

2008 Zoonotic Infectious Disease: Surveillance and Control



Vector Control Program
Environmental Health Division

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Introduction

The Southern Nevada Health District's Vector Control office conducts routine surveillance and control of diseases in animals communicable to man. These animal diseases, or zoonoses, include West Nile virus (WNV), Western Equine encephalitis (WEE), St. Louis encephalitis (SLE), plague, hantavirus and rabies. Mosquito control, a critical function of WNV, SLE and WEE prevention, occurred concurrently with mosquito disease surveillance activities. This report details the health district's zoonotic disease surveillance, control and public education activities in Southern Nevada throughout 2008.

Vector Control uses a geographical information system (GIS) for capturing, storing, analyzing and managing zoonotic disease surveillance and control activity data. Field staff, equipped with global positioning systems (GPS), entered field data into a desktop GIS system. This data has been plotted onto maps and supplements the numeric tables throughout this report.

Mosquito Borne Diseases

Human Surveillance Methodology

West Nile encephalitis is a reportable condition per Nevada Administrative Code Chapter 441A.520. West Nile fever was made temporarily reportable by a technical bulletin issued by the Nevada State Health Division on Sept. 23, 2003. The temporary West Nile requirement expired on Sept. 23, 2006, and was not renewed by the State Health Officer. In order to ensure the prompt and complete reporting of West Nile cases in the future, West Nile infection was made reportable in Clark County on Jan. 4, 2007 by order of the Chief Health Officer.

In the United States, a case is reported based on the person's home jurisdiction, despite being diagnosed or potentially acquiring the disease elsewhere. Each case of West Nile virus infection is reported into two surveillance systems: National Electronic Telecommunications System for Surveillance (NETSS) and ArboNET. ArboNET captures information on diseases spread by arthropods, such as mosquitoes and ticks, and includes information on human cases, as well as infections in horses, birds and mosquitoes. NETSS captures information on human cases of all nationally notifiable diseases.

2008 Human Cases

In 2008, 12 WNV cases were reported from Clark County. Of these 12 cases, two had West Nile fever and 10 cases developed West Nile meningoencephalitis, a more severe neuroinvasive form of the disease. Of the neuroinvasive cases, six were male and four were female. The average age among neuroinvasive cases was 61.2 years with a median age of 67.5 years. Nine of the cases had no travel outside Clark County during the incubation period, one case had travel history outside of Clark County, and travel history could not be obtained for two cases.

Mosquito Surveillance

Mosquito trapping and testing remains the cornerstone of the health district's arbovirus surveillance program. In comparison to migratory bird or sentinel chicken flock sampling, mosquito surveillance provides an up-to-date indicator of WNV vectors in an area. Mosquito sampling also provides information on the type of mosquitoes present, their estimated infection rate, and can be used as a trigger for control measures. In Clark County the major mosquito breeding months are generally April through October, with the breeding season shorter in the higher elevations of Nye, Lincoln and White Pine Counties. This breeding season is weather dependent and will vary slightly from year to year.

The portable encephalitis vector surveillance (EVS) trap, designed to attract host seeking female mosquitoes using carbon dioxide as the primary attractant, was used extensively throughout Southern Nevada. Traps were set overnight in potential mosquito breeding areas such as washes, drainage ditches, rivers and pools of standing water, as well as in human and equine population centers. 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, gender, and 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.

In 2008, the health district and collaborating agencies set 321 EVS traps in Clark, Nye, Lincoln and White Pine counties, submitting 15,495 mosquitoes to the ADL for WNV, SLE, and WEE analysis. Map 1 shows the spatial distribution of the trapping locations. Mosquito surveillance adjustments were made based on increased mosquito breeding complaints generated by the community. As shown in Table 1, although only 346 mosquitoes tested positive, WNV maintains a presence in the mosquito populations of Southern Nevada. Table 2 details the mosquito trapping and sample submissions by county.

