

2019 MOSQUITO SURVEILLANCE REPORT



MOSQUITO DISEASE SURVEILLANCE PROGRAM

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SUMMARY

2019 was an unprecedented year for arbovirus activity in both mosquito and human populations throughout Clark County. Mosquito surveillance identified a dramatic increase in West Nile virus infected mosquitoes which was followed by an explosion of human case activity, ultimately prompting SNHD to issue a public health advisory of an outbreak of WNV in humans.

During April through October, staff set 2,752 mosquito traps throughout Clark County. From these traps, 43,219 mosquitoes, representing 2,262 mosquito testing pools, were submitted to the Southern Nevada Public Health Laboratory (SNPHL) West Nile Virus (WNV), St. Louis encephalitis (SLEV), and Western Equine Encephalitis (WEE) analysis. West Nile Virus was identified in 268 submission pools, comprising of 7,945 mosquitoes, collected from 43 zip codes. St. Louis encephalitis was identified in 30 submission pools, comprising of 604 mosquitoes, collected from 15 zip codes.

Forty-three human WNV cases were reported to the Southern Nevada Health District's Office of Epidemiology and Disease Surveillance (OEDS); 34 (79%) cases were reported as WNV neuroinvasive, 9 (21%) cases were reported as WNV non-neuroinvasive and two deaths caused by WNV were reported.

The program, which does not conduct routine mosquito abatement, notified jurisdictional counterparts of WNV mosquito and human case activity within their boundaries and requested they survey and manage any breeding sources.

In addition to the intense arboviral activity, the program initiated the first of a two-year surveillance project, funded by the Centers for Disease Control and Prevention (CDC), to develop a baseline population density estimation of *Ae. aegypti* in a target community, determine what environmental factors are favorable to the mosquito in the North Las Vegas area where it is found, and to evaluate what control measures could work to eradicate the species from the area.

Throughout the mosquito season, the Southern Nevada Health District's Office of Communications continued its efforts to educate the public about West Nile virus illnesses and 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.

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). 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.

Since its inception, the Vector Surveillance program has submitted over 300,000 mosquitoes to the Nevada Department of Agriculture (2004 – 2017) and the Southern Nevada Public Health Laboratory (2018 – current) for WNV, SLEV, and WEE analysis. West Nile virus is the predominant arbovirus in Clark County, however in 2015 SLEV infected mosquitoes were first identified, which has maintained a presence ever since. Although rare, WEE has also been identified in mosquito submissions.

MISSION

The principal mission of the Mosquito Disease Surveillance Program is to identify diseases in mosquitoes and provide public health prevention messages prior to, and after, reports of human cases. Mosquito disease surveillance and prevention education is an important component of the Environmental Health Division and supports SNHD's overall mission, "To protect and promote the health, the environment and the wellbeing of Southern Nevada residents and visitors."

GOALS

1. Monitor mosquito populations and associated disease prevalence within Clark County.
2. Develop effective and timely public education messages regarding mosquito borne disease prevention.
3. Identify, report, and assist jurisdictions with small, targeted larval mosquito control measures utilizing Integrated Mosquito Management principles.
4. Conduct environmental investigations related to arbovirus cases reported by the Office of Epidemiology and Disease Surveillance.
5. Maintain communication with state and federal agencies to ensure WNV, SLEV, and WEE surveillance activities are included on nationwide monitoring systems.

METHODOLOGY

Mosquito trapping and testing remains the cornerstone of the Health District's arbovirus 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 May. Program staff primarily utilize three types of mosquito traps, Encephalitis Vector Surveillance, Gravid, and BG Sentinel traps. Each offers a different method of attracting mosquitoes while targeting specific mosquito vectors. Budgetary constraints have eliminated migratory bird or sentinel chicken flock sampling.

EVS Trap

Encephalitis Vector Surveillance (EVS) traps, 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.

All traps were set overnight in potential mosquito breeding areas such as washes, drainage ditches, pools of standing water, plant nurseries and private residences. From the collection sites, live mosquitoes were frozen on dry ice and transported to the Health District's onsite 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 less female mosquitoes, from the same species and location, combined into a vial for testing. Once pooled, the mosquitoes were placed into vials and stored in -40c freezer until collected by the Southern Nevada Public Health Laboratory.

The Vector 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's remediation of mosquito breeding areas is limited to small, targeted chemical treatments of areas identified when setting mosquito traps. Areas requiring abatement are referred to counterpart agencies including Public Works, Parks and Recreation, and Code Enforcement offices within the six distinct jurisdictions.

Surveillance, in general, is the first line of defense against infectious agents. The ability for early detection of a vector borne disease, or for rapid interruption of transmission if an outbreak were to occur, is a direct function of adequate surveillance. The program's surveillance activities and public information activities, coupled with jurisdictional counterpart referrals for mosquito control measures, have been instrumental in countering the spread of West Nile Virus disease.

Over the years, the Program has utilized a variety of arbovirus surveillance methods including sentinel chicken flocks and migratory bird sampling. Annual reports detailing surveillance and control activities since 2004 can be found on SNHD's web site.

2019 SURVEILLANCE RESULTS

During April through September, staff set 2,752 traps at 577 distinct sites throughout Clark County. Trap types comprised of 1,345 Gravid (49%), 1,174 BG Sentinel (43%), 214 EVS (8%) and 19 (1%) other. From these traps, 43,219 mosquitoes, representing 2,262 mosquito testing pools, were submitted to the SNPHL for WNV, SLEV, and WEE analysis. West Nile Virus was identified in 268 submission pools, comprising of 7,945 mosquitoes, collected from 43 zip codes. St. Louis encephalitis was identified in 30 submission pools, comprising of 604 mosquitoes, collected from 15 zip codes. Tables 2- 5 detail the types and number of mosquito samples positive for arbovirus activity and maps 1 –8 show distribution and results of surveillance activities. Jurisdictional counterparts, including Code Enforcement, Parks and Recreation, Streets and Sanitation, and Public Works were notified of all arboviral activity and requested to survey their infrastructure to identify and remove breeding sources.

West Nile Virus (WNV) is a reportable disease in Clark County, NV. Since 2004, the Office of Epidemiology and Disease Surveillance (OEDS) has conducted 155 investigations relating to WNV. The number of human cases of WNV reported to OEDS has fluctuated over the past 10 mosquito surveillance seasons (Figure 1). It is important to note that cases of WNV are classified according to the most recent Centers for Disease Control and Prevention (CDC) surveillance case definitions. WNV is likely underreported because affected individuals must seek care and healthcare professionals must request appropriate diagnostic tests to meet surveillance case classifications¹. Most people infected with WNV do not develop symptoms and the CDC estimates that approximately 1 in 5 individuals will develop the non-neuroinvasive disease. Non-neuroinvasive disease is defined as individuals who present to their healthcare provider with fever along with other possible symptoms such as headache, body aches, joint pain, vomiting, diarrhea, or rash. Approximately 1 in 150 individuals will develop the neuroinvasive disease, which typically manifests as meningitis, encephalitis, or acute flaccid paralysis^{2, 3}.

In 2019, 43 human WNV cases were reported to the Southern Nevada Health District's OEDS; 34 (79%) cases were reported as WNV neuroinvasive and 9 (21%) cases were reported as WNV non-neuroinvasive (Figure 2). The median age of cases was 56 years (range 23-85 years) and 28 (65%) were male. Two deaths caused by WNV were reported (Table 1). In 2019, the number of human WNV cases was above the five-year average (Figure 3) and Clark County saw its largest increase in the number of human cases in more than 10 years.

West Nile virus infected mosquitoes were identified in 43 ZIP codes, and SLEV infected mosquitoes were identified in 15 ZIP codes. The majority of WNV human cases lived in ZIP codes identified with WNV positive pool submissions. There was one ZIP code with an identified human case of WNV disease where no WNV positive submission pools were identified. Also, the ZIP code with the highest number of WNV positive pools submissions did not have a WNV human case reported to OEDS residing in that ZIP code. There were no reported SLEV human cases during 2019.

During the mosquito surveillance season, the peak in human cases appeared to follow the peak in percent of mosquito pool submissions screening positive for WNV (Figure 4). On July 29th, SNHD released a Public Health Advisory declaring an outbreak of WNV and St. Louis Encephalitis Virus (SLEV) in local mosquito populations amid increasing human WNV cases reported to OEDS. During that time, 6 human cases were reported to OEDS. Over the following month, OEDS continued to

closely monitor human WNV through passive disease surveillance. On August 29th, OEDS released a Public Health Advisory declaring an outbreak of WNV in humans in Clark County. At the time of the declaration, OEDS reported 36 human cases and statistical control charts indicated activity above the upper control limit. The upper control limit is set to a level of three standard deviations greater than the baseline mean. It is important to note, that the statistical control charts assist in public health monitoring of disease morbidity in our community and are not the sole factor in deciding the declaration of an outbreak.

The surveillance case definition for aseptic meningitis is a syndrome characterized by acute onset of meningeal symptoms, fever, and cerebrospinal pleocytosis with no evidence of bacterial or fungal meningitis⁵. Previous studies have shown evidence indicating missed opportunities to diagnose WNV neuroinvasive disease through laboratory testing of individuals with suspected viral meningitis or aseptic meningitis^{6,7}. In 2019, the number of cases of aseptic meningitis doubled from the previous year in Clark County (Figure 5). Most aseptic meningitis cases were reported to OEDS during the mosquito surveillance season (Figure 6). Human cases for the more severe form of disease (neuroinvasive) may have been much higher than what was reported to OEDS during the outbreak.

Factors that may have contributed to the WNV outbreak were the unseasonably wet and cool weather Las Vegas experienced in the first 5 months of 2019. February was the fifth wettest February on record and the coldest since 1985⁸. The average annual rainfall of 4.19 inches was surpassed by May 9th and the average temperature during May was 71°F instead of the normal 77°F⁹. The increased rain and lower temperatures may have provided favorable conditions leading to the disease outbreak, including increased mosquito breeding sources, greater plant development, and larger reservoir bird populations.

The 2019 mosquito season presented unique challenges for the Southern Nevada Public Health Laboratory (SNPHL) arboviral testing program. As a result of record West Nile Virus activity in Clark County, there were increases in the number of mosquito collections and the number of WNV positive pools. SNPHL was able to experience the system stresses associated with high volumes of testing and the need for rapid turn-around times. SNPHL was able to provide accurate and fast results for WNV and SLEV and was able to notify partners in Environmental Health (EH) of the increases in viral activity for WNV in a timely and efficient manner. This in turn lead to Epidemiologists having advance forewarning and up to date information to assist with the investigation of human cases of WNV. EH and SNPHL, in collaboration with partners at Northern Arizona University, are currently undergoing having samples from the 2019 WNV outbreak sequenced to determine geographic origins and the possibility of potential future outbreaks of WNV in Clark County.

The Southern Nevada Health District's Office of Communications continued its efforts to educate the public about West Nile virus illnesses and prevention measures. The Office of Communications utilized social media, traditional news releases and public health updates, media interviews, and static monitors placed in public areas and employee breakrooms of the Health District's main public health center. West Nile virus prevention, mosquito bite and breeding prevention messages were posted to the Health District's Twitter, Facebook and Instagram accounts at least once per week between June and September. Spanish-language messages were also posted to the Health District's Spanish Twitter account.

To complement social media programs, the Health District's Office of Communications produced video to accompany postings, and mosquito surveillance activities were also included in Clark County Medical Association updates. West Nile prevention messages generated by the Public Information Office is detailed in Appendix 1.

***Aedes aegypti* Surveillance**

In 2017 *Aedes aegypti*, an invasive urban mosquito responsible for transmitting Zika virus, Dengue, and Yellow Fever, was first identified in Clark County. In response, staff collaborated with the Centers for Disease Control and Prevention (CDC) to develop a two-year project proposal to establish a baseline population density of *Ae. aegypti* in a North Las Vegas community, determine what environmental factors are favorable to the mosquito, and evaluate what control measures could work to eradicate the species from the area. The project was implemented in 2019.

Homes in the 89032 ZIP code, all within a quarter mile radius, were canvassed by staff and selected for the project based on cooperative residents. Thirty locations were identified and had BG Sentinel traps, with CO₂ and BG Sweet Lure attractants, set for two consecutive trap nights, every other week. A HOBO data logger was attached to each trap and recorded temperature (F°) and light intensity (lumen/ft²) every 3 minutes throughout the trap's deployment. From May through September, staff conducted ten trapping events with 60 trap nights each event, totaling 600 trap nights. From this effort, 124 female and 51 male *Aedes aegypti* were captured. Although the male mosquitoes were not tested for WNV, their numbers will be calculated in the overall population density analysis of the *Ae. aegypti* in the area. The CDC were provided with all trapping data, including trap locations, mosquito species and counts, disease results, and HOBO data logger information. Analysis is pending at the time of this report. Additionally, the male *Ae. aegypti* were submitted to UC Davis Department of Entomology and Nematology's Mosquito Control Research Lab for genetic analysis.

