

2014



Mosquito Surveillance Report Vector Surveillance Program

SOUTHERN NEVADA HEALTH DISTRICT
ENVIRONMENTAL HEALTH DIVISION | VECTOR CONTROL PROGRAM

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Summary

In 2014, Southern Nevada Health District's Vector Surveillance program identified the highest proportion of West Nile Virus activity in Clark County mosquitoes since 2004. The program enhanced its mosquito surveillance methods to include routine use of Gravid and BG Sentinel traps in complement with Encephalitis Vector Surveillance (EVS) traps. Additionally, staff initiated routine surveillance at plant nurseries in an effort to capture imported *Aedes* mosquito species.



An enlarged view of a *Culex quinquefasciatus* mosquito which is known as one of the many arthropodal vectors responsible for spreading the arboviral encephalitis, West Nile virus (WNV) to human beings through their bite when obtaining a blood meal. Photo Credit: CDC Public Health Image Library

During April through October, staff set a total of 931 traps throughout Clark County. From these traps, 20,468 mosquitoes, representing 1,103 mosquito testing pools, were submitted to the Nevada State Department of Agriculture's Animal Disease Lab for West Nile Virus (WNV), St. Louis Encephalitis (SLE), and Western Equine Encephalitis (WEE) analysis. West Nile Virus was identified in 69 submission pools, totaling 1,011 mosquitoes from 9 species, and representing 24 zip codes. No invasive *Aedes* spp. mosquitoes were identified. Jurisdictional counterparts, responsible for mosquito control, were notified of WNV activity within their boundaries and were requested to environmentally manage breeding sources.

In 2014, the Office of Epidemiology conducted two WNV case investigations. Both were classified as probable cases of WNV neuroinvasive disease. Of the two cases, both were male and the median age was 67 years. There were no WNV associated deaths.

The Public Information Office continued its communications program to educate the public about West Nile illnesses and prevention measures. The Health District utilized social media, traditional news releases as well as media interviews. West Nile prevention messages, in both Spanish and English, were posted to the district's Twitter account and Facebook pages at least once per week between June and September and were repeated throughout the summer.

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 developed and maintains a Vector Surveillance program to survey mosquito populations for arboviral diseases including WNV, WEE, and SLE. The Health District 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.



Workers practicing "vector control" in 1920 by digging a drainage ditch, in order to help disperse standing water that was acting as a popular breeding ground for a population of *Anopheles* mosquitoes, a well known vector for the parasitic disease, malaria. Photo Credit: CDC Public Health Image Library

Since its inception, the Vector Surveillance program has submitted over 150,000 mosquitoes to the Nevada Department of Agriculture for WNV, SLE, and WEE analysis. Of these, approximately 4,000 mosquitoes have tested positive for WNV, and although rare, WEE and SLE have also been identified in mosquito submissions.

West Nile Virus is a reportable disease in Clark County and, since 2004 the Office of Epidemiology has conducted 139 investigations relating to WNV. Of those 139 investigations, 106 were reported as either probable or confirmed cases of West Nile Fever (N=45) or West Nile Neuroinvasive Disease (N=61). There were 31 presumptively viremic blood donors, meaning the case tested positive for the virus in their blood, but had no symptoms of disease. Of the 106 cases with clinical illness, 6 were fatal. Appendix 1 is the Office of Epidemiology's Human Case Surveillance Activity summary charts. Historical data can be found on the Health District's web site at: <http://www.southernnevadahealthdistrict.org/stats-reports/west-nile-virus.php>.

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. The Health District'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 the public works, parks and recreation, and code enforcement offices within the six jurisdictional counterparts.

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, coupled with appropriate mosquito control measures and public information, have been instrumental in countering the spread of WNV disease. West Nile prevention messages generated by the Public Information Office is detailed in Appendix 2.

Over the years, Vector Control has utilized a variety of WNV surveillance methods including sentinel chicken flocks and migratory bird sampling. Vector Control's annual reports detailing surveillance and control activities since 2004 can be found on the Health District's web site at: <http://www.southernnevadahealthdistrict.org/stats-reports/zoonotic-diseases.php>.

Mission

The principal mission of the Vector Surveillance Office is to identify diseases in vectors and provide public health prevention messages prior to, and after, reports of human cases. Vector surveillance and control is an important function of the Environmental Health Division and supports the Health District's overall mission, "To protect and promote the health, the environment and the well being of Southern Nevada residents and visitors."

Goals

1. Monitor mosquito and rodent populations and associated disease prevalence within Clark County.
2. Identify, report, and assist jurisdictions with targeted vector control measures utilizing Integrated Pest Management principles.
3. Develop effective and timely public education messages regarding mosquito and rodent borne disease prevention.

4. Conduct environmental investigations related to cases of zoonotic diseases reported by the Office of Epidemiology or the Department of Agriculture.
5. Maintain communication with state and federal agencies to ensure WNV, WEE, and SLE surveillance activities are included on nationwide monitoring systems.
6. Provide staff with educational training to remain current on industry developments and to earn Continuing Education Units for Nevada Restricted Use Pesticide and Nevada Environmental Health Specialist certifications.

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 WNV vectors in an area and can be used as a trigger for control measures. Seventeen species of mosquitoes live in Clark County, of which, 10 are known to be vectors of disease. The primary mosquito breeding months are April through October, with submission for disease analysis beginning typically in June. However, with moderate winter temperatures, several of these mosquito species can breed year round or overwinter as adults.

Vector Surveillance staff 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.