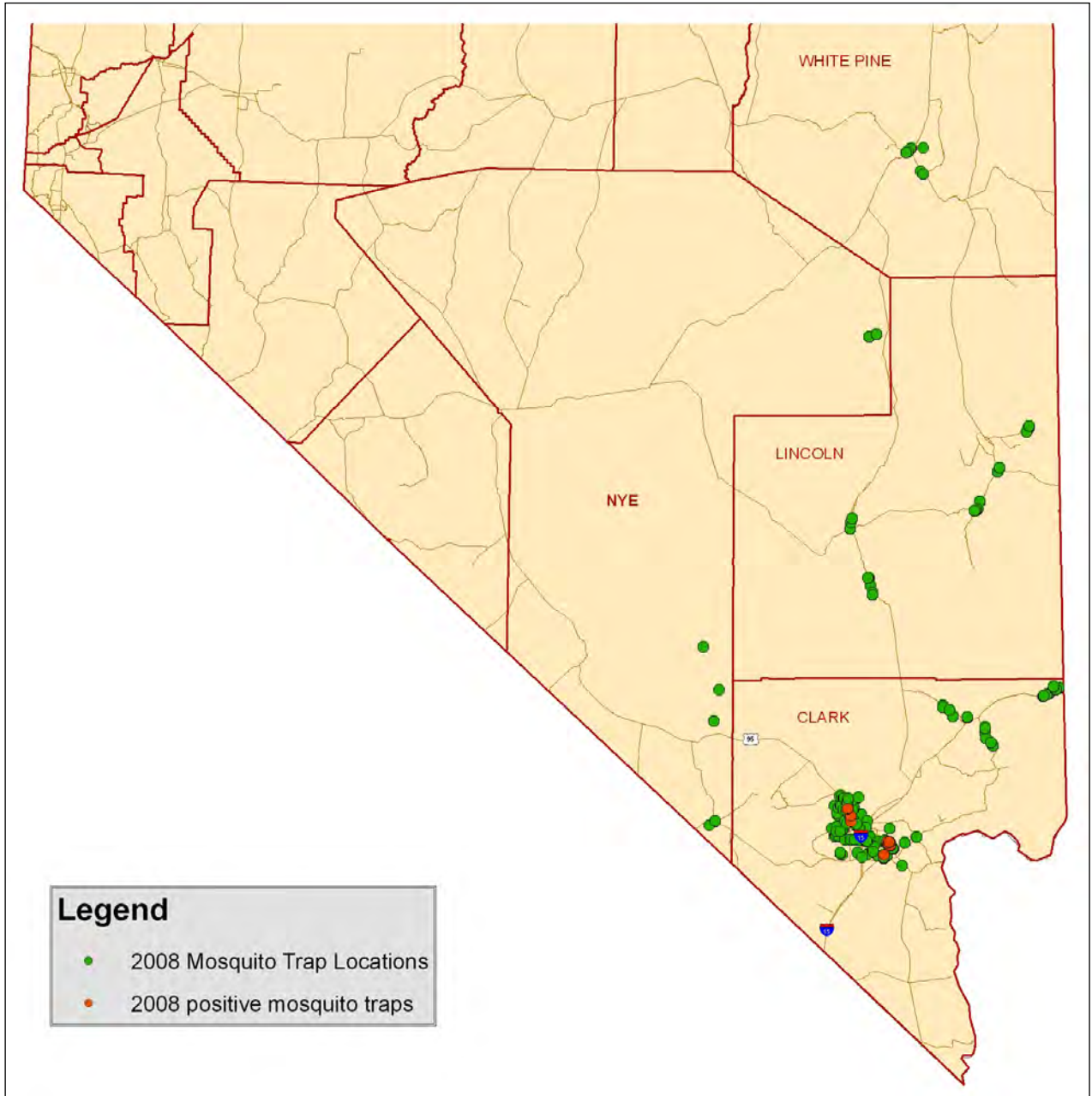
Table 1: 2004-2008 EVS Sample Submission Comparison

	2004	2005	2006	2007	2008
EVS Traps Set	NA	561	871	468	321
Pools Submitted	154	1,256	1,269	1,096	709
Mosquitoes Tested	4,900	31,059	29,492	25,698	15,495
Arbovirus Positive Pools	25	59	23	10	16
Arbovirus Positive Mosquitoes	154	1,826	275	247	346

