmission season, with an early onset of cases extending late into the year.**

**Figure 2: West Nile Virus Activity by Week, MMWR – 2019 and 2024**



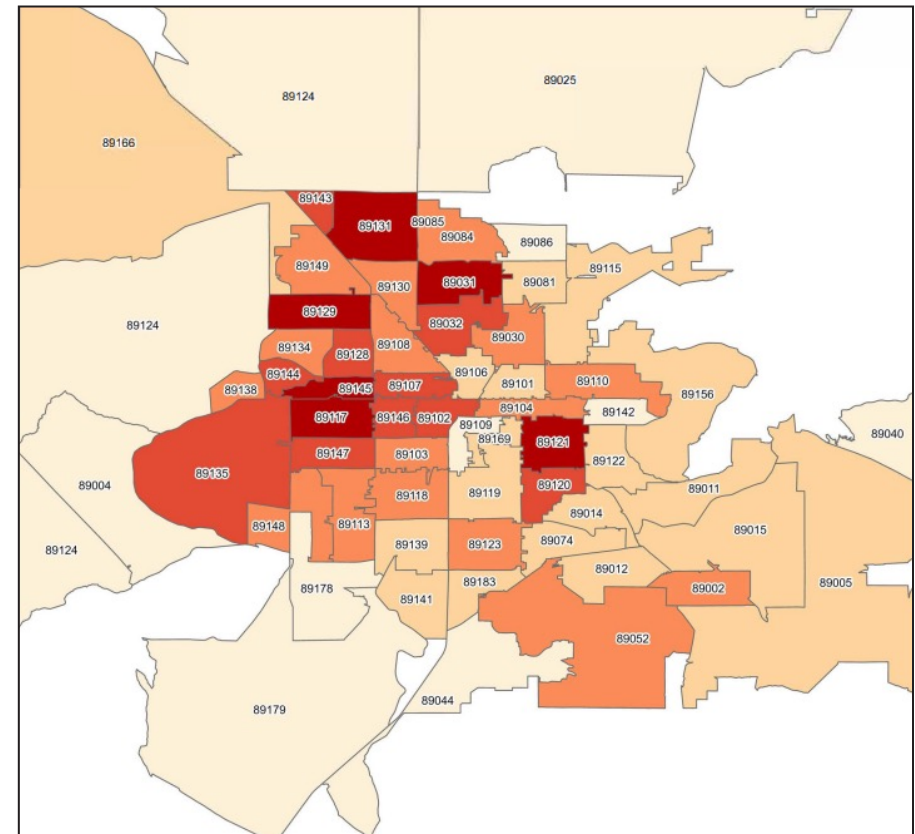
## AEDES AEGYPTI SURVEILLANCE

***Aedes aegypti* continues to be the most important emerging vector-borne disease threat in Southern Nevada.** This highly aggressive and invasive urban mosquito is responsible for transmitting, Dengue, Yellow Fever, Zika Virus and other exotic arboviruses that have a significant global health impact. In 2024, over 13 million cases of dengue were reported in North, Central and South America and the Caribbean.

The mosquito was first identified in 2017 and has been trapped in 48 zip codes across Clark County. Many of the newly identified locations were a result of citizens reporting mosquito activity to SNHD, with **491 citizen complaints of mosquito activity being reported to SNHD in 2024**. This trend of increased calls for service will continue as *Ae. aegypti* entrench themselves in communities. **Map 4** depicts the density of *Ae. aegypti* per Zip Code in 2024.

Clark County has over 40 million visitors annually, many of which travel from areas in which dengue fever is endemic. Additionally, many residents travel to areas where dengue fever is a common mosquito-borne disease. The Los Angeles County Department of Public Health confirmed 14 cases of locally acquired dengue in 2024 and Maricopa County, Arizona identified its first locally acquired case in 2022. The likelihood of travelers bringing dengue into Clark County is a possibility when considering its continued global presence and that *Ae. aegypti* are found throughout the community.

**Map 4: 2024 Distribution and Density per Trap of *Ae. aegypti***





## LOOKING AHEAD

The Mosquito Disease Surveillance program will continue monitoring mosquito populations and disease prevalence within the six jurisdictions of Clark County. Maintaining a single surveillance system across the county is the most efficient way to ensure the community has consistent information on vector disease prevalence and its prevention.



## 2024 MOSQUITO DISEASE SURVEILLANCE TEAM

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