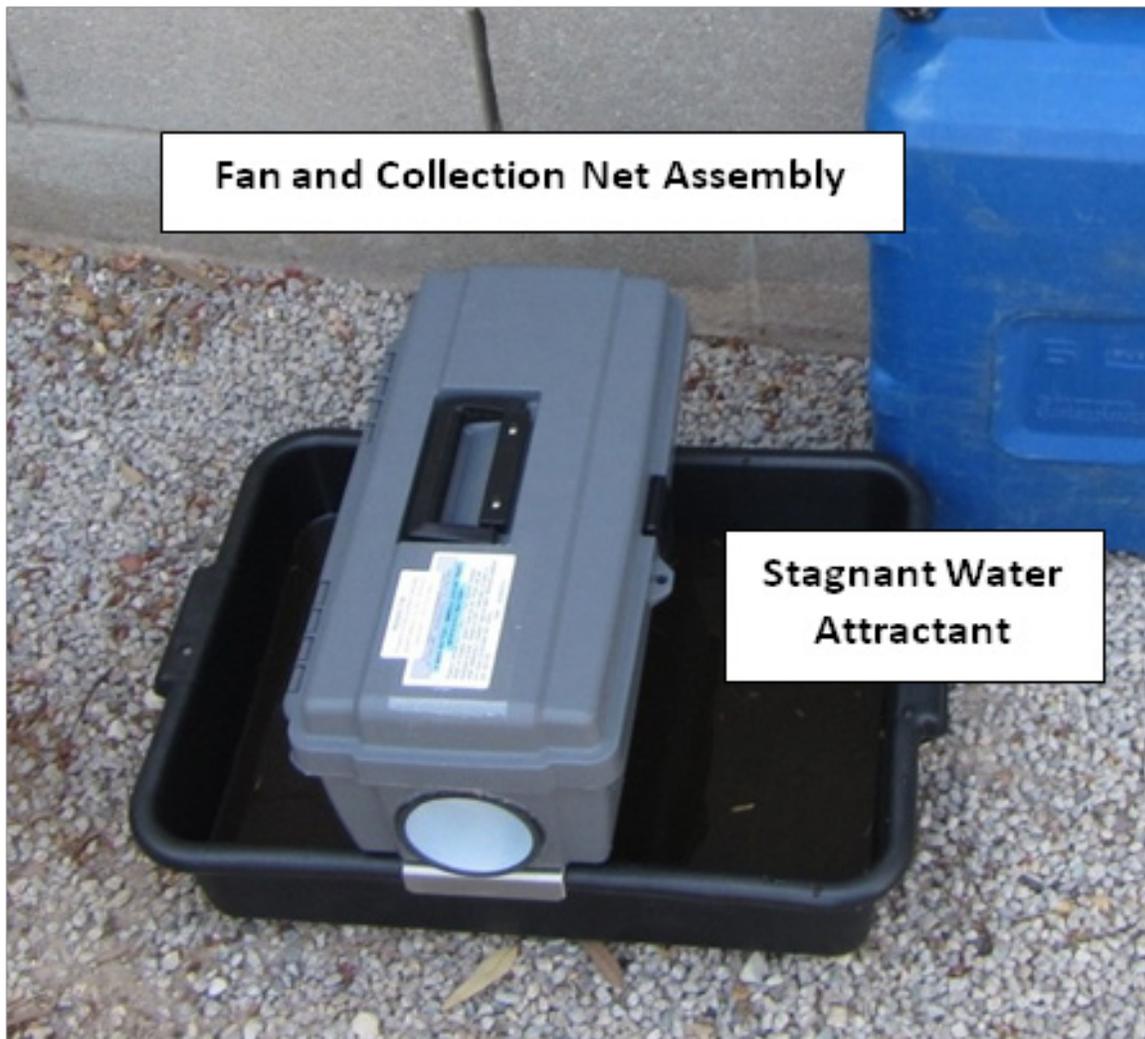
Encephalitis Vector Surveillance (EVS) traps, designed to attract host seeking female mosquitoes using carbon dioxide (dry ice) as the primary attractant, captures mosquitoes of several species, including *Culex*, *Anopheles*, and *Aedes*.

EVS 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.

Gravid 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*, both invasive mosquito species not currently found in Southern Nevada. These mosquitoes are capable of vectoring emerging diseases including Chikungunya and Dengue Fever.

BG Sentinel Trap



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 submission. One pool consists of no more than 50 adult females of a single species from the same trap. Once pooled, the mosquitoes were placed into vials, packed in ice and shipped overnight for analysis to the Nevada Department of Agriculture's Animal Disease Lab (ADL) in Reno.

2014 Surveillance Results

During April through October, staff set a total of 931 traps throughout Clark County, comprising of 519 EVS (56%), 294 Gravid (32%), and 115 BG Sentinel (12%) traps. From the 931 traps set, 623 (68%) of the traps were successful in capturing mosquitoes; unsuccessful traps can be attributed to equipment malfunction, uncooperative weather, or lack of mosquito populations in the area. Staff submitted 1,103 mosquito testing pools, totaling 20,468 mosquitoes, to the Nevada State Department of Agriculture's Animal Disease Lab for WNV, SLE, and WEE analysis.

West Nile Virus was identified in 69 submission pools, totaling 1,011 mosquitoes from 9 species, and representing 24 zip codes throughout Clark County. These results are the highest proportion of WNV activity in mosquitoes since 2004. Jurisdictional counterparts, responsible for mosquito control, were notified of WNV activity within their boundaries and requested to environmentally manage breeding sources. Although no invasive *Aedes* mosquitoes were identified at plant nurseries, several nurseries were found to have active *Culex* breeding sources and have WNV positive pools.



This 1965 photograph depicts an entomologic field technician using an aspiration suction tube in order to trap adult mosquitoes from the interior of a drainage pipe. Photo Credit: CDC Public Health Image Library

Tables 1 and 2 detail the jurisdictional distribution of mosquito traps, submissions numbers, and positive mosquito samples. Table 3 details the species of WNV positive mosquitoes. Chart 1 depicts the distribution of WNV positive mosquitoes per month. Maps 1, 2, and 3 depict geographical distribution of the trapping locations and results.

Emergency Management

In September, Clark County experienced severe rains and flooding in the Moapa Valley area, including Glendale, Overton, Logandale and the Paiute Indian Reservation. Vector Control staff coordinated expanded surveillance efforts in the affected areas, provided mosquito breeding and WNV prevention education at Town Hall meetings and donated mosquito control products to Clark County Vector Control for application into stagnant water. Clark County Vector Control (CCVC), the office responsible for mosquito control within unincorporated Clark County, are the control experts in Southern Nevada and have equipment and staff capable of chemically treating large mosquito breeding areas. The Health District's Vector Surveillance and CCVC have collaborated on numerous mosquito surveillance and control projects over the years.