Table 2: Mosquito Submissions by County

County	# EVS Traps	# Pools	# Mosquitoes	# WNV Positive Pools	# WNV Positive Mosquitoes
Clark	248	478	9,454	16	346
Nye	13	12	102	0	0
White Pine	10	12	43	0	0
Lincoln	50	207	5,896	0	0
Total	321	709	15,495	16	346

Map 1: Mosquito Trapping Activity in Southern Nevada



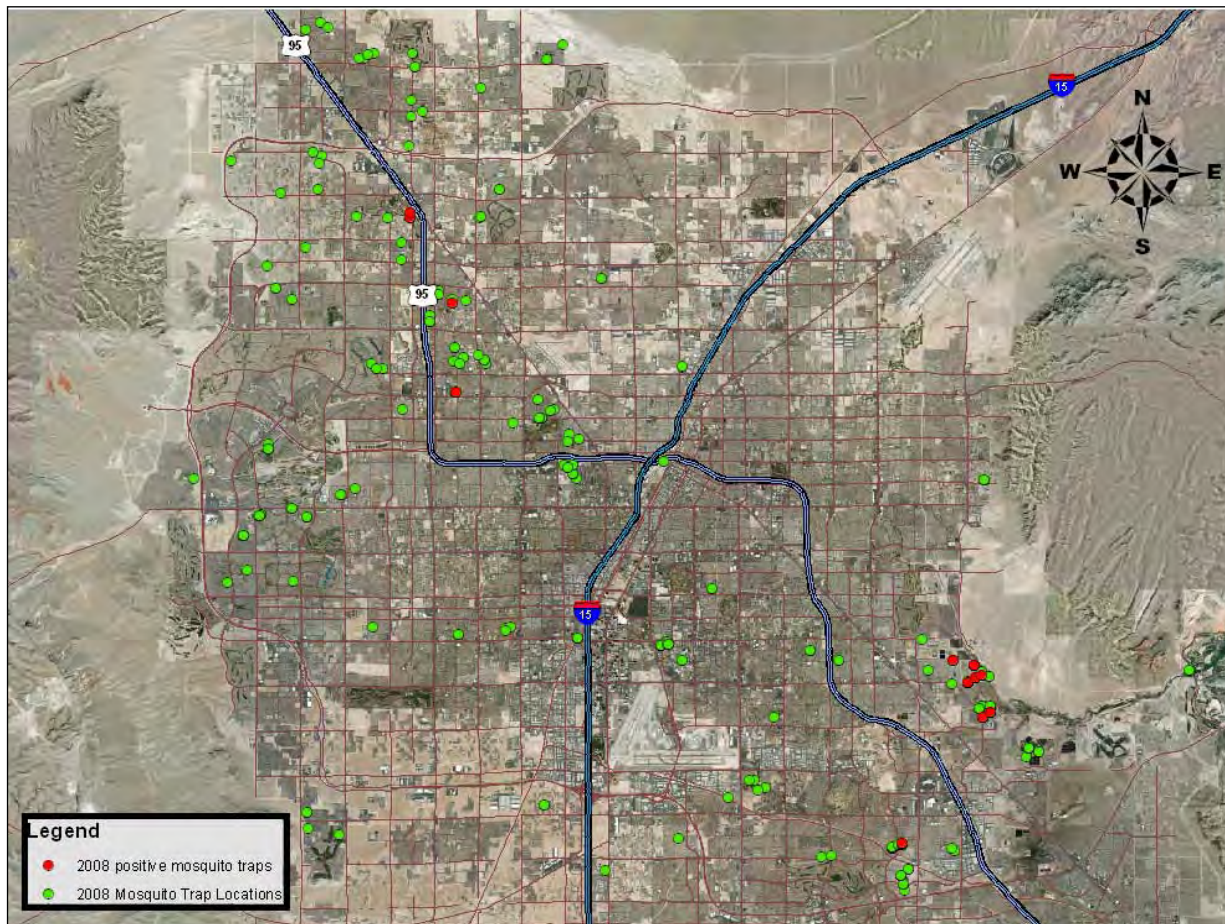
Clark County (Population 1,836,333)

In 2008, staff set 248 traps in rural and urban Clark County. From these traps, 478 pools were submitted to the ADL, totaling 9,454 mosquitoes. Of the 478 pools submitted, 16 were WNV positive, totaling 346 mosquitoes. Table 3 details the type and number of mosquitoes tested from Clark County, including the WNV positive samples, and Map 2 shows the spatial distribution of the trapping locations.