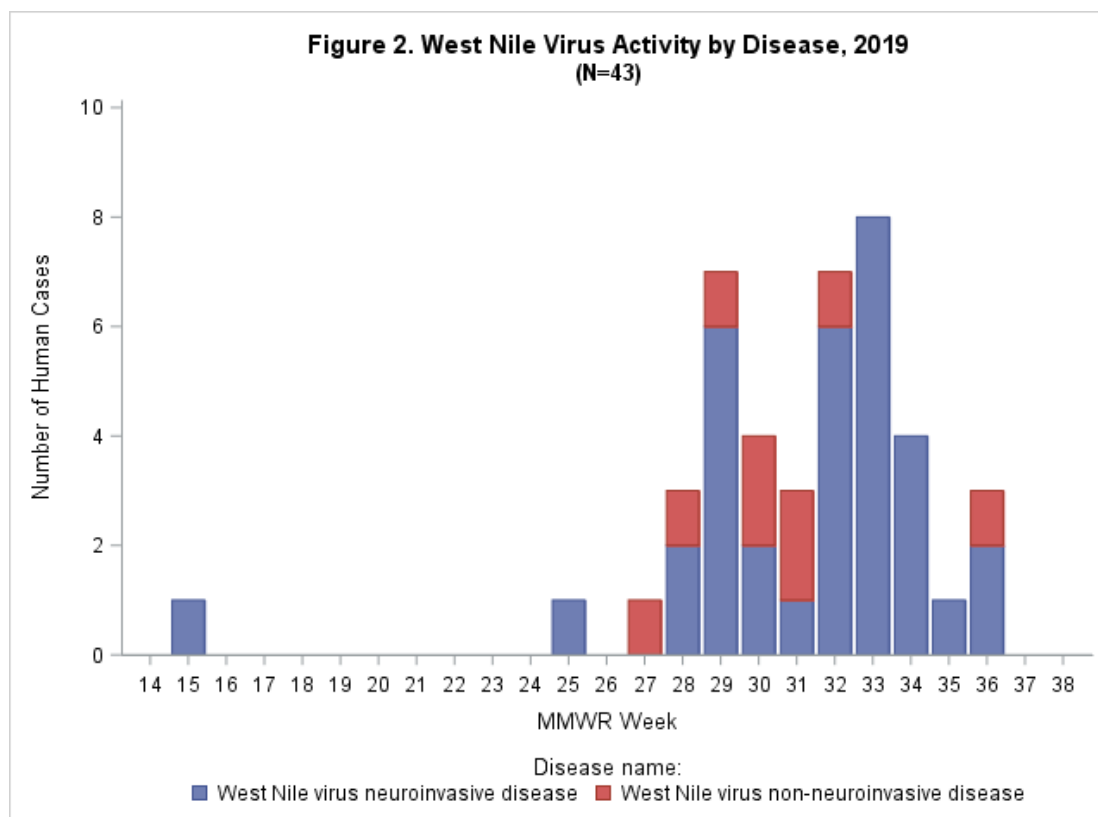
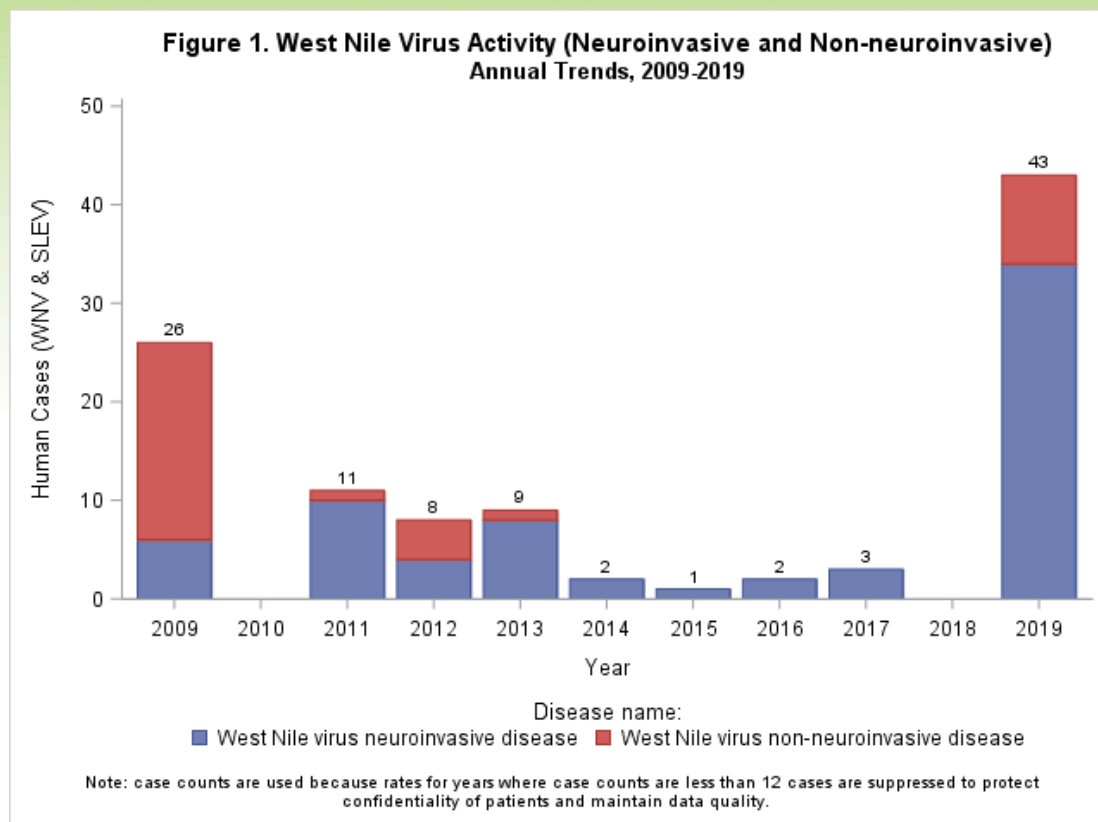
The approach for the project's second year is to introduce a mosquito control intervention into the target area, such as a Wide Area Larvicide Spray (WALS) of a bacterial larvicide and continue with the same sampling approach through the season. This will help determine if the control measures were statistically significant in reducing the population. Details to the specific control intervention are still to be determined at the time of this report.

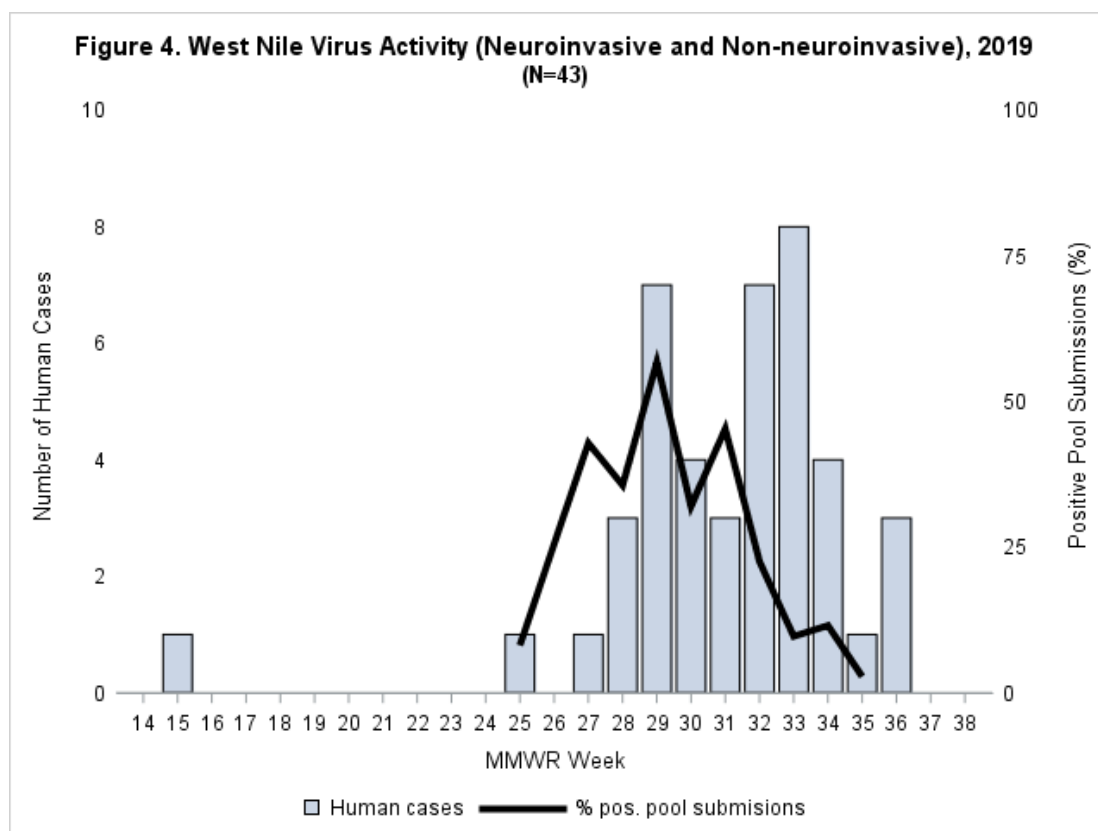
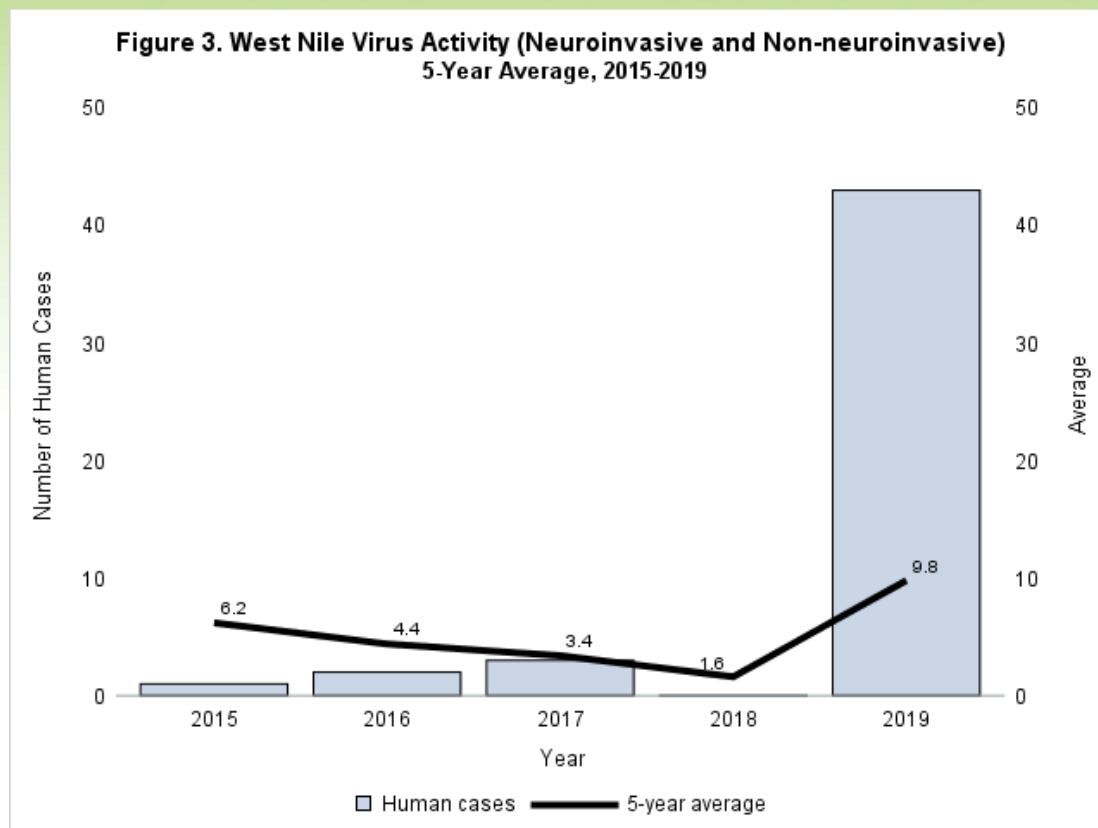
Looking Ahead

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. In 2020, staff will implement programmatic updates to support the overall mission.