Looking Ahead

The Vector 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 2015, staff will implement programmatic updates to support the overall mission. These include:

1. Develop and utilize Environmental Health's inspection data system 'Envision Connect' for managing mosquito trap sites, speciation and analysis information. This system will simplify entry of surveillance and treatment information, and will provide a robust set of tools to query and analyze data.
2. Enhance the Vector Surveillance web site to include an interactive GIS map of trap sites and results.
3. Provide counterparts with monthly updates on all areas trapped and results within their jurisdictions and not simply the areas of breeding concern.
4. Resume raising mosquito fish, or *Gambusia affinis*, on Health District property as a low cost control method for placement in breeding areas such as wash channels and detention basins.
5. Continue looking for grant opportunities and sources of dedicated funding to sustainably support programmatic activities.

Table 1: Jurisdictional Breakdown of Mosquito Submissions and WNV activity

Jurisdiction	Traps w/ Mosquitoes	Mosquitoes Tested	WNV + Mosquitoes
Unincorporated Clark County	246	9,305	332
City of Las Vegas	199	5,600	554
Henderson	87	1,867	20
Mesquite	39	1,683	3
City of North Las Vegas	30	1,357	102
Paiute Reservation	7	507	0
Nellis Air Force Base	7	106	0
Boulder City	8	43	0
Total	623	20,468	1,011

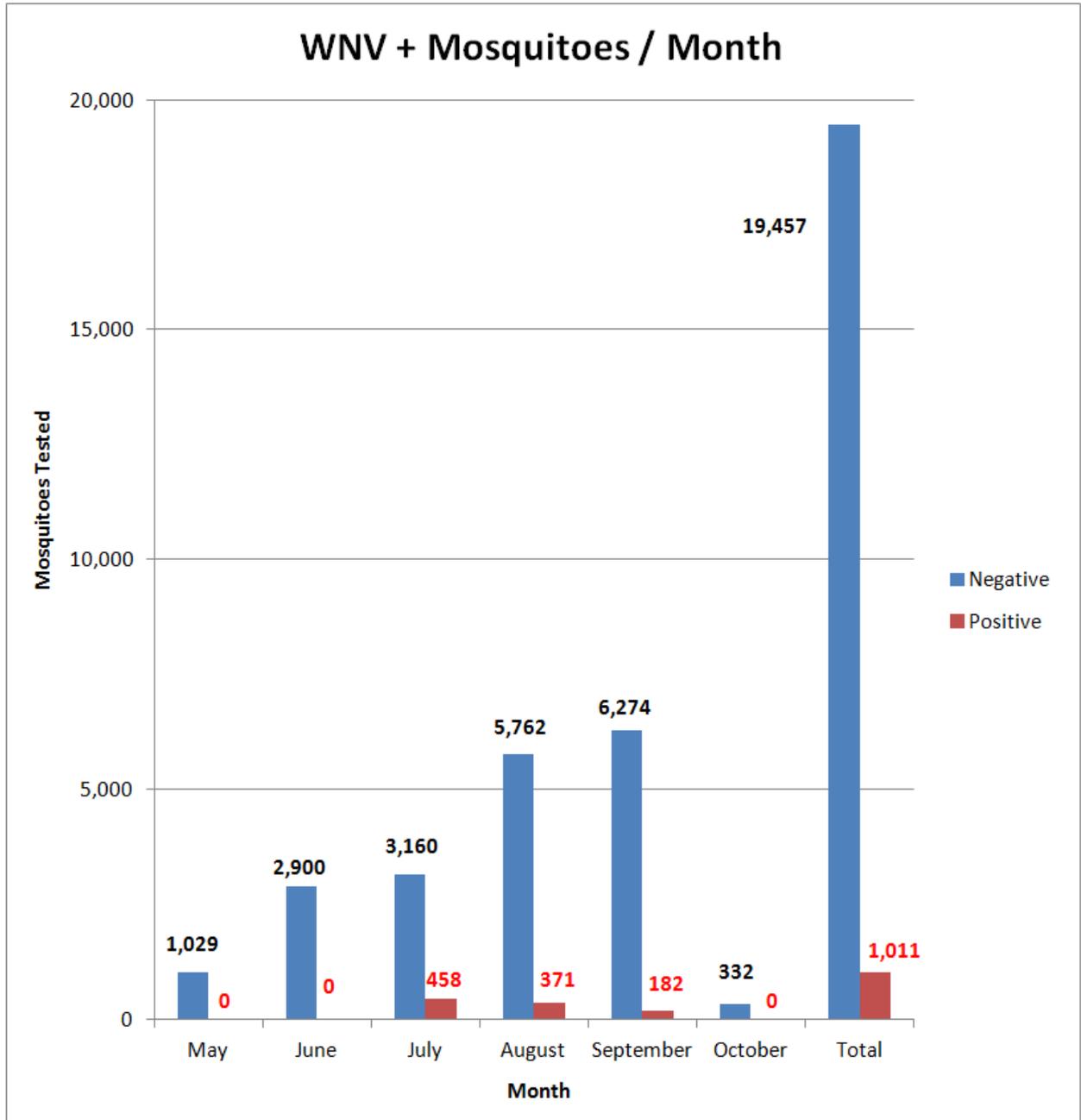
Table 2: Zip Code Distribution of WNV + Mosquitoes

CLV	WNV +	CC	WNV +	COH	WNV +	NLV	WNV +	Bunkerville / Mesquite	WNV +
89107	195	89040	36	89011	1	89031	102	89007	3
89117	21	89103	93	89014	5				
89128	15	89120	25	89074	14				
89129	94	89122	20						
89131	43	89123	3						
89134	45	89125	7						
89138	60	89139	5						
89143	1	89146	18						
89144	30	89149	125						
89145	50								
	554		332		20		102		3