Table 3: Clark County Mosquito Submissions

Mosquito Species	# of Mosquitoes	# of Pools	# Positive or Suspect Mosquitoes	# Positive or Suspect Pools
<i>Aedes vexans</i>	2,739	67	0	0
<i>Anopheles franciscanus</i>	192	28	0	0
<i>Anopheles freeborni</i>	289	28	0	0
<i>Culiseta inornata</i>	228	27	1	1
<i>Culex erythrothorax</i>	1,692	53	0	0
<i>Culex quinquefasciatus</i>	1,142	122	80	5
<i>Culex stigmatosoma</i>	211	21	0	0
<i>Culex tarsalis</i>	2,938	126	266	11
<i>Culex thriambus</i>	1	1	0	0
<i>Ochlerotatus dorsalis</i>	6	2	0	0
<i>Psorophora sp.</i>	16	3	0	0
Total	9,454	478	346	16

Map 2: Spatial Distribution of Trapping in Clark County



Nye County (Population 44,116)

Nye County Emergency Management staff trapped mosquitoes in Pahrump, while biologists with National Security Technologies, LLC (NST) trapped mosquitoes on the Nevada Test Site. Mosquitoes collected were submitted to SNHD for identification, pooling and shipment to the ADL.

In 2008, 13 EVS traps were set in Nye County, totaling 102 mosquitoes from 12 pools. None of the mosquitoes tested were positive for WNV, WEE or SLE. Table 4 details the type and number of mosquitoes tested from Nye County and Map 1 shows the spatial distribution of the trapping locations.

Table 4: Nye County Mosquito Submissions

Mosquito Species	# of Mosquitoes	# of Pools	# Positive or Suspect Mosquitoes	# Positive or Suspect Pools
<i>Culiseta inornata</i>	12	2	0	0
<i>Culex erythrothorax</i>	1	1	0	0
<i>Culex tarsalis</i>	89	9	0	0
Total	102	12	0	0

White Pine County (Population 9,146)

Health district staff set 10 traps in White Pine County, totaling 43 mosquitoes from 12 pools. None of the mosquitoes tested were positive for WNV, WEE or SLE. EVS traps were set in and immediately around Ely, with the remainder of the county being surveyed by Nevada Department of Agriculture staff.

Table 5 details the type and number of mosquitoes tested from White Pine County, and Map 1 shows the geographical distribution of the trapping locations.

Table 5: White Pine County Mosquito Submissions

Mosquito Species	# Mosquitoes	# of Pools	# Positive or Suspect Mosquitoes	# Positive or Suspect Pools
<i>Aedes sticticus</i>	1	1	0	0
<i>Aedes vexans</i>	17	1	0	0
<i>Anopheles freeborni</i>	1	1	0	0
<i>Culiseta inornata</i>	10	6	0	0
<i>Culex tarsalis</i>	14	3	0	0
Total	43	12	0	0

Lincoln County (Population 4,759)

Staff set 50 EVS traps in Lincoln County, collecting 5,820 mosquitoes from 207 pools. None of the mosquitoes tested were positive for WNV, WEE or SLE. Table 6 details the type and number of mosquitoes tested from Lincoln County and Map 1 shows the spatial distribution of the EVS trap locations.

Table 6: Lincoln County Mosquito Submissions

Mosquito Species	# Mosquitoes	# of Pools	# Positive or Suspect Mosquitoes	# Positive or Suspect Pools
<i>Aedes vexans</i>	13	3	0	0
<i>Anopheles franciscanus</i>	93	8	0	0
<i>Anopheles freeborni</i>	238	20	0	0
<i>Culiseta inornata</i>	260	28	0	0
<i>Culex erythrothorax</i>	3,786	89	0	0
<i>Culex stigmatosoma</i>	76	2	0	0
<i>Culex tarsalis</i>	1,031	45	0	0
<i>Ochlerotatus dorsalis</i>	398	11	0	0
<i>Ochlerotatus increptius</i>	1	1	0	0
Total	5,896	207	0	0

Bird Surveillance

The health district continued submitting bird samples for WNV in 2008, although surveillance efforts were reduced due to increased community generated mosquito breeding complaints. In total, nine bird samples, collected in part by USDA Wildlife Services, Animal Control and SNHD staff, were submitted to the ADL; zero tested positive. Table 7 details the type and number of birds tested for WNV, SLE and WEE and Table 8 is a comparison of bird submissions from 2004 through 2008.