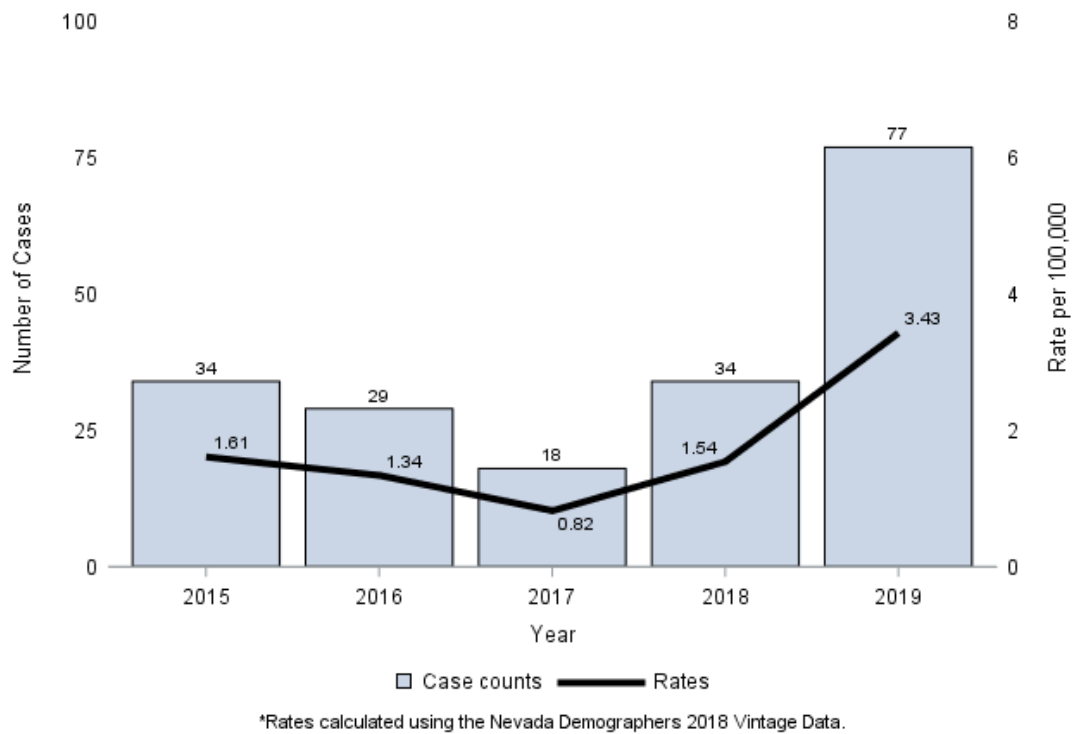
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**Figure 5. Aseptic Meningitis Historical Annual Trends
2015-2019**



**Figure 6. Aseptic Meningitis Activity, 2019
(N=77)**

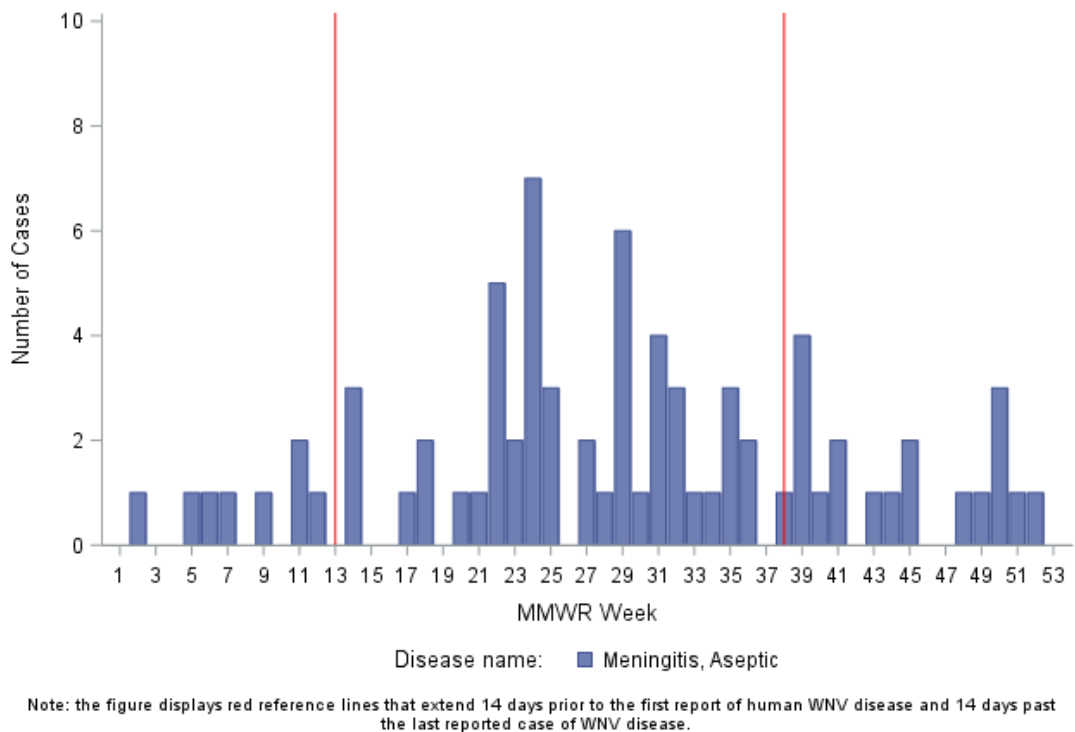


Table 1: Select Demographic Variables for Cases in 2019

	WNV Disease Activity			
	Neuroinvasive Disease		Non-neuroinvasive Disease	
	N	(%)	N	(%)
Age Group				
18-39	5	(14.7)	3	(33.3)
40-64	17	(50.0)	4	(44.4)
>64	12	(35.3)	2	(22.2)
Gender				
Male	21	(61.8)	7	(77.8)
Female	13	(38.2)	2	(22.2)
Died				
Yes	2	(5.9)	0	0
No	32	(94.1)	8	(88.9)
Missing	0	0	1	(11.1)

Table 2: Mosquito species and arbovirus result

Mosquito Species	Mosquito Submission Pools	Mosquitoes Tested	WNV + Pools	SLEV + Pools
<i>Aedes aegypti</i>	97	125	0	0
<i>Anopheles franciscanus</i>	18	107	0	0
<i>Anopheles freeborni</i>	14	102	0	0
<i>Culex erythrothorax</i>	45	1040	0	0
<i>Culex quinquefasciatus</i>	1,645	37,325	247	26
<i>Culex stigmatasoma</i>	204	2,029	8	3
<i>Culex tarsalis</i>	174	2,249	13	1
<i>Culiseta incidens</i>	7	75	0	0
<i>Culiseta inornata</i>	28	107	0	0
Other	30	60	0	0
Total	2,262	43,219	268	30

Table 3: Jurisdictional Distribution of Traps Set, Mosquitoes Samples and Arbovirus Results

Jurisdiction	Mosquito Traps Set	Mosquitoes Tested	Mosquito Pools	WNV + Pools	SLEV + Pools
City of Las Vegas	826	16,784	756	135	20
Unincorporated Clark County	604	12,951	579	60	4
City of North Las Vegas	788	7037	577	50	4
City of Henderson	456	5,231	280	19	2
City of Mesquite	56	1,082	50	3	0
Boulder City	22	134	20	1	0
Total	2,752	43,219	2,262	268	30

Table 4: Jurisdictional Distribution of Traps Set and WNV Positive Mosquitoes Samples

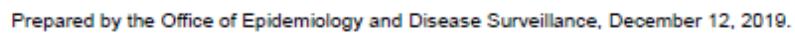
Jurisdiction	Mosquitoes Tested	Mosquito Pools	WNV + Pools	# of Mosquitoes in WNV + Pools
City of Las Vegas	16,784	756	135	4,132
Unincorporated Clark County	12,951	579	60	1,995
City of North Las Vegas	7037	577	50	1,231
City of Henderson	5,231	280	19	485
City of Mesquite	1,082	50	3	99
Boulder City	134	20	1	3
Total	43,219	2,262	268	7945

Table 5: Jurisdictional Distribution of Traps Set and SLEV Positive Results

Jurisdiction	Mosquitoes Tested	Mosquito Pools	SLEV + Pools	# of Mosquitoes in SLEV + Pools
City of Las Vegas	16,784	756	20	374
Unincorporated Clark County	12,951	579	4	152
City of North Las Vegas	7037	577	4	57
City of Henderson	5,231	280	2	21
City of Mesquite	1,082	50	0	0
Boulder City	134	20	0	0
Total	43,219	2,262	30	604