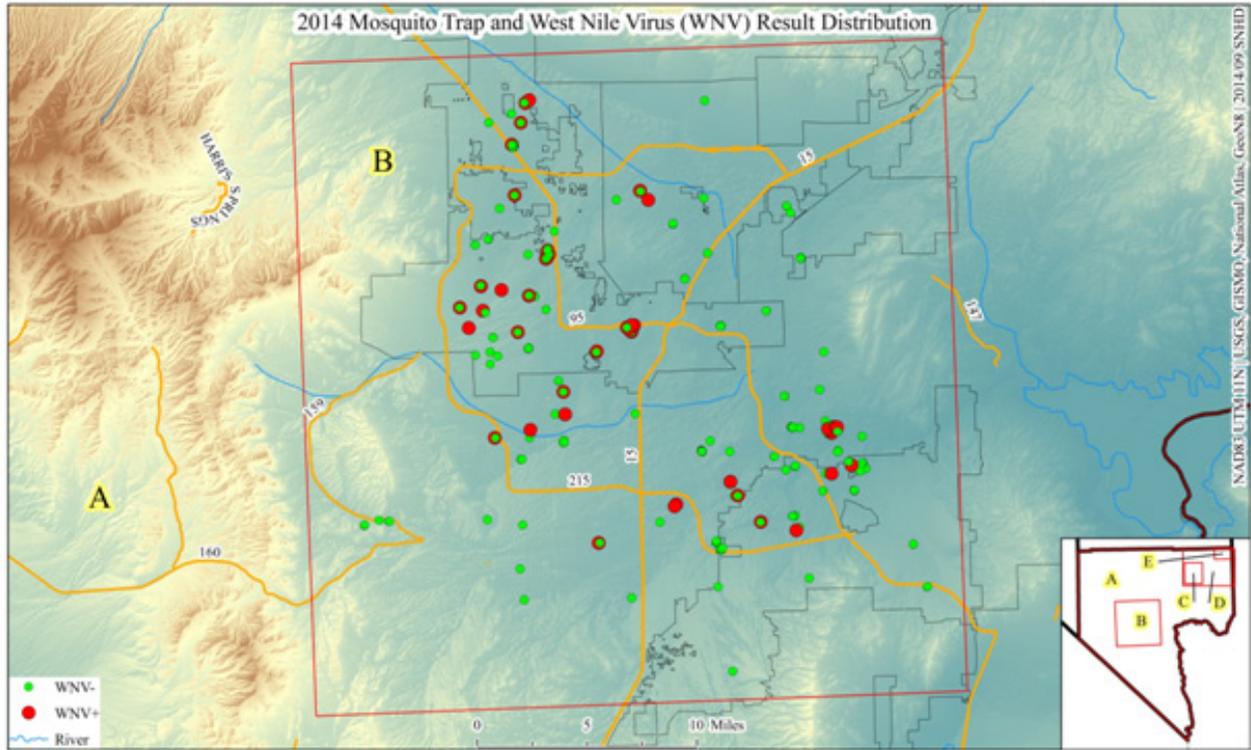
Table 3: WNV Positive Mosquito Species

Species	# of Pools	# of Mosquitoes
<i>Aedes dorsalis</i>	1	2
<i>Aedes vexans</i>	2	2
<i>Anopheles franciscanus</i>	1	1
<i>Anopheles freeborni</i>	1	1
<i>Culex erythrothorax</i>	6	12
<i>Culex quinquefasciatus</i>	36	821
<i>Culex tarsalis</i>	20	170
<i>Psorophora columbiae</i>	1	1
<i>Psorophora signipennis</i>	1	1
Total	69	1,011