Table 7: Bird Sample Species Distribution

Common Name	Scientific Name	# Sampled	# Arbovirus Positive
Finch	<i>Carpodacus mexicanus</i>	1	0
Mourning dove	<i>Zenaida macroura</i>	1	0
Quail	<i>Callipepla sp.</i>	1	0
Raven	<i>Corvus corax</i>	4	0
Red tailed hawk	<i>Buteo jamaicensis</i>	1	0
Swan	<i>Cygnus sp.</i>	1	0
Total		9	0

Table 8: 2004-2008 Bird Sample Submission Comparison

	2004	2005	2006	2007	2008
Birds Tested	155	179	159	17	9
Arbovirus Positive Birds	8	6	1	0	0

Mosquito Control

The principal goal of the health district's mosquito control program is to use an integrated pest management approach to eliminating or reducing mosquito breeding habitats. To eliminate the breeding source, environmental engineering is the first course of action, followed by placing mosquito fish in appropriate breeding habitats. If neither of these options is feasible or effective, then staff treats the mosquito breeding areas with chemical or biological insecticides. The insecticides used are registered by the EPA and are carefully chosen for larviciding and adulticiding applications. Mosquito adulticiding is not a routine activity and is conducted to control biting mosquitoes in areas where larviciding is impractical to control the population.

Seventeen species of mosquitoes live in Clark County, of which 10 are known to be vectors of disease. Due to moderate winter temperatures in Clark County, several of these mosquito species can breed year round or overwinter as adults.

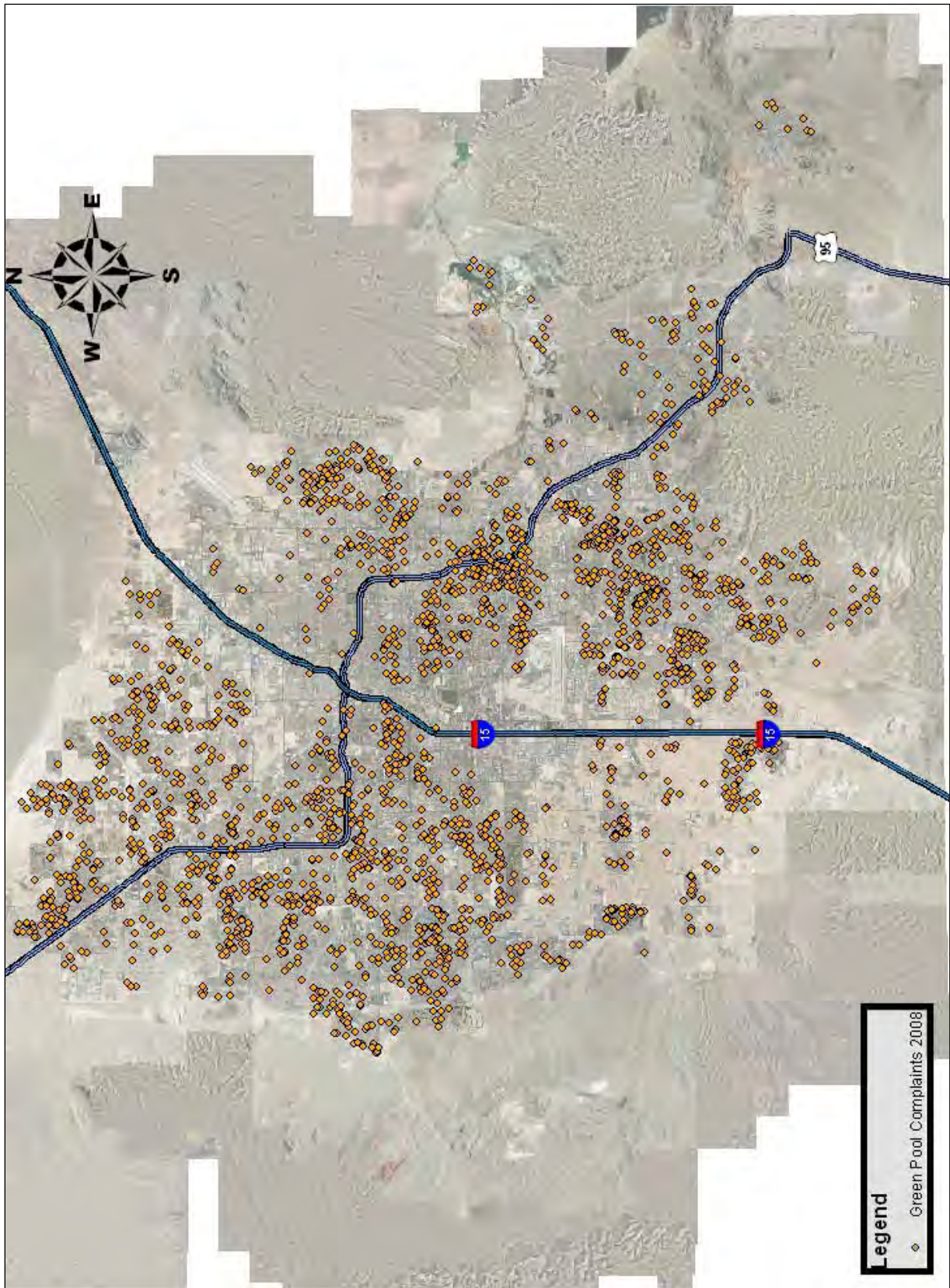
The health district routinely inspected and treated approximately 85 known mosquito breeding sources throughout the year. These areas include flood channels, road side ditches, catch basins, pastures, irrigated fields, wastewater treatment ponds, and wetland ponds. Local public agencies and private property owners were contacted to maintain drainage in channels and ditches, remove or thin vegetation in wetland and wastewater ponds, remove debris from street gutters and drains, and improve field irrigation methods for agriculture use.