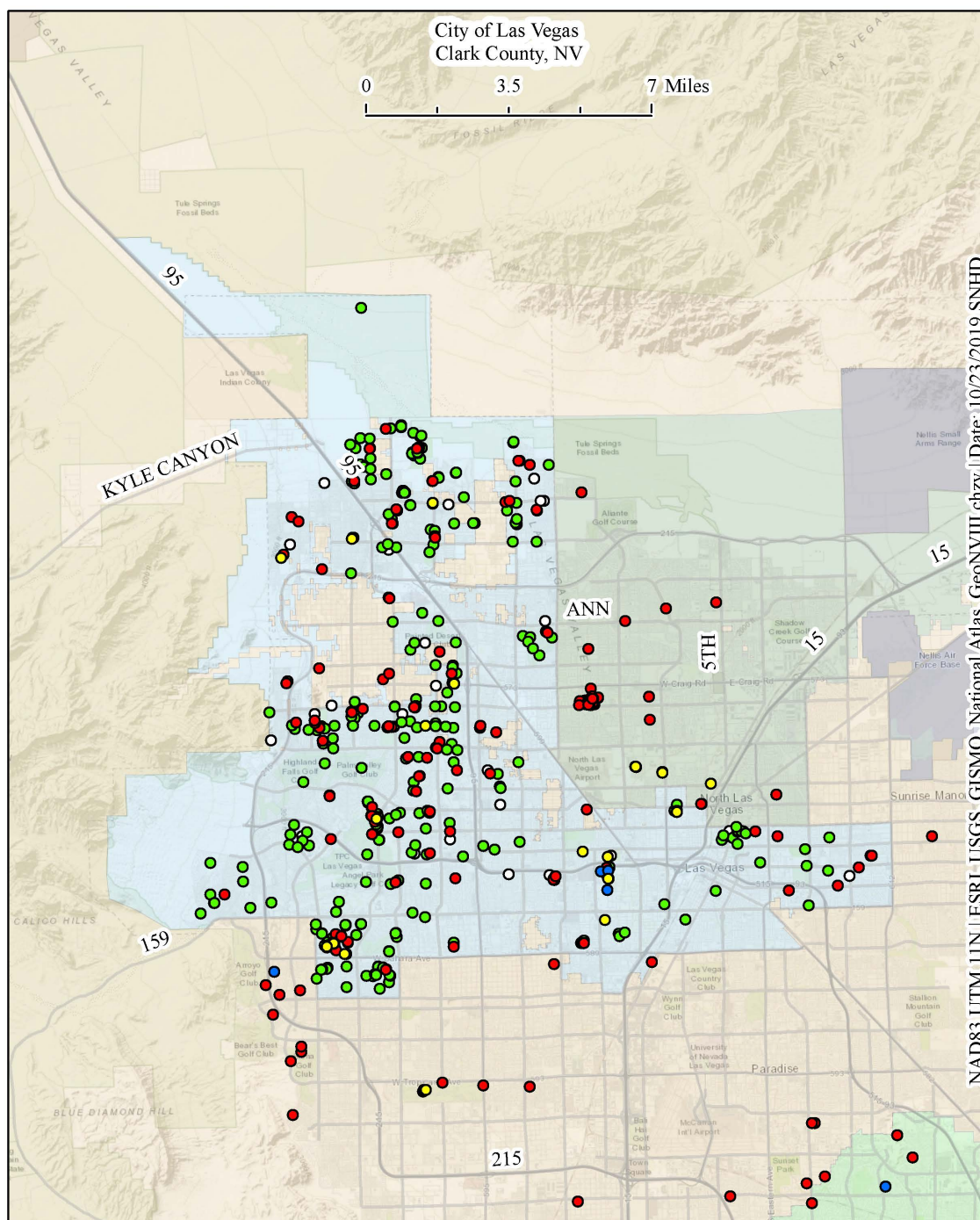


A map of the Chicago area showing various ZIP codes. The ZIP code 60617 is highlighted in red. Other ZIP codes shown include 60616, 60615, 60614, 60613, 60612, 60611, 60610, 60609, 60608, 60607, 60606, 60605, 60604, 60603, 60602, 60601, 60600, 60599, 60598, 60597, 60596, 60595, 60594, 60593, 60592, 60591, 60590, 60589, 60588, 60587, 60586, 60585, 60584, 60583, 60582, 60581, 60580, 60579, 60578, 60577, 60576, 60575, 60574, 60573, 60572, 60571, 60570, 60569, 60568, 60567, 60566, 60565, 60564, 60563, 60562, 60561, 60560, 60559, 60558, 60557, 60556, 60555, 60554, 60553, 60552, 60551, 60550, 60549, 60548, 60547, 60546, 60545, 60544, 60543, 60542, 60541, 60540, 60539, 60538, 60537, 60536, 60535, 60534, 60533, 60532, 60531, 60530, 60529, 60528, 60527, 60526, 60525, 60524, 60523, 60522, 60521, 60520, 60519, 60518, 60517, 60516, 60515, 60514, 60513, 60512, 60511, 60510, 60509, 60508, 60507, 60506, 60505, 60504, 60503, 60502, 60501, 60500, 60499, 60498, 60497, 60496, 60495, 60494, 60493, 60492, 60491, 60490, 60489, 60488, 60487, 60486, 60485, 60484, 60483, 60482, 60481, 60480, 60479, 60478, 60477, 60476, 60475, 60474, 60473, 60472, 60471, 60470, 60469, 60468, 60467, 60466, 60465, 60464, 60463, 60462, 60461, 60460, 60459, 60458, 60457, 60456, 60455, 60454, 60453, 60452, 60451, 60450, 60449, 60448, 60447, 60446, 60445, 60444, 60443, 60442, 60441, 60440, 60439, 60438, 60437, 60436, 60435, 60434, 60433, 60432, 60431, 60430, 60429, 60428, 60427, 60426, 60425, 60424, 60423, 60422, 60421, 60420, 60419, 60418, 60417, 60416, 60415, 60414, 60413, 60412, 60411, 60410, 60409, 60408, 60407, 60406, 60405, 60404, 60403, 60402, 60401, 60400, 60399, 60398, 60397, 60396, 60395, 60394, 60393, 60392, 60391, 60390, 60389, 60388, 60387, 60386, 60385, 60384, 60383, 60382, 60381, 60380, 60379, 60378, 60377, 60376, 60375, 60374, 60373, 60372, 60371, 60370, 60369, 60368, 60367, 60366, 60365, 60364, 60363, 60362, 60361, 60360, 60359, 60358, 60357, 60356, 60355, 60354, 60353, 60352, 60351, 60350, 60349, 60348, 60347, 60346, 60345, 60344, 60343, 60342, 60341, 60340, 60339, 60338, 60337, 60336, 60335, 60334, 60333, 60332, 60331, 60330, 60329, 60328, 60327, 60326, 60325, 60324, 60323, 60322, 60321, 60320, 60319, 60318, 60317, 60316, 60315, 60314, 60313, 60312, 60311, 60310, 60309, 60308, 60307, 60306, 60305, 60304, 60303, 60302, 60301, 60300, 60299, 60298, 60297, 60296, 60295, 60294, 60293, 60292, 60291, 60290, 60289, 60288, 60287, 60286, 60285, 60284, 60283, 60282, 60281, 60280, 60279, 60278, 60277, 60276, 60275, 60274, 60273, 60272, 60271, 60270, 60269, 60268, 60267, 60266, 60265, 60264, 60263, 60262, 60261, 60260, 60259, 60258, 60257, 60256, 60255, 60254, 60253, 60252, 60251, 60250, 60249, 60248, 60247, 60246, 60245, 60244, 60243, 60242, 60241, 60240, 60239, 60238, 60237, 60236, 60235, 60234, 60233, 60232, 60231, 60230, 60229, 60228, 60227, 60226, 60225, 60224, 60223, 60222, 60221, 60220, 60219, 60218, 60217, 60216, 60215, 60214, 60213, 60212, 60211, 60210, 60209, 60208, 60207, 60206, 60205, 60204, 60203, 60202, 60201, 60200, 60199, 60198, 60197, 60196, 60195, 60194, 60193, 60192, 60191, 60190, 60189, 60188, 60187, 60186, 60185, 60184, 60183, 60182, 60181, 60180, 60179, 60178, 60177, 60176, 60175, 60174, 60173, 60172, 60171, 60170, 60169, 60168, 60167, 60166, 60165, 60164, 60163, 60162, 60161, 60160, 60159, 60158, 60157, 60156, 60155, 60154, 60153, 60152, 60151, 60150, 60149, 60148, 60147, 60146, 60145, 60144, 60143, 60142, 60141, 60140, 60139, 60138, 60137, 60136, 60135, 60134, 60133, 60132, 60131, 60130, 60129, 60128, 60127, 60126, 60125, 60124, 60123, 60122, 60121, 60120, 60119, 60118, 60117, 60116, 60115, 60114, 60113, 60112, 60111, 60110, 60109, 60108, 60107, 60106, 60105, 60104, 60103, 60102, 60101, 60100, 60099, 60098, 60097, 60096, 60095, 60094, 60093, 60092, 60091, 60090, 60089, 60088, 60087, 60086, 60085, 60084, 60083, 60082, 60081, 60080, 60079, 60078, 60077, 60076, 60075, 60074, 60073, 60072, 60071, 60070, 60069, 60068, 60067, 60066, 60065, 60064, 60063, 60062, 60061, 60060, 60059, 60058, 60057, 60056, 60055, 60054, 60053, 60052, 60051, 60050, 60049, 60048, 60047, 60046, 60045, 60044, 60043, 60042, 60041, 60040



Map 3: City of Las Vegas - Surveillance Distribution and Results

Traps	Mosquitoes Tested	Mosquito Pools Tested	WNV + Mosquito Pools	SLEV+ Mosquito Pools	WNV/SLEV Co-infected Pools
826	16,784	756	135	20	18



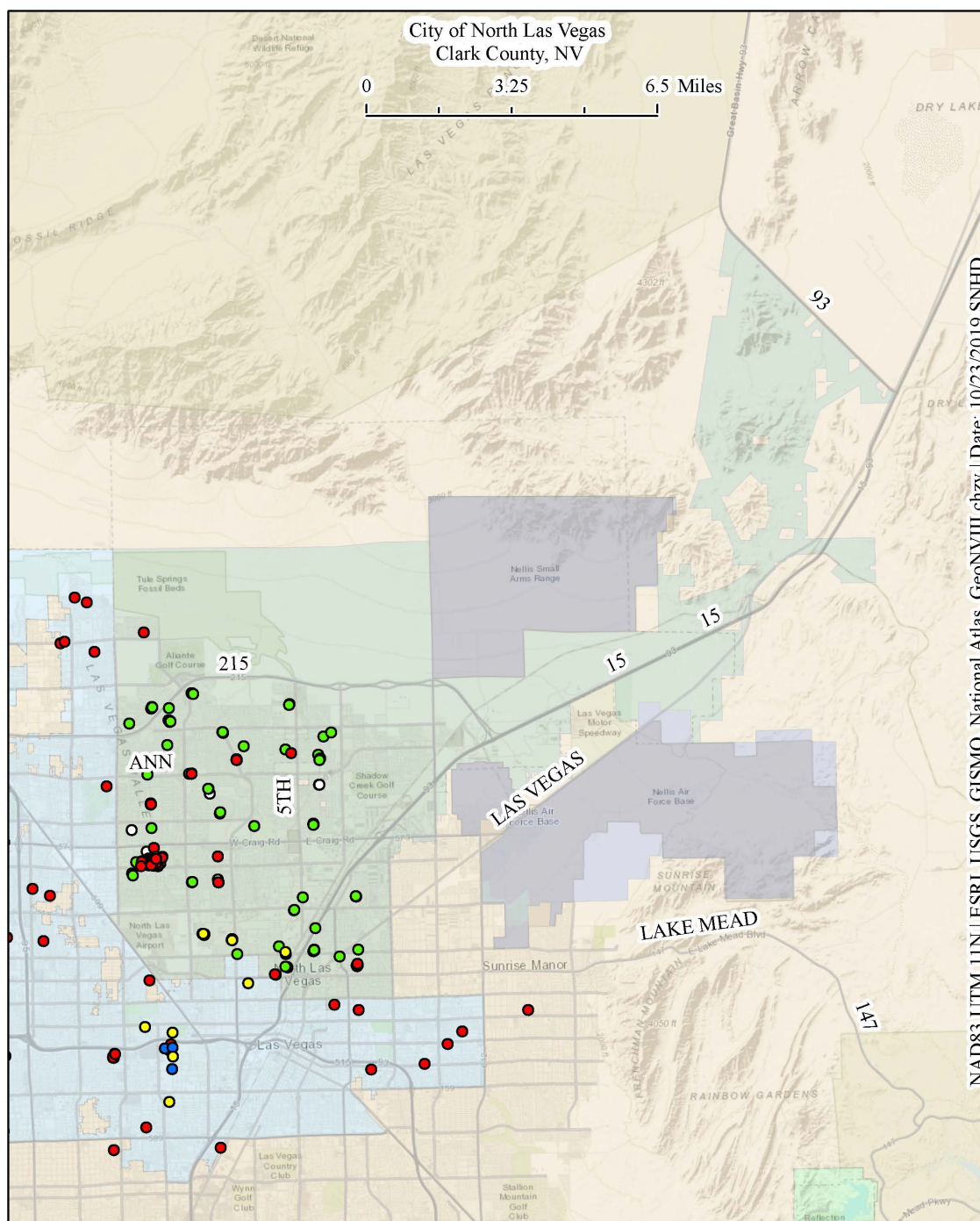
CY 2019 DISEASE DETECTED ● WNV(+), SLEV (+) ● WNV(-), SLEV (+)
 ● WNV(-), SLEV(-) ● WNV(+), SLEV (-) ○ Empty Trap

Traps	Mosquitoes Tested	Mosquito Pools Tested	WNV + Mosquito Pools	SLEV+ Mosquito Pools	WNV/SLEV Co-infected Pools
604	12,951	579	60	4	2



Map 5: City of North Las Vegas - Surveillance Distribution and Results

Traps	Mosquitoes Tested	Mosquito Pools Tested	WNV + Mosquito Pools	SLEV+ Mosquito Pools	WNV/SLEV Co-infected Pools
788	7037	577	50	4	3



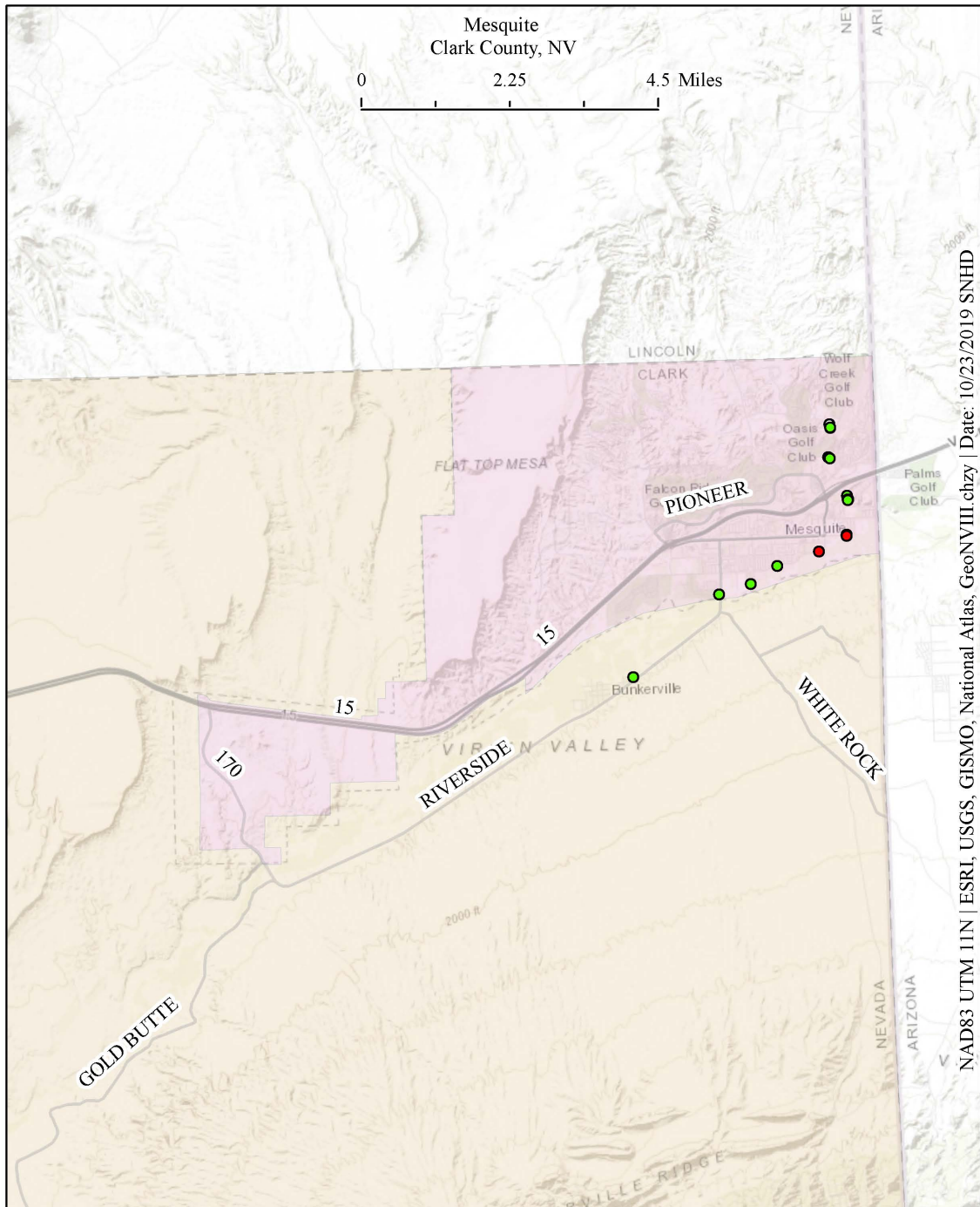
CY 2019 DISEASE DETECTED ● WNV(+), SLEV (+) ● WNV(-), SLEV (+)
 ● WNV(-), SLEV(-) ● WNV(+), SLEV (-) ○ Empty Trap