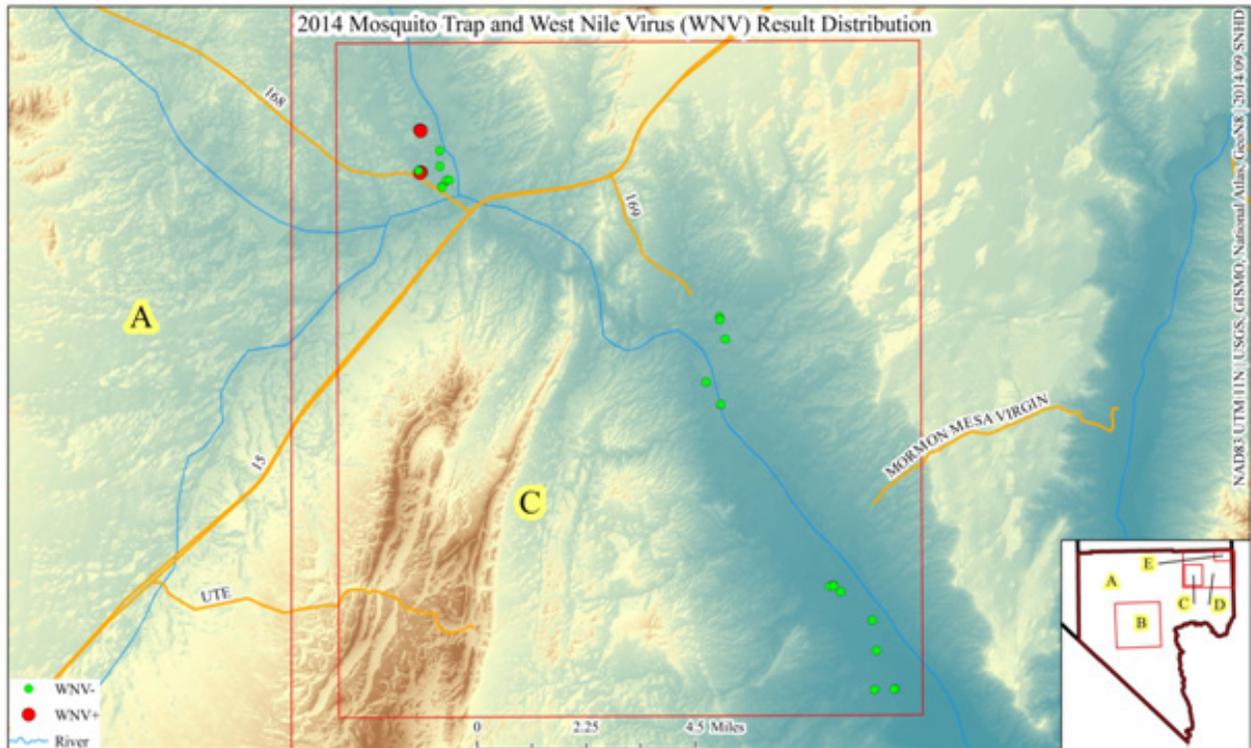
Chart 1: WNV + Mosquitoes / Month



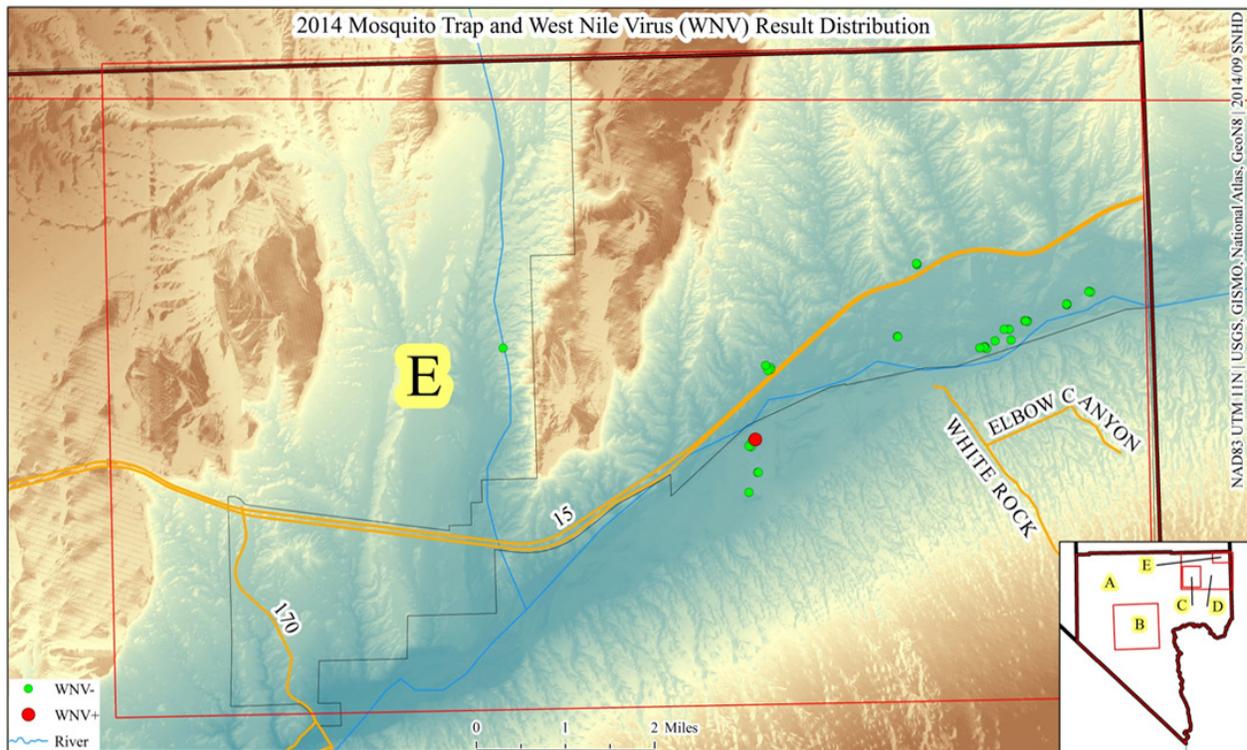
Map 1: Las Vegas Valley - Mosquito Surveillance & WNV Positive Locations