A major component of the health district's urban mosquito control efforts are at abandoned residential swimming pools. In 2008 staff responded to 2,854 citizen complaints of stagnant swimming pools, standing water and general mosquito control concerns, an increase of 1,307 complaints over 2007. Of the 2,854 complaints, 2,785 responses were to stagnant swimming pools, with the remaining responses to vacant lots, storm drains, washes and other areas of standing water. Many of these responses required multiple site visits to verify the mosquito breeding source had been eliminated.

Table 9: 2005-2008 Mosquito Control Complaint Response Totals

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2005	0	0	0	3	6	363	205	349	115	45	37	14	1,131
2006	12	18	50	75	318	138	130	128	86	61	24	6	1,046
2007	14	42	96	115	257	276	233	255	153	98	78	7	1,624
2008	43	62	185	334	542	463	400	391	205	112	79	38	2,854

Map 3: Green Pool Complaints in Clark County



Rabies Surveillance

Rabies is a disease of the nervous system caused by a virus. It usually results from an exposure to an animal with rabies and is fatal to humans. In 2008, staff submitted 145 specimens from 15 animal species to the ADL for rabies surveillance, with six bats testing positive. Samples were collected by animal control agencies in Clark County and submitted to the health district for recording and shipment to the ADL. Table 10 details the type of specimens submitted for rabies testing in 2008. Table 11 is a year-by-year comparison of rabies test submissions since 2001. Map 4 shows the geographical distribution of the positive rabies samples since 2002. No human cases of rabies infection were reported to the health district.