Traps	Mosquitoes Tested	Mosquito Pools Tested	WNV + Mosquito Pools	SLEV+ Mosquito Pools	WNV/SLEV Co-infected Pools
456	5,231	280	19	2	1



Map 7: City of Mesquite - Surveillance Distribution and Results

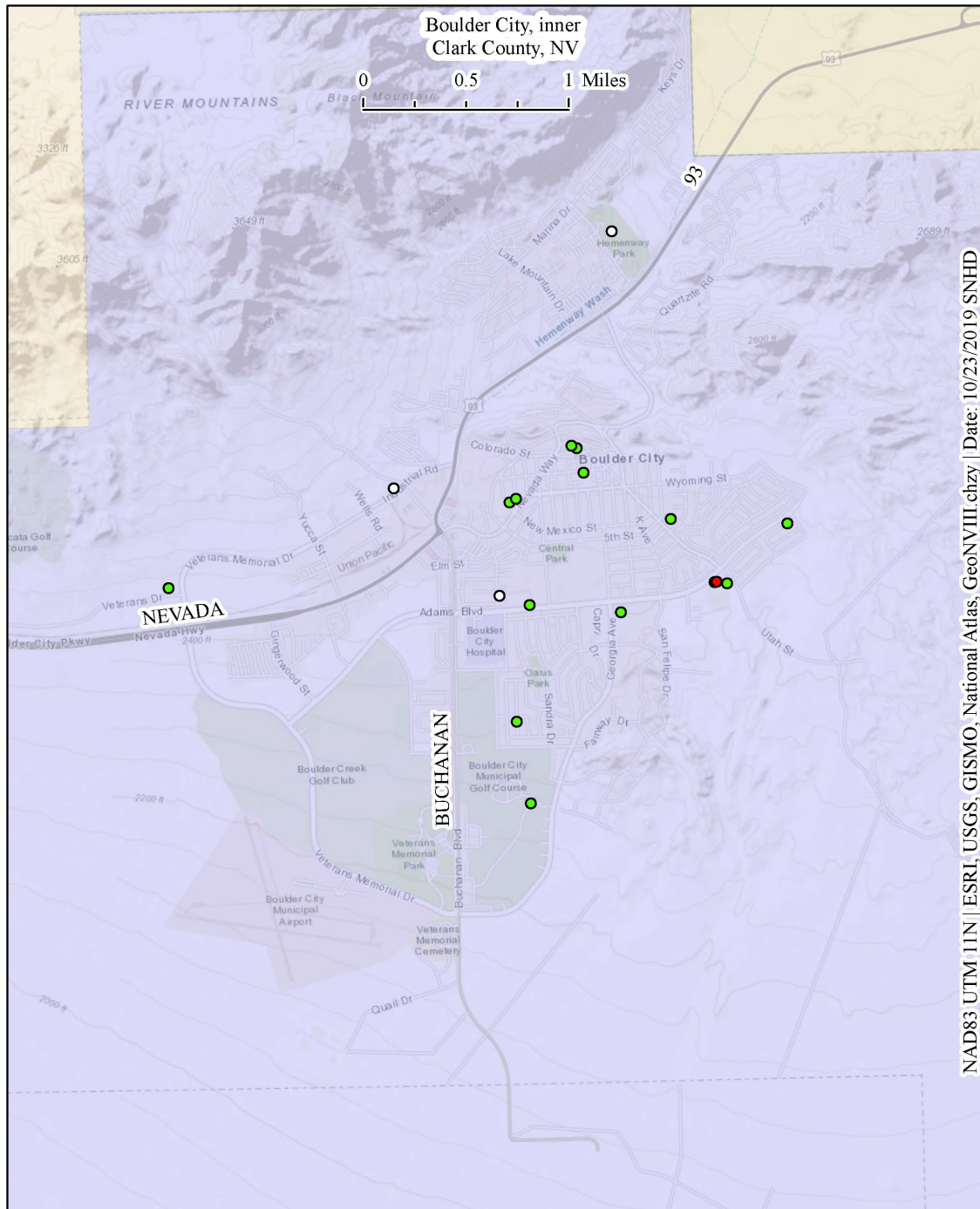
Traps	Mosquitoes Tested	Mosquito Pools Tested	WNV + Mosquito Pools	SLEV+ Mosquito Pools	WNV/SLEV Co-infected Pools
56	1,082	50	3	0	0



CY 2019 DISEASE DETECTED ● WNV(+), SLEV (+) ● WNV(-), SLEV (+)
 ● WNV(-), SLEV(-) ● WNV(+), SLEV (-) ○ Empty Trap

Map 8: Boulder City - Surveillance Distribution and Results

Traps	Mosquitoes Tested	Mosquito Pools Tested	WNV + Mosquito Pools	SLEV+ Mosquito Pools	WNV/SLEV Co-infected Pools
22	134	20	1	0	0



CY 2019 DISEASE DETECTED ● WNV(+), SLEV (+) ● WNV(-), SLEV (+)
 ● WNV(-), SLEV(-) ● WNV(+), SLEV (-) ○ Empty Trap

Appendix 1: Office of Communications Timeline of Outreach Activities

The Southern Nevada Health District's Office of Communications continued its efforts to educate the public about West Nile virus illnesses and prevention measures. The Office of Communications utilized social media, traditional news releases and public health updates, media interviews, and static monitors placed in public areas and employee breakrooms of the Health District's main public health center. West Nile virus prevention, mosquito bite and breeding prevention messages were posted to the Health District's Twitter, Facebook and Instagram accounts at least once per week between June and September. Spanish-language messages were also posted to the Health District's Spanish Twitter account.

To complement social media programs, the Health District's Office of Communications produced video to accompany postings, and mosquito surveillance activities were also included in Clark County Medical Association updates.

West Nile virus news releases, public health updates, and surveillance updates are posted to the Health District's website at the following links: <https://www.southernnevadahealthdistrict.org/Health-Topics/west-nile-virus/>

The comprehensive weekly arbovirus reports are found here:

<https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/weekly-arbovirus-update/>

News Releases:

- "Tis the Season – Mosquito Season, that is?" April 10
- "Health District reports first 2019 West Nile case," April 26
- "First West Nile-positive mosquitoes of the season identified," June 10
- "Health District reports second 2019 West Nile case," July 9
- "Health District issues precautions as additional West Nile cases reported," July 25
- West Nile Virus Update: Health District reports sixth case of West Nile virus, July 26
- "Mosquitoes – Southern Nevada has them and they are spreading disease!" July 30
- "West Nile virus an ongoing risk in Southern Nevada," Aug. 1
- "Twenty-eight cases of West Nile virus reported; Health District declares an outbreak – urges the public to protect themselves from mosquito bites," Aug. 22
- "Southern Nevada Health District reports first West Nile virus death in Clark County," Oct. 17

Public Health Updates:

- Health District reports 12th Case of West Nile Virus, Aug. 6
- Health District reports 13th, 14th, and 15th Cases of West Nile Virus, Aug. 7
- Health District reports 16th Case of West Nile virus, Aug. 8
- Weekly Arbovirus Report: Aug. 23

Social Media messages:

January:

Twitter:

- #MosquitoMonday: #Mosquito fish can be used in ornamental pools/golf courses as a natural #mosquito control tool. To get a batch, call 702-759-1633. It's not too early to think about #MosquitoControl! #FighttheBite #EnvironmentalHealth

Facebook:

- This week's rain is great but it might have left standing water in the yard, a perfect scenario for #mosquito breeding sites. Toss any standing water. <http://j.mp/2loNsUS> It's not too early to look around for #MosquitoBreeding at your home. #FighttheBite!

February:

Twitter

- Did you love this week's rain? Remember, standing water is a #mosquito's dream! Take a look around the yard and #TipNToss any standing water. It's not too early to prevent #mosquitobreeding! #FighttheBite: <https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-breeding-prevention/>
- RT OMG! #TipNToss! It doesn't take much water for a #mosquito breed. Check out the potential #mosquitobreeding spots in the yard, especially after recent rains! #FighttheBite even in February!
- #MosquitoMonday: Think just because it's winter, you don't need to eliminate standing water? <https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-breeding-prevention/> #TipNToss #FighttheBite #MosquitoBreeding

Facebook:

- Did you love this week's rain? Remember, standing water is a #mosquito's dream! Take a look around the yard and #TipNToss any standing water. It's not too early to prevent #mosquitobreeding! #FighttheBite: <http://j.mp/2t5hDTU>

March

Twitter:

- #MosquitoMonday: Spring is around the corner! Remember to identify places in the yard where water can pool. Those spots are perfect for #mosquitobreeding! Make it a habit to #TipNToss each week. #FighttheBite. <https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-breeding-prevention/>

- #MosquitoMonday: It takes only a bottle cap of water to become a #mosquitobreeding site! How many bottle caps of water are around your house after all this rain? Here's where you need to look: <http://j.mp/2t5hDTU> #TipNToss #FightTheBite #Mosquitosurveillance #publichealth
- If #SpringBreak includes travel plans, remember to pack smart and include #mosquito bite repellent, #sunscreen and a #travelhealthkit. @CDCgov: <https://wwwnc.cdc.gov/travel/page/pack-smart>
- #MosquitoMonday: #Mosquitoes lay eggs in a 'raft' on water or damp ground. Rafts can contain up to 400 eggs. They hatch into larvae in a day. Don't let this happen at your house! Check your yard for potential #mosquitobreeding sites! <http://j.mp/2t5hDTU> #FighttheBite

Facebook:

- Mosquito Monday: It takes only a bottle cap of water to become a mosquitobreeding site! How many bottle caps of water are around your house after all this rain? Here's where you need to look: <http://j.mp/2t5hDTU> #TipNToss #FightTheBite #Mosquitosurveillance #publichealth

April

Twitter

- #MosquitoMonday: Warming temperatures and #climatechange can mean more #mosquitoes, fleas, or ticks and the risk of #mosquitoborne illnesses. #FighttheBite #TipNToss #NPHW #NationalPublicHealthWeek @PublicHealth <http://www.nphw.org/nphw-2019/climate-change>
- #MosquitoMonday: Have you seen this guy? Our #mosquitosurveillance has begun for 2019: <https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/> #FlatVivek #FlatVee #EnvironmentalHealth #FighttheBite #MosquitoControl #VectorControl
- Have you seen these? Our #mosquitosurveillance activities have begun. We set these traps throughout the @ClarkCountyNV in potential #mosquitobreeding spots. For more information: <https://www.southernnevadahealthdistrict.org/news-release/tis-the-season-mosquito-season-that-is/> #FighttheBite #VectorControl #Mosquito #Environmentalhealth
- #MosquitoMonday: What are these? They're Health District #mosquitosurveillance traps that we use to monitor #mosquito activity in Southern Nevada. For #mosquitosurveillance info: <https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-trapping-methods/> #Vector #MosquitoBreeding #FighttheBite #EnvironmentalHealth
- #MosquitoMonday: We find #mosquitoes with #WestNile every year! Prevent #mosquito breeding, #TipNToss any standing water. #Mosquitoes can breed in as little as a capful of water! Here's where you should look: <http://j.mp/2t5hDTU> #FighttheBite
- We have confirmed the first human case of #WestNile virus in 2019. We remind everyone to prevent #mosquito bites and #mosquitobreeding. Remove standing water, use @EPA approved repellent. For more information: <http://j.mp/2Zzy2b>