Map 2: Moapa Valley - Mosquito Surveillance & WNV Positive Locations

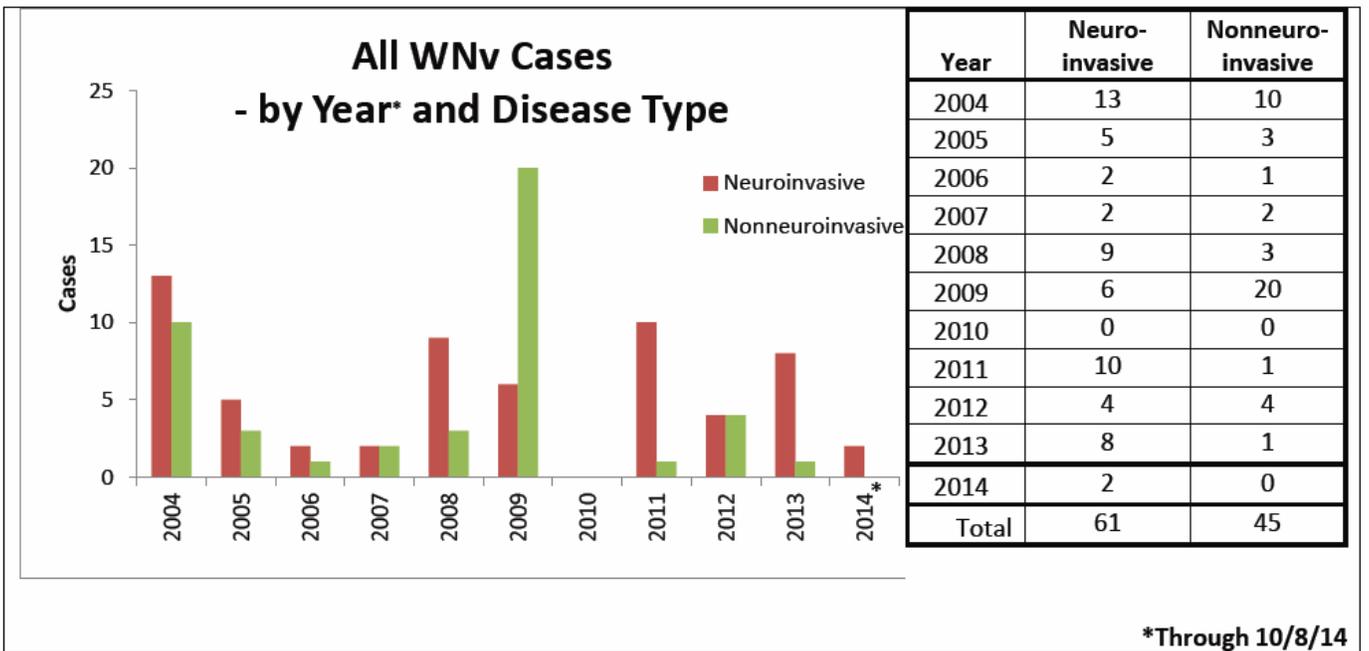
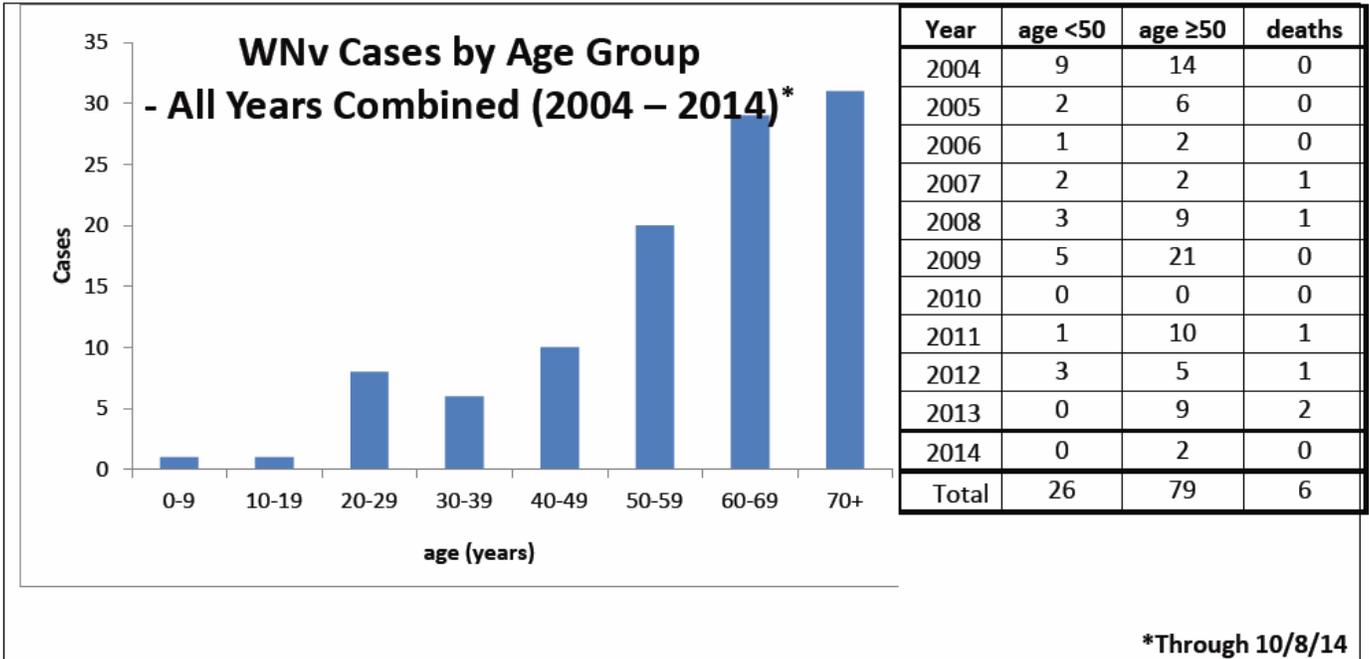


Map 3: Bunkerville / Mesquite - Mosquito Surveillance & WNV Positive Locations



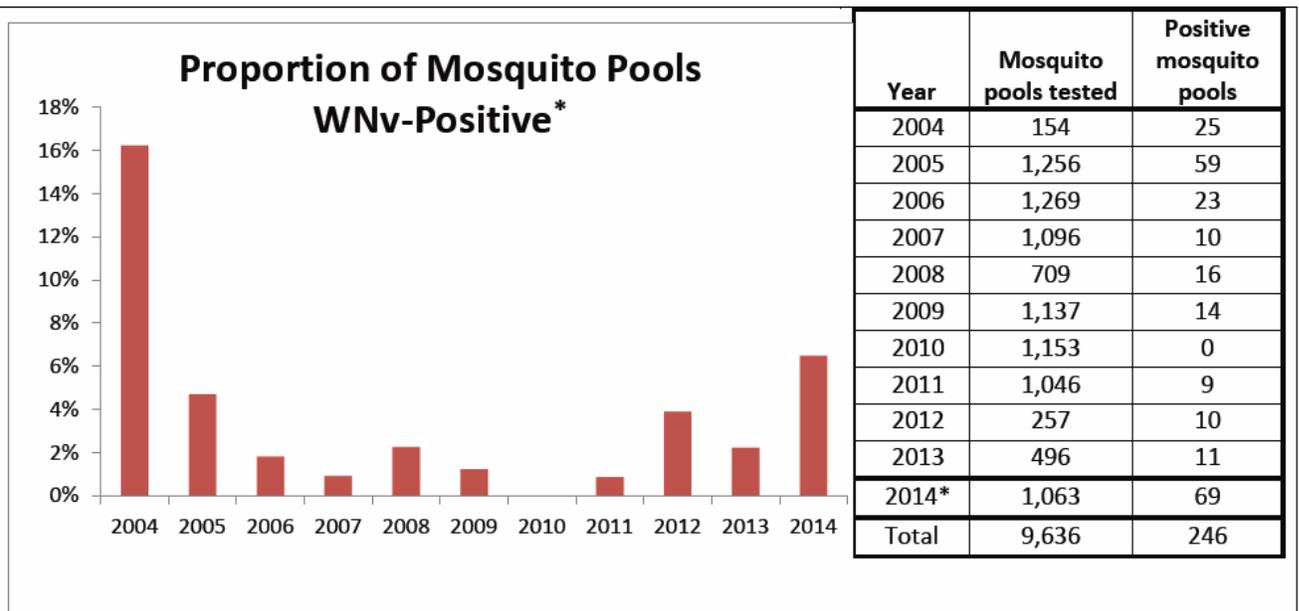
Appendix 1: Office of Epidemiology - Human Case Surveillance 2004 - 2015

Clark County, NV West Nile Virus Activity 2004 - present



Appendix 1: Office of Epidemiology - Human Case Surveillance 2004 - 2015

Clark County, NV West Nile Virus Activity 2004 - present



During 2004 – 2013, approximately 900 pools of mosquitoes were tested (comprised of nearly 20,000 individual mosquitoes) each year. About 2% contained evidence of West Nile virus.