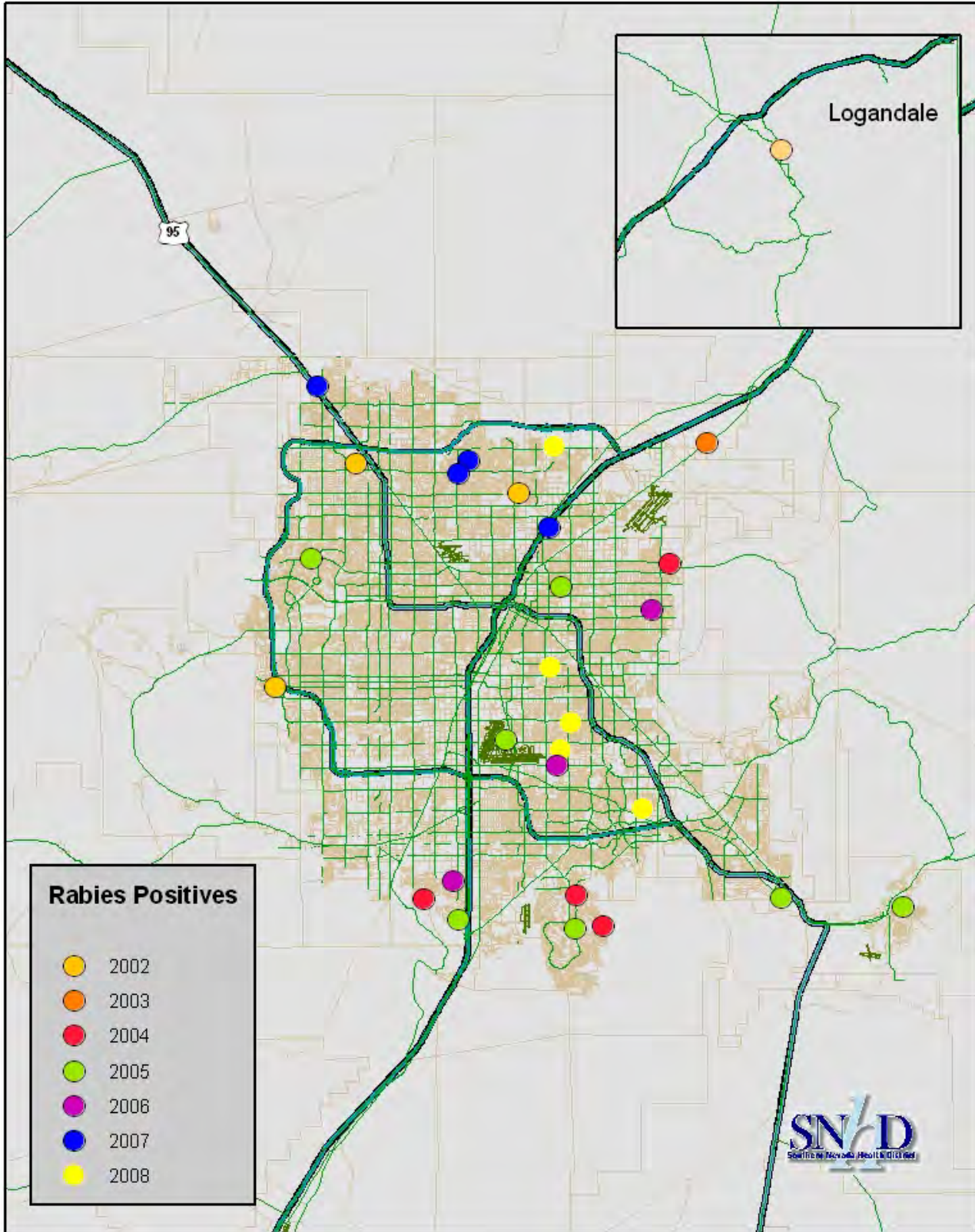
Table 10: 2008 Rabies Surveillance Submissions

Animal	# Sampled	# Positive
Bat	26	6
Badger	1	0
Bobcat	1	0
Cat	43	0
Chipmunk	1	0
Coyote	2	0
Dog	58	0
Ferret	1	0
Fox	1	0
Genet Cat	1	0
Opossum	1	0
Raccoon	8	0
Rat	1	0
Skunk	3	0
Squirrel	1	0
Total	145	6

Table 11: 2001-2008 Rabies Test Submission Comparison

Year	Total Sampled	# of Bats	# Positive Bats
2001	156	17	4
2002	138	22	4
2003	128	13	1
2004	155	20	4
2005	140	19	7
2006	93	24	4
2007	123	23	4
2008	145	26	6
Total	1078	164	34 (21%)