- **#MosquitoMonday:** #WestNile virus is a preventable illness! We've already had one human case this season. Use EPA approved repellent to #FighttheBite and follow the directions carefully, especially when you're using it on children. We have more tips here: <http://j.mp/2Zzjy2b>

Facebook:

- **#MosquitoMonday:** Have you seen this guy? Our #mosquitosurveillance has begun for 2019! Remember to Fight the Bite and remove any standing water around your house to avoid mosquito breeding. They only need a capful of water!! Visit <http://j.mp/2uLKpKh> for more about our Environmental Health Division's Vector Control program.
- What's this? Our #mosquitosurveillance activities have begun. We set these traps throughout the @ClarkCountyNV in potential #mosquitobreeding spots. Different traps use different methods. #FighttheBite #VectorControl #Mosquito #Environmentalhealth
- We have confirmed the first human case of #WestNilevirus in 2019. We remind everyone to prevent #mosquitobites and #mosquitobreeding sources. Remove standing water at your home, and use @EPA approved repellent. For more information: <http://j.mp/2ZDuGv2> #FighttheBite
- **#MosquitoMonday:** #WestNile virus is a preventable illness! We've already had one human case this season. Use @EPA approved repellent to #FighttheBite and follow the directions carefully, especially when you're using it on children. We have more tips here: <http://j.mp/2Zzjy2b>

Instagram:

- **#MosquitoMonday:** Have you seen this guy? Our [#mosquitosurveillance](#) has begun for 2019. Remember to [#TipNToss](#) any standing water to prevent [#mosquitobreeding](#)! For more about our program, link in to our bio and go to the Mosquito Surveillance page. [#FlatVivek](#) [#FlatVee](#) [#EnvironmentalHealth](#) [#publichealth](#) [#VectorControl](#) [#MosquitoControl](#) [#FighttheBite](#) [#HealthyLV](#) [#WestNile](#) [#mosquito](#)
- What are these? They're [#mosquito](#) traps we use in our [#mosquitosurveillance](#) program. Each trap uses a different method. Our [#MosquitoControl](#) staff members drop them off in places that are likely to be [#mosquitobreeding](#) spots. No worries, they pick them up and bring them back to the office. The mosquitoes are then sorted and tested! You can help eliminate breeding by getting rid of any standing water in and around your yard. [#TipNToss](#)! Link in to our bio for more information about our Mosquito Surveillance Program. [#FightTheBite](#) [#Mosquito](#) [#snhd](#) [#publichealth](#) [#VectorControl](#)
- [#FlatV](#) here just [#chillin](#) out on another [#mosquitomondays](#)! Our EVS traps use dry ice to attract mosquitoes. Find out more about our program and the traps we use on the [#mosquitosurveillance](#) section of our [www.SNHD.info](#) website. [#fightthebite](#) [#mosquito](#) [#mosquitoseason](#) [#mosquitoprevention](#) [#tipandtoss](#) [#zika](#) [#westnilevirus](#)
- It's [#mosquitomondays](#) and our mosquito surveillance staff is ready for action! Are you? [#fightthebite](#) this mosquito season by eliminating standing water, preventing mosquito bites, and reporting mosquito activity by calling 702.759.1633. Find out more on our website

at www.SNHD.info!

[#mosquito](#) [#mosquitosurveillance](#) [#snhd](#) [#publichealth](#) [#vectorcontrol](#) [#healthylv](#) [#healthysouthernnevada](#) [#prevention](#) [#tipandtoss](#) [#skeeterbeater](#)

May

Twitter:

- Always follow the instructions when using an insect repellent, especially for babies and children. Need more about information about them, @CDCgov: <https://www.cdc.gov/zika/prevention/prevent-mosquito-bites.html> #TipNToss #FighttheBite
- #MosquitoMonday: In a single season, a female #mosquito can produce more than 400 million babies even if just 25 percent survive, according to the @AMCTweets. #FighttheBite prevent #mosquitobreeding! Here's what to look for: <http://j.mp/2t5hDTU>
- Our wet #spring is a #mosquito's dream! #TipNToss anything that can hold water, including the dog's dish! Where else should you look? Here: <https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-breeding-prevention/> #FighttheBite #MosquitoBite
- #MosquitoMonday: In 2018, we set 2008 #mosquito traps! Our program is up and running for 2019. You can help by removing potential breeding sources, like standing water. #TipNToss anything that can hold water, like flower pots or dog dishes! #FighttheBite: <https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-breeding-prevention/>
- If #summer vacation includes travel plans, remember to pack smart and include #mosquitobite repellent, #sunscreen and a #travelhealthkit. @CDCgov: <https://wwwnc.cdc.gov/travel/page/pack-smart>
- #MosquitoMonday: #Mosquitoes in Las Vegas? Yes and quite a few! With few exceptions, we've had human cases of #WestNile virus each year since 2004. #Mosquito borne illnesses are preventable. #FighttheBite at home and on vacation this spring and summer: <http://j.mp/2Zzjy2b>
- #FlatV reminds everyone that we've already had a year's worth of rain in Southern Nevada! Remember to #TipNToss any items that collect water to prevent #mosquitobreeding: <https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-breeding-prevention/> #FighttheBite #MosquitoBite
- If you're traveling this #summer, don't forget your #mosquitobite prevention tools with @EPA-approved repellent, long pants and long sleeves. Visit <https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-bite-prevention/> for tips. #FighttheBite #SummerVacation #healthySummer

Facebook:

- #MosquitoMonday: In 2018, we set 2008 #mosquito traps! Our program is up and running for 2019. You can help by removing potential breeding sources, like standing water. #TipNToss anything that can hold water, like flower pots or dog dishes! #FighttheBite: <https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-breeding-prevention/>

- FlatV reminds everyone that we've already had a year's worth of rain in Southern Nevada! Remember to #TipNToss any items that collect water to prevent mosquito breeding: <https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-breeding-prevention/> #FighttheBite #MosquitoBite

June

Twitter:

- #MosquitoMonday: We love @AMCTweets #funfacts! Like this one: #mosquitoes fly an estimated 1 to 1.5 miles per hour. You still need to use repellent! #FighttheBite with @EPA-registered repellent and follow all the directions: <http://j.mp/2H6xPel> #SummerSafety
- In 7 to 10 days, a #mosquito develops from an egg into an adult and starts wiggling around in a water source in your yard. #FlatV reminds Southern Nevadans we have #mosquitofish to use in your ornamental pools or bird baths prevent #mosquitobreeding! Call (702) 759-1633 for info.
- RT #FighttheBite #TipNToss Here are a few places to look for standing water:!
- #MosquitoMonday: Our #MosquitoSurveillance team is trapping lots of #mosquitoes across @ClarkCountyNV. #FighttheBite and #TipNToss any standing water. Use @EPA-registered #insectrepellent. For more: <https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-bite-prevention/> #WestNile #WNV #MosquitoControl
- We're reporting our first #WestNile-positive #mosquitoes in 2019 in the 89005 ZIP code. In April, we reported a human case in a woman over age 50. #FighttheBite! #TipNToss anything with standing water around your home to prevent #mosquitobreeding! For more: <https://www.southernnevadahealthdistrict.org/news-release/first-west-nile-positive-mosquitoes-of-the-season-identified/>
- #FridayFact: #Mosquitoes use sight to find their hosts-you! They detect infra-red radiation put out by warm bodies and by chemical signals, like carbon dioxide. Don't welcome them in! #FighttheBite with #insect repellent. For more: <https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-bite-prevention/> #WestNile #SummerSafety
- #MosquitoMonday: You're never too young to learn to #FighttheBite! Find out how: <https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-breeding-prevention/> #MosquitoControl #SummerSafety
- #MosquitoMonday: @AMCATweets-there are 2,700 #mosquito species; 176 here in North America! They find hosts -you- by observing movement and chemical 'signals.' #FighttheBite! Use @EPA-registered repellents. #MosquitoBite #SummerSafety #MosquitoAwarenessWeek <http://j.mp/2Zzy2b>
- #MosquitoAwarenessWeek: We've set 900 traps so far. We found #WestNile positive #mosquitoes in the 89005/89101/89110 ZIP codes. Just because we haven't found them in your ZIP code doesn't mean they're not there. #FighttheBite! Prevent #mosquitobreeding: <http://j.mp/2t5hDTU>
- Our Chief Health Officer Dr. Joe Iser was a guest today on @KNPRnews State of Nevada. He chatted about #hepatitisA, #WestNile, #immunizations and #measles: <https://knpr.org/knpr/2019-06/hep-west-nile-what-else-public-health-questions-answered>

- MosquitoAwarenessWeek: If you're roughing it, remember to use #mosquito netting if you're sleeping outdoors or in an unscreened building. For more ways to #fightthebite, <http://j.mp/2Zzjy2b> #SummerSafety #MosquitoControl
- #FridayFact: If you're active or fidgety, you're more attractive to #mosquitoes! Who knew? Active people produce more CO2 and lactic acid, 2 things #mosquitoes love. Remember #insectrepellent when you're outside. To #FighttheBite: <http://j.mp/2Zzjy2b> #SummerSafety @AMCAtweets

Facebook:

- Mosquito Monday: You're never too young to learn to Fight the Bite! Find out how to prevent mosquito bites and mosquito breeding to keep you safe and healthy this summer: <http://j.mp/2t5hDTU>
- We're reporting our first West Nile virus-positive #mosquitoes in 2019. They're in the 89005 ZIP code. In April, we reported one West Nile virus case in a woman over age 50. Don't give mosquitoes a chance to breed! They need very little water. #FightheBite and #TipNToss anything with standing water around your home! More: <http://j.mp/31mWfcT>

Instagram:

- It's never too early to learn how to #fightthebite and have a safer and healthier summer! Environmental Health Supervisor Vivek Raman shared tips for preventing #mosquito bites with his son and classmates - and some awesome #swag to reinforce the message while they're having fun! Link in our bio for more mosquito surveillance information. #mosquitomonday [#mosquitoprevention](#) [#skeeterbeeter](#) [#environmentalhealth](#) [#publichealth](#) [#mosquitosurveillance](#) [#healthylv](#) [#healthysouthernnevada](#) [#thisispublichealth](#) [#vectorcontrol](#)

July

Twitter:

- MosquitoMonday: Our team identified #WestNile-positive #mosquitoes in ZIP codes all over the Valley. Prevent #mosquitobites by using #insectrepellent. #FlatV shows you how! For updated information, check out our weekly reports: <http://j.mp/2ZTjsBN> #FighttheBite #SummerSafety
- Traveling this summer? Bring home souvenirs not #Zika or #WestNile! #FighttheBite. Pack right to avoid #mosquitobites: #insectrepellent, long pants, long-sleeved shirts and mosquito netting for tents or baby strollers <http://j.mp/1PpokTz> #SummerSafety #MosquitoControl
- #MosquitoMonday: #Mosquitoes lay eggs in a "raft" for 100 to 400 eggs, singly on the water or on damp ground where water will cover them. They hatch in a day or so into larvae. #FighttheBite! #TipNToss anything with water: <http://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-breeding-prevention/> #MosquitoControl #SummerSafety
- We are reporting our second case of #WestNile virus in a woman under the age of 50. #WNV is preventable. Take steps to #FighttheBite! Remove any #standingwater, and use

#inspectrepellent. For more: <https://www.southernnevadahealthdistrict.org/news-release/health-district-reports-second-2019-west-nile-case/>

- The real V, our #mosquitosurveillance supervisor, explains how one of our traps work to @KTNV and @UnivisionNevada. #FighttheBite to prevent #WestNile virus.
- It's Monsoon Season! When it rains it pours. It really pours! Remember to #TipNToss any standing water to prevent #mosquitobreeding:
<http://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-breeding-prevention/> #FighttheBite #SummerSafety
- #MosquitoMonday: Where should you look for standing water? To #FighttheBite, #tipntoss standing water from dog dishes, wading pools, check the rain gutters and the A/C drain outlets as well as under your house. Say no to #mosquitobreeding!
<http://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-breeding-prevention/> #SummerSafety
- We continue to find #WestNile-positive #mosquitoes throughout @ClarkCountyNV. Remember to remove any standing water to eliminate #mosquitobreeding sources. They need very little water to breed! #FighttheBite:
<https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-breeding-prevention/> #SummerSafety #Mosquitobite
- #MosquitoMonday: Did you know only female #mosquitoes bite? They need blood — yours — to develop their eggs! Don't let them! #FighttheBite by removing #standingwater, using #insectrepellent, wearing long sleeves and long pants. For more tips: <http://j.mp/2Zzjy2b> #SummerSafety
- #SummerSafety: We've had two cases of #WestNile in people nad #WNV-positive #mosquitoes! Most people have mild symptoms, come can get very ill. Remember, it is preventable. #FighttheBite with #insectrepellent, long-sleeves, #mosquito netting. For more: <https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-bite-prevention/>
- 6th West Nile virus case in 2019 reported in the Valley.
- We're reporting six cases of #westnilevirus and an ongoing outbreak in the #mosquitopopulaton. #FighttheBite with repellent and eliminating standing water around your home!