*through 10/8/14

Appendix 2: Public Information Office – Timeline of Outreach Activities

The Southern Nevada Health District continued its communications program to educate the public about West Nile illnesses and prevention measures. The Health District utilized social media, traditional news releases as well as media interviews.

News Releases:

- “Spring is here, prepare for West Nile virus season” June 5
- “Health District detects West Nile in mosquitoes” Aug. 4
- “Health District reports first human West Nile case” Sept. 3
- “Moapa community meetings to address mosquito issues” Sept. 19

Social Media Messages

The Health District posted West Nile prevention messages to its Twitter accounts and Facebook pages. Twitter messages were translated into Spanish as well. Messages were posted at least once per week between June and September and were repeated throughout the summer.

June:

- Facebook: Our annual mosquito control and West Nile surveillance program is under way for 2014. Did you know mosquitoes can breed in as little as a cup of water? Take some time to check out your property and eliminate mosquito breeding sources to decrease the mosquito population. We’ve got tips to help you Fight the Bite here: <http://bit.ly/NUbXEr>
- Twitter: Our annual mosquito surveillance kicked in for ‘14. Take time to reduce your #WestNile risks by checking your yard: <http://bit.ly/NUbXEr>
- Twitter: Mosquitoes love water! Don’t let them fall in love with your yard. Fight the Bite with #WestNile prevention: <http://bit.ly/NUbXEr>
- Twitter: DEET? Check. Long pants? Check. See other tips to Fight the Bite & #WestNile: <http://bit.ly/NUbXEr>
- Twitter: We have mosquitoes in NV? Indeed. More than 17 species. Fight the Bite with these prevention tips: <http://bit.ly/NUbXEr>
- Twitter: If you’ve got an unused bird bath, mosquitoes will love it. Clean out any standing water to reduce #WestNile risk: <http://bit.ly/NUbXEr>
- Twitter: Do you know how much water a mosquito needs to breed? A cup! Prevent #WestNile this summer: <http://bit.ly/NUbXEr>

Appendix 2: Public Information Office – Timeline of Outreach Activities

- Twitter: Spring & summer bring critters like bats & mosquitoes. Play safe & healthy. For tips to prevent illness, visit SNHD.info

July

- Facebook: They're here . . . triple-digit temps. We've got tips to stay safe and healthy during the long, hot summer. The Health District reminds parents about the ABCDs of drowning prevention, tips to prevent mosquito breeding and bites, information about #healthyswimming to prevent illness, and heat safety. Check info here: <http://www.southernnevadahealthdistrict.org/health-topics/summersafety.php>
- Twitter: Mosquitoes love water! Don't let them fall in love with your yard. Fight the #WestNile bite: <http://bit.ly/NUbXEr>
- Twitter: If you're roughing it, use mosquito netting when sleeping outside or in an unscreened bldg. #WestNile prevention: <http://bit.ly/NUbXEr>
- Twitter: This is how much water a mosquito needs to breed - 1 cup. #westNile prevention tips: <http://www.SNHD.info> (VINE)
- Twitter: Fight the Bite by knowing when mosquitoes are most 'active.' Click here: <http://bit.ly/NUbXEr> to learn more about prevention
- Twitter: If you've got an unused bird bath, mosquitoes will love you! Clean out any standing water to reduce #WestNile risk: <http://bit.ly/NUbXEr>
- Twitter: In 7-10 days after they are laid, 100-400 mosquito larvae can be wriggling around in your pool. #WestNile: <http://bit.ly/NUbXEr>
- Twitter: Fight the Bite by knowing when mosquitoes are most 'active'. Click here <http://bit.ly/NUbXEr> to learn more about prevention
- Twitter: DEET? Check. Long pants? Check. See other tips to Fight the Bite & #WestNile: <http://bit.ly/NUbXEr> (PHOTO)
- Twitter: We have mosquitoes in NV? Indeed. More than 17 species. Fight the Bite with these prevention tips: <http://bit.ly/NUbXEr>
- Twitter: In 7-10 days after they are laid, 100-400 mosquito larvae can be wriggling around in your pool. #WestNile: <http://bit.ly/NUbXEr>

August

- Facebook: We identified our first West Nile positive mosquito pools this season. Right now, we've got no human cases. You can Fight the Bite by taking precautions and eliminating stagnant water,

Appendix 2: Public Information Office – Timeline of Outreach Activities

wearing DEET, wearing long pants and long sleeves especially if you're out at dawn or dusk. For more prevention tips: <http://bit.ly/NUbXEr>

- Twitter: We've ID'd #WestNile positive mosquitoes in town. #FighttheBite w/'these prevention tips: <http://bit.ly/NUbXEr>
- Twitter: Fight the Bite by knowing when mosquitoes are most 'active'. Click here <http://bit.ly/NUbXEr> to learn more about prevention
- Twitter: In 7-10 days after they are laid, 100-400 mosquito larvae can be wriggling around in your pool. #WestNile: <http://bit.ly/NUbXEr>
- Twitter: Is your yard a tad too 'mosquito friendly?' Visit <http://bit.ly/NUbXEr> for tips to reduce breeding sources & summer's #WestNile risk.
- Twitter: Mosquitoes love water! Don't let them fall in love with your yard. Fight the Bite with #WestNile prevention: <http://bit.ly/NUbXEr>
- Twitter: If you're roughing it, use mosquito netting when sleeping outside or in an unscreened bldg. #WestNile prevention: <http://bit.ly/NUbXEr>