Facebook:

- Mosquito Monday: Our team has identified West Nile virus-positive mosquitoes in ZIP Codes throughout the Las Vegas Valley! You can protect yourself against West Nile or other illnesses by avoiding mosquito bites by using #insect repellent. FlatV shows you how! For more information about how to #FighttheBite <http://j.mp/2Zzjy2b>
- We are reporting our second 2019 case of West Nile virus in a woman under the age of 50. #WNV is preventable. Take steps to Fight the Bite! Remove any standing water and use inspect repellent. For more: <http://j.mp/2XMYIUB>
- The real FlatV, our mosquito surveillance supervisor otherwise known as Vivek, explains how one of our mosquito traps work to @KTNV LasVegas and @NoticiasUnivisionNevada. It's mosquito season, take time to Fight the Bite to prevent West Nile virus. We have tips here: <http://j.mp/2t5hDTU>

- We're reporting six cases of West Nile virus and an ongoing outbreak in the mosquito population. Fight the Bite by using an EPA-registered repellent and by eliminating standing water around your home!
- It's Monsoon Season! When it rains it pours. It really pours! Remember to tip and toss anything that has standing water to prevent mosquito breeding. They need just a little water to breed. For more tips: <http://j.mp/2LI35Ko>. Fight the Bite!

Instagram:

- [#MosquitoMonday](#): Our team has identified [#WestNile](#) virus-positive [#mosquitoes](#) here in the Las Vegas Valley! You can protect yourself against West Nile or other illnesses by avoiding [#mosquitobites](#) by using [#insectrepellent](#). FlatV shows you how! For more information about how to [#FighttheBite](#) link into our bio. .
[#summersafety](#) [#publichealth](#) [#snhd](#) [#mosquitocontrol](#) [#mosquitoseason](#) [#TipNToss](#)
- Vivek Raman, Environmental Health Supervisor, aka 3D-V vs. [#FlatV](#) - explains how [#mosquitotraps](#) are used for surveillance to [@ktnv](#) and [@univision](#) after another new case of [#westnilevirus](#) is reported. [#mosquitomonday](#)
[#fightthebite](#) [#mosquitorepellent](#) [#mosquitocontrol](#) [#tipandtoss](#) [#snhd](#) [#healthylv](#)
[#healthysouthernnevada](#) [#thisispublichealth](#) [#vectorcontrol](#) [#environmentalhealth](#)
- We're reporting six cases of [#westnilevirus](#) and an ongoing outbreak in the [#mosquito](#) population. The public is urged to protect themselves from [#mosquitobites](#) by using an EPA-registered repellent and eliminating breeding sources around their homes. [#mosquitomonday](#) [#fightthebite](#) [#tipandtoss](#) [#tipandtosswater](#) [#snhd](#) [#healthylv](#)
[#healthysouthernnevada](#) [#thisispublichealth](#) [#mosquitocontrol](#)

August

Twitter

- We reported Clark County's 12th case of [#WestNile](#) virus. No matter where you live or play, [#FighttheBite](#) with [@EPA](#)-registered [#insectrepellent](#). For more [#mosquito](#) bite prevention tips go to <https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-bite-prevention/#SummerSafety> [#FlatV](#)
- [#MosquitoMonday](#): [#WestNile](#) virus continues to be identified in the Las Vegas Valley. Prevent [#mosquitobites](#) by using [@EPA](#)-registered [#insectrepellents](#). We have information here: <https://www.southernnevadahealthdistrict.org/Health-Topics/west-nile-virus/insect-repellent/> [#FighttheBite](#) [#Mosquito](#)
- [#MosquitoMonday](#): We submitted 38,000+ [#mosquitoes](#) for testing; 19 percent were positive for [#WestNile](#) virus or St. Louis Encephalitis. Remember, [#FighttheBite](#) with [#insectrepellent](#) and [#TipNToss](#) items that can hold water, like wading pools or dog dishes!
<http://j.mp/2Zzjy2b>
- DYK [#mosquitoes](#) are among the deadliest animals in the world? According to [@AMCAtweets](#), each year more than 1 million people worldwide die from a [#mosquitoborne](#) illness. [@AMCAtweets](#): <https://www.mosquito.org/page/diseases>. Be safe, [#FighttheBite](#) [#TipNToss](#) [#InsectRepellent](#) [#WorldMosquitoDay](#)

- No #mosquitoes in Nevada? There are 18 species in Southern Nevada. Our #MosquitoSurveillance team has identified the species that can transmit #WestNile, #Zika, St. Louis Encephalitis. #FighttheBite. #TipNToss anything that can hold water.
- We're declaring an outbreak of #WestNile virus in @ClarkCountyNV with 28 cases of #WNV in people—the most ever in one season. Seventeen of the 28 cases have had the more serious neuroinvasive form. Prevent #mosquitobites and eliminate standing water. More: <https://www.southernnevadahealthdistrict.org/news-release/twenty-eight-cases-of-west-nile-virus-cases-reported/>
- We're having an outbreak of #WestNile. If you're outdoors this weekend, #FighttheBite and protect against #WestNile! Avoid #mosquito bites and use #insectrepellent/long pants/long-sleeved shirts/mosquito netting for tents/crib/stroller: <http://j.mp/1PpokTz> #SummerSafety
- Unused bird baths, wading pools, and flower pots are #mosquito dreamhouses. #FighttheBite #TipNToss anything with standing water to reduce breeding sources. For more, our #MosquitoSurveillance program has tips: <http://j.mp/2t5hDTU> #WNV #WestNile #Zika #mosquitoes
- #MosquitoMonday: We're midway through #summer, but it's still #mosquito season. We're reporting 29 cases of #WestNile with a month to go! It's a preventable illness. Take #mosquitobite prevention seriously! #FighttheBite #insectrepellent #TipNToss More: <http://j.mp/2zkFCBTI>
- Our #MosquitoSurveillance teams are still setting #mosquito traps, they're loaded with the bugs when they pick them up. #FighttheBite and eliminate #mosquitobreeding sources. #TipNToss anything that can hold even a cupful of water! Where should you look? <http://j.mp/2t5hDTU>

Facebook:

- Mosquito Monday: In 2019, we submitted 38,000+ #mosquitoes for testing to the Southern Nevada Public Health Laboratory; 19 percent were positive for West Nile virus or St. Louis Encephalitis. Remember to fight the bite with insect repellent and tip and toss items that can hold water, like wading pools or dog dishes! <http://j.mp/2Zzy2b>
- Mosquito Monday: We're midway through summer, but it's still mosquito season. We're reporting 29 cases of West Nile virus in people so far this year and we've got at least a month to go! It's a preventable illness. Take mosquito bite prevention seriously! Remember your insect repellent, wear long-sleeves/pants and remove any standing water in your yard. For more information: <http://j.mp/2HtDJqO>
- We are declaring an outbreak of West Nile virus in Clark County after receiving reports of 28 cases of the disease in people. This is the highest case count in a season since the virus was first detected in the state in 2004. In addition to the high number of cases, 17 of the 28 reported cases have had the more serious neuroinvasive form of the illness. We remind everyone to protect against mosquito bites. Use insect repellent, wear long-sleeved shirts and pants, and eliminate any standing water. For more information: https://www.southernnevadahealthdistrict.org/news-release/twenty-eight-cases-of-west-nile-virus-cases-reported/?fbclid=IwAR2cNOfgQwLCzFTlr3eSJ1Dgl8hF8lluwjB27J8kN6ZJ_o37gYRZIsHA8RU

Instagram:

- We've submitted 38,000+ [#mosquitoes](#) for testing this year - 19% were positive for [#westnilevirus](#) or [#stlouiscephalitis](#). Remember to [#fightthebite](#) with insect repellent and to eliminate standing water around your home! [#mosquitomonday](#) [#tipandtoss](#) [#snhd](#) [#nomosquitosallowed](#) [#snhd](#) [#mosquitocontrol](#) [#healthylv](#) [#healthysouthernnevada](#) [#thisispublichealth](#) [#vectorcontrol](#)

September

Twitter

- #MosquitoMonday: Our #MosquitoSurveillance team's still catching plenty of #mosquitoes! This year, we've had more #WestNile cases than ever before! #WNV is preventable. #FighttheBite use #insectrepellent and #TipNToss standing water: <http://j.mp/2Zzjy2b> #Skeeterfighters
- #Mosquitoes need only about a capful of water to breed. A capful! Eliminate your risk of #WestNile virus infection by eliminating #mosquitobreeding sources. #FighttheBite. Where should you look? <https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-breeding-prevention/> #MosquitoSurveillance
- DYK: Only female mosquitoes bite and they may live three to five weeks in summer. In order to lay eggs, she needs a blood meal. That's you! We're seeing more cases of #WestNile than ever before. Take steps to eliminate #mosquitobreeding and #fightthebite: <https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/>
- #MosquitoMonday: Remember to use an @EPA-registered #insectrepellent when you go outside, even if it's for a few minutes. #Mosquitoes that carry #WestNile virus typically bite at dawn/dusk. Follow the directions. For more: <http://j.mp/2H6xPeI> #FighttheBite #WNV #FlatV
- #MosquitoMonday: Even though temperatures are cooling down, it's still summer! Don't let your #mosquitobite prevention guard down. #Mosquitoes are still out there looking for you! #FighttheBite. Our #MosquitoSurveillance team has tips! For more: <http://j.mp/2Zzjy2b>
- #MosquitoMonday: If you have green pools in your neighborhood, call your local code enforcement or public works departments to respond. Find them here: <http://j.mp/2LwbH0x> @ClarkCountyNV @CityofLasVegas @cityofhenderson @CNLV @BoulderCityNev @GoMesquiteNV #FighttheBite
- #MosquitoMonday: Our #MosquitoSurveillance program can provide #mosquito fish to help homeowners or businesses #fightthebite and eliminate #mosquitobreeding. For more information <https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-breeding-prevention/> or call 702-759-1633.

Facebook:

- Great prevention tips on the accompanying video - Click on the article to view! [43 cases of West Nile Virus reported in Clark County](#)
The Southern Nevada Health District reported at least 43 cases of West Nile Virus have been recorded in Clark County in 2019. This is up from...

- Mosquito Monday: Our Mosquito Surveillance program can provide mosquito fish to help homeowners or businesses fight the bite and eliminate mosquito breeding. For more information, visit our Mosquito Surveillance program pages: <http://j.mp/2t5hDTU> or call 702-759-1633.
- Mosquito Monday: Even though the temperatures are cooling down (by Southern Nevada standards), it's still summer! Don't let your #mosquitobite prevention guard down. #Mosquitoes are still out there looking for you! Take steps to #FighttheBite. Our Mosquito Surveillance team has tips! Visit our website for more: <http://j.mp/2Zzjy2b>

Instagram:

- Temperatures may be dropping to the chilly 90s here in Southern Nevada, but the #mosquitoes are still biting! If you're spending time outside make sure to use an FDA-registered mosquito repellent! #mosquitomonday #fightthebite #mosquitoessuck #snhd #healthysouthernnevada #itsstillhotout #tipandtoss #healthylv #thisispublichealth #publichealth #mosquitoesbite

October:

Twitter:

- #MosquitoMonday: #Mosquitoes are making their last stand as the weather cools down, so remember to #FighttheBite! #TipNToss any standing water to prevent #mosquitobreeding: <https://www.southernnevadahealthdistrict.org/programs/mosquito-surveillance/mosquito-breeding-prevention> #FighttheBite #publichealth

Media Interviews and News Stories:

Between April and October, there were 127 news stories related to West Nile virus, mosquito activity and mosquito season. Media interviews with Health District Mosquito Surveillance staff included television, radio and print media outlets. In addition, media outlets developed stories from weekly updates:

April:

- 04.10.2019: Las Vegas Review Journal: "Las Vegas Valley mosquito monitoring operation begins," <https://www.reviewjournal.com/local/local-las-vegas/las-vegas-valley-mosquito-monitoring-operation-begins-1637961/>
- 04.10.2019: KXNT-AM/FM: "Mosquito Season Officially Arrived In Southern Nevada," <https://kxnt.radio.com/articles/mosquito-season-officially-arrived-southern-nevada>
- 04.13.2019: KSNV-TV3: "SNHD helps locals 'fight the bite' with mosquito awareness," <https://news3lv.com/news/local/snhd-helps-locals-fight-the-bite-with-mosquito-awareness>
- 04.26.2019: KXNT-AM/FM: "First Clark County West Nile Virus Case of the Year Reported," <https://kxnt.radio.com/articles/first-clark-county-west-nile-virus-case-year-reported>
- 04.26.2019: KNPR-FM: "1st Human Case of West Nile This Year Reported in Las Vegas Area," <https://knpr.org/headline/2019-04/1st-human-case-west-nile-year-reported-las-vegas-area>

- 04.26.2019: KDWN-AM/FM: "First Case of West Nile Reported in Clark County," <https://kdwn.com/2019/04/26/first-case-of-west-nile-reported-in-clark-county/>
- 04.26.2019: KTNV-TV13: "First Human Case of West Nile This Year in Southern Nevada," <http://www.ktnv.com/story/40376034/first-human-case-of-west-nile-this-year-in-southern-nevada>
- 04.26.2019: Las Vegas Review Journal: "Southern Nevada has first human case of West Nile virus in 2019," <https://www.reviewjournal.com/local/southern-nevada-has-first-human-case-of-west-nile-virus-in-2019-1650215/>
- 04.26.2019: KLAS-TV8: "First West Nile virus case reported in Clark County for 2019," <https://www.lasvegasnow.com/news/local-news/first-west-nile-virus-case-reported-in-clark-county-for-2019/1956638440>
- 04.26.2019: SFGate: "1st human case of West Nile this year reported in Vegas area," <https://www.sfgate.com/news/article/1st-human-case-of-West-Nile-this-year-reported-in-13798457.php>
- 04.26.2019: The Argus Press: "1st human case of West Nile this year reported in Vegas area," https://www.argus-press.com/news/state_news/article_3d5c5c8c-88a8-5e97-a5b0-145c1dc50380.html
- 04.26.2019: St. George News: "County mosquito crews battle deadliest insect on earth; 1 West Nile illness reported in Nevada," <https://www.stgeorgeutah.com/news/archive/2019/04/26/cgb-county-mosquito-crews-battle-deadliest-insect-on-earth-1-west-nile-illness-reported-in-nevada/#.XMcPd4IKjcs>
- 04.26.2019: Las Vegas Sun: "Health District reports fir 2019 West Nile case," <https://lasvegassun.com/news/2019/apr/26/health-district-reports-first-2019-west-nile-case/>
- 04.26.2019: KSNV-TV3: "First human case of West Nile virus reported in Southern Nevada for 2019," <https://news3lv.com/news/local/first-human-case-of-west-nile-virus-reported-in-southern-nevada-for-2019>
- 04.26.2019: KVVU-TV5: "Health District confirms first case of West Nile virus for 2019," https://www.fox5vegas.com/news/health-district-confirms-first-case-of-west-nile-virus-for/article_74a0c10e-683b-11e9-9a1a-136862fc093d.html
- 04.28.2019: Outbreak News Today: "Las Vegas area reports 1st West Nile virus case of 2019," <http://outbreaknewstoday.com/las-vegas-area-reports-1st-west-nile-virus-case-2019/>
- 04.29.2019: Las Vegas Heals: "Health District Reports First 2019 West Nile Case," <https://www.lasvegasheals.org/health-district-reports-first-2019-west-nile-case/>

May:

- 05.01.2019: Lotus Broadcasting: Fermin Leguen recorded an interview with Luis Bonilla for the Spanish-language public affairs show regarding measles and the first West Nile case.
- 05.14.2019: KLAV-AM: Jorge Viote was a guest on Miriam Hickerson's Spanish-language weekly consumer affairs show to discuss Hepatitis Awareness Month, where to obtain free hepatitis C testing, and mosquito breeding and bite prevention.

June:

- 06.10.2019: KTNV-TV13: First West Nile Positive Mosquitoes Found in Southern Nevada," <https://www.ktnv.com/story/40623117/first-west-nile-positive-mosquitoes-found-in-southern-nevada>

- 06.10.2019: KVVU-TV5: "West Nile-carrying mosquitoes found near Las Vegas Valley, Health District says," https://www.fox5vegas.com/news/west-nile-carrying-mosquitoes-located-in-las-vegas-valley-health/article_7aa1e726-8bd2-11e9-8c6d-8f609730e3fb.html
- 06.10.2019: "Southern Nevada Health District reports case of West Nile virus," <http://www.sneakpeekreports.com/article/southern-nevada-health-district-reports-case-of-west-nile-virus?aid=7AbsCNGqAXaDxQEi5fEz>
- 06.10.2019: Business Breaking News: "Southern Nevada Health District reports case of West Nile virus," <https://www.businessbreakingnews.net/2019/06/southern-nevada-health-district-reports-case-of-west-nile-virus/>
- 06.10.2019: Las Vegas Review Journal: "Southern Nevada Health District reports case of West Nile virus," <https://www.reviewjournal.com/local/southern-nevada-health-district-reports-case-of-west-nile-virus-1684132/>
- 06.10.2019: KLAS-TV8: "West Nile virus-positive mosquitoes found in 89005 zip code," <https://www.lasvegasnow.com/news/local-news/west-nile-virus-positive-mosquitoes-found-in-89005-zip-code/2066783876>
- 06.10.2019: KTNV-TV13: "Woman contracts West Nile virus in Southern Nevada," <https://www.ktnv.com/news/woman-contracts-west-nile-virus-in-southern-nevada>
- 06.10.2019: KSNV-TV3: "Mosquitoes with West Nile virus found in Boulder City," <https://news3lv.com/news/local/mosquitoes-with-west-nile-virus-found-in-boulder-city>
- 06.10.2019: KRXI-TV11 Reno: "Mosquitoes with West Nile virus found in Boulder City," <https://foxreno.com/news/local/mosquitoes-with-west-nile-virus-found-in-boulder-city>
- 06.11.2019: KKOH-AM: "Southern Nevada Reports First West Nile Virus Case for 2019," <http://www.kkoh.com/2019/06/11/southern-nevada-reports-first-west-nile-virus-case-for-2019/>
- 06.11.2019: The Spectrum: "West Nile positive mosquitoes reported in Southern Nevada, raising worries in nearby Utah," <https://www.thespectrum.com/story/news/2019/06/11/west-nile-virus-mosquitoes-reported-near-lake-mead-water/1419323001/>
- 06.12.2019: Boulder City Review: "West Nile virus found in three area mosquitoes," <https://bouldercityreview.com/news/west-nile-virus-found-in-three-area-mosquitoes-52944/>
- 06.15.2019: Mohave Daily News: "Clark County reports mosquito tests positive for West Nile," http://www.mohavedailynews.com/news/clark-county-reports-mosquito-tests-positive-for-west-nile/article_43238c9c-8ffa-11e9-845a-47f13cc66509.html
- 06.17.2019: Las Vegas Heals: "First West Nile-Positive Mosquitoes of the Season Identified," <https://www.lasvegasheals.org/first-west-nile-positive-mosquitoes-of-the-season-identified/>
- 06.26.2019: Boulder City Review: "To help prevent mosquito bites, eliminate their preferred environment," <https://bouldercityreview.com/news/to-help-prevent-mosquito-bites-eliminate-their-preferred-environment-53137/>
- 06.26.2019: Pahrump Valley Times: "Southern Nevada Health District reports case of West Nile virus," <https://pvtimes.com/news/southern-nevada-health-district-reports-case-of-west-nile-virus-71867/>

July:

- 07.08.2019: KTNV-TV13: "Second reported case of West Nile virus this year," <https://www.youtube.com/watch?v=EEE2DkYxqrY>
- 07.08.2019: KDWN-AM/FM: "2nd Case of West Nile Reported in Southern Nevada," <https://kdwn.com/2019/07/08/2nd-case-of-west-nile-reported-in-southern-nevada/>

- 07.08.2019: KVVU-TV5: "Las Vegas woman talks about frightening West Nile diagnosis," https://www.fox5vegas.com/news/second-west-nile-virus-case-reported-in-southern-nevada-for/article_68329774-a19a-11e9-abe1-53b171f38f2b.html
- 07.08.2019: KLAS-TV8: "Second West Nile case reported in Southern Nevada," <https://www.lasvegasnow.com/news/local-news/second-west-nile-case-reported-in-southern-nevada/>
- 07.08.2019: Las Vegas Review Journal: "Second case of West Nile virus in 2019 confirmed in Southern Nevada," https://www.reviewjournal.com/life/health/second-case-of-west-nile-virus-in-2019-confirmed-in-southern-nevada-1706089/?utm_source=onesignal&utm_medium=push_notification
- 07.08.2019: Reno Gazette Journal: "Las Vegas area logs second case of West Nile, woman hospitalized," <https://www.rgj.com/story/news/2019/07/08/las-vegas-area-logs-second-case-west-nile-woman-hospitalized/1679270001/>
- 07.08.2019: Las Vegas Sun: "Health District reports 2nd human case of West Nile virus," <https://lasvegassun.com/news/2019/jul/08/health-district-reports-2nd-human-case-of-west-nile/>
- 07.08.2019: KSNV-TV3: "Second West Nile case reported in Southern Nevada," <https://news3lv.com/news/local/second-west-nile-case-reported-in-southern-nevada>
- 07.10.2019: Mesquite Local News: "Report of West Nile Virus," <https://mesquitelocalnews.com/2019/07/10/report-of-west-nile-virus/>
- 07.25.2019: Las Vegas Review Journal: "Agency warns of outbreak of mosquito-borne illness in Clark County," <https://www.reviewjournal.com/life/health/agency-warns-of-outbreak-of-mosquito-borne-illness-in-clark-county-1810903/>
- 07.25.2019: KVVU-TV5: "Southern Nevada Health District reports 3 more cases of West Nile virus," https://www.fox5vegas.com/news/local/southern-nevada-health-district-reports-more-cases-of-west-nile/article_b1ed9f84-af33-11e9-892a-aba2f3312bdd.html
- 07.25.2019: KLAS-TV8: "3 new West Nile Virus cases confirmed in Las Vegas valley," <https://www.lasvegasnow.com/news/local-news/3-new-west-nile-virus-cases-confirmed-in-las-vegas-valley/>
- 07.25.2019: KSNV-TV3: "Three more cases of West Nile reported in Southern Nevada," <https://news3lv.com/news/local/three-more-cases-of-west-nile-reports-brings-total-to-five-in-so-nevada>
- 07.25.2019: KTNV-TV13: "3 more Clark County residents test positive for West Nile virus," <https://www.ktnv.com/news/3-more-clark-county-residents-test-positive-for-west-nile-virus>
- 07.26.2019: KXNT-AM/FM: "Three New Cases of West Nile Virus Reported," <https://kxnt.radio.com/articles/news/three-new-cases-west-nile-virus-reported>
- 07.26.2019: KLAS-TV8: "6th West Nile virus case in 2019 reported in Las Vegas valley," <https://www.lasvegasnow.com/news/local-news/6th-west-nile-virus-case-in-2019-reported-in-las-vegas-valley/>
- 07.26.2019: Mesquite Local News: "Health District Issues Precautions as Additional West Nile Virus Cases Reported," <https://mesquitelocalnews.com/2019/07/26/health-district-issues-precautions-as-additional-west-nile-virus-cases-reported/>
- 07.26.2019: Reno Gazette Journal: "Mosquitoes test positive for West Nile virus in Washoe County; no human cases reported," <https://www.rgj.com/story/news/2019/07/26/mosquitoes-test-positive-west-nile-virus-washoe-county/1840332001/>

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