September

- Facebook: We've reported West Nile illness in a local resident – the first human case this year. We've also ID'd additional West Nile positive mosquito pools in town. Remember, it takes just a cup of water for mosquitoes to breed! West Nile is preventable and there are ways to 'fight the bite.' Visit <http://bit.ly/NUbXEr>
- Twitter: We're reporting our 1st case of #WestNile illness. It's still mosquito season. Take steps to Fight the Bite: <http://bit.ly/NUbXEr>
- Twitter: Fight the Bite by knowing when mosquitoes are most 'active'. Click here <http://bit.ly/NUbXEr> to learn more about prevention
- Twitter: In 7-10 days after they are laid, 100-400 mosquito larvae can be wriggling around in your pool. #WestNile: <http://bit.ly/NUbXEr>
- Twitter: Mosquitoes love water! Don't let them fall in love with your yard. Fight the #WestNile bite: <http://bit.ly/NUbXEr>
- Twitter: Get rid of standing water from tires, buckets, etc. around your home to lessen mosquito breeding sites. For more info <http://bit.ly/NUbXEr>
- Twitter: CC Emerg.Mgmt, SNHD to host 2 Moapa mtgs re: mosquito issues M, 9/22, 3p/Moapa Valley Comm.Ctr, 6p/Moapa Comm Ctr <http://bit.ly/1DnOAtA>
- Facebook: The Southern Nevada Health District and Clark County Emergency Management will host two community meetings in Moapa to discuss mosquito surveillance and abatement related to the recent flooding. The meetings are scheduled for Monday, Sept. 22 at 3 p.m. at the Moapa

Appendix 2: Public Information Office – Timeline of Outreach Activities

Valley Community Center, 320 N. Moapa Blvd., Overton, 89040, and at 6 p.m. at the Moapa Community Center, 1340 E. State Highway 168, Moapa, 89025.

Radio Interviews:

- June 5: KXNT-AM/FM: V. Raman recorded an interview regarding West Nile virus prevention tips/eliminating mosquito breeding sources as a follow up to a news release.
- July 2: KXNT-AM/FM: N. Williams was a guest live on the air with morning show host Joe Gillespie as a follow up to the news release distributed regarding summer safety, including mosquito bite protection.
- Aug. 4: KXNT-AM/FM: V. Raman recorded an interview regarding identification of West Nile virus positive mosquitoes
- Sept. 3: KXNT-AM/FM: D. Raman recorded an interview regarding West Nile virus case, prevention, etc.
- Sept. 3: KJUL-FM: D. Raman recorded an interview regarding a West Nile virus case, prevention, etc.
- Sept. 4: Lotus Broadcasting/Neon & Beyond. V. Raman and D. Raman recorded a 30-minute interview with Andy Kaye for this public affairs show regarding West Nile virus disease and prevention. Airdate was Sunday, Sept. 7 on KXPT-FM, KOMP-FM
- Sept. 16: KXNT-AM/FM: V. Raman recorded an interview regarding West Nile virus surveillance related to Moapa flooding, and prevention strategies
- Sept. 22: KXNT-AM/FM: J. Reszetar recorded an interview with KXNT to discuss Moapa meeting.

Television Interviews:

- Jul 1: KINC-TV 15: J. Viote was interviewed regarding West Nile virus protection strategies
- Aug. 4: KLAS-TV 8: V. Raman was interviewed regarding West Nile prevention strategies, surveillance
- Aug. 4: KTNV-TV 13: V. Raman was interviewed regarding West Nile prevention strategies, surveillance
- Aug. 4: KINC-TV 15: J. Viote was interviewed regarding West Nile prevention strategies, surveillance
- MundoFOX: J. Viote was interviewed regarding West Nile prevention strategies, surveillance
- Aug. 5: KBLR-TV 39: J. Viote was interviewed regarding West Nile prevention strategies, surveillance

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- Aug. 5: KSNV-TV 3: V. Raman demonstrated WNV trapping, surveillance, and prevention issues
- Sept. 3: KVVU-TV 5: D. Raman was interviewed regarding human case of West Nile, as well as prevention strategies
- Sept. 3: KTNV-TV 13: : D. Raman was interviewed regarding human case of West Nile, as well as prevention strategies
- Sept. 3: KINC-TV 15: J. Viote was interviewed regarding human case of West Nile as well as prevention strategies.
- Sept. 3: MundoFOX: J. Viote was interviewed regarding human case of West Nile as well as prevention strategies.
- Sept. 12: KSNV-TV 3: Station was provided with information about ongoing West Nile virus surveillance due to Moapa flooding
- Sept. 12: KLAS-TV 8: P. Klouse was interviewed regarding the Health District's response role for the Moapa flooding especially regarding West Nile virus potential
- Sept. 15: KLAS-TV 8: V. Raman recorded an interview regarding West Nile virus surveillance, strategies and potential for positive mosquitoes following Moapa flooding.
- Sept. 16: KSNV-TV 3: V. Raman was interviewed regarding mosquito surveillance and activity following Moapa flooding.
- Sept. 16: KLAS-TV 8: V. Raman was interviewed regarding mosquito surveillance and activity following Moapa flooding.
- KTNV-TV 13: V. Raman was interviewed regarding mosquito surveillance and activity following Moapa flooding.
- KINC-TV 15: J. Viote was interviewed regarding mosquito surveillance and activity following Moapa flooding.
- Sept. 17: KINC-TV 15: J. Viote was interviewed regarding cases of West Nile virus and prevention strategies
- Sept. 17: KSNV-TV 3: V. Raman was interviewed regarding West Nile virus surveillance and mosquito trapping following Moapa flooding.
- Sept. 17: MundoFOX: J. Viote was interviewed regarding West Nile virus surveillance and mosquito trapping following Moapa flooding.
- Sept. 22: KSNV-TV 3: J. Reszetar and R. Cole were interviewed regarding West Nile virus surveillance and potential for mosquito activity prior to Moapa public meeting.
- Sept. 22: KVVU-TV 5: J. Reszetar/R. Cole were interviewed regarding West Nile virus surveillance and potential for mosquito activity prior to Moapa public meeting.
- Sept. 22: KLAS-TV 8: J. Reszetar/R. Cole were interviewed regarding West Nile virus surveillance and potential for mosquito activity prior to Moapa public meeting.

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Print Interviews:

- Aug. 5: Las Vegas Sun: V. Raman was interviewed regarding mosquito prevention and district surveillance, including WNV and chikungunya
- Aug 4: Las Vegas Sun: V. Raman was interviewed regarding West Nile strategies, surveillance