Map 4: Positive Rabies Samples in Clark County



Hantavirus Surveillance

Hantavirus pulmonary syndrome (HPS) is a serious respiratory disease transmitted by infected rodents through urine, droppings or saliva. Humans can contract the disease when they breathe in aerosolized fecal matter or urine containing the virus. In 2008, staff collected and submitted 98 blood samples to the University of New Mexico for hantavirus analysis. Three animals tested positive for hantavirus: two deer mice and one brush mouse. Table 12 details the type and numbers of animals tested and Table 13 is a year-by-year comparison of hantavirus test submissions since 2001. Map 5 shows the spatial distribution of hantavirus sample collections in Clark County. No human cases of hantavirus infection were reported to the health district.

Table 12: Hantavirus Specimen Distribution

Species	Name	# Sampled for Hantavirus	# Hantavirus Positive
<i>Ammospermophilus leucurus</i>	White-tailed Antelope Squirrel	1	0
<i>Dipodomys merriami</i>	Merriam's Kangaroo rat	1	0
<i>Eutamias panamintinus</i>	Panamint chipmunk	2	0
<i>Mus musulus</i>	House mouse	5	0
<i>Neotoma albigula</i>	White-throated Wood Rat	7	0
<i>Neotoma lepida</i>	Desert Wood rat	6	0
<i>Peromyscus boylii</i>	Brush mouse	40	1
<i>Peromyscus eremicus</i>	Cactus mouse	2	0
<i>Peromyscus maniculatis</i>	Deer mouse	21	2
<i>Peromyscus truei</i>	Piñon mouse	2	0
<i>Rattus rattus</i>	Roof rat	11	0
Total		98	3

Table 13: 2001-2008 Hantavirus Test Submission Comparison

Year	Samples Tested	Total
2001	0	0
2002	0	0
2003	50	4
2004	0	0
2005	128	0
2006	386	12
2007	53	0
2008	98	3
Total	715	16 (2%)

Plague Surveillance

Plague is caused by a bacterium, *Yersinia pestis*, which is carried by fleas that feed on infected animals. In 2008, staff submitted 104 animal blood samples to the Centers for Disease Control and Prevention for plague analysis. Samples were collected by USDA Wildlife Services or health district staff. One sample tested positive for plague in 2008. Table 14 details the type and number of animals tested for plague. Additionally, 79 fleas were combed from rodents, of which zero tested positive for plague. Table 15 details the type and number of fleas submitted for plague analysis. Table 16 is a year-by-year comparison of plague test submissions since 2001. Map 6 shows the spatial distribution of plague sample collections in Clark County. No human cases of plague infection were reported to the health district.

Table 14: Plague Specimen Distribution

Species	Name	# Sampled for Plague	Plague Positive Results	# Animals With Fleas	Fleas Positive Results
<i>Ammospermophilus leucurus</i>	White-tailed Antelope Squirrel	1	0	0	0
<i>Canis latrans</i>	Coyote	8	0	0	0
<i>Dipodomys merriami</i>	Merriam's Kangaroo Rat	1	0	4	0
<i>Eutamias panamintinus</i>	Panamint Chipmunk	2	0	1	0
<i>Felis rufus</i>	Bobcat	1	0	0	0
<i>Mus musculus</i>	House Mouse	5	0	0	0
<i>Neotoma albigula</i>	White-throated Wood Rat	7	0	2	0
<i>Neotoma lepida</i>	Desert Wood Rat	8	0	7	0
<i>Peromyscus boylii</i>	Brush Mouse	33	1	12	0
<i>Peromyscus eremicus</i>	Cactus Mouse	2	0		
<i>Peromyscus maniculatis</i>	Deer Mouse	21	0	3	0
<i>Peromyscus truei</i>	Piñon Mouse	2	0	1	0
<i>Procyon lotor</i>	Raccoon	2	0	0	0
<i>Rattus rattus</i>	Roof Rat	11	0	0	0
Total		104	1	30	0

Table 15: 2001-2008 Plague Sample Distribution

Year	Samples	# Positive	Gray Fox	Raccoon	Feral Cat	Palmer's Chipmunk
2001	116	12	5	4	2	1
2002	25	0	0	0	0	0
2003	84	7	7	0	0	0
2004	84	3	2	1	0	0
2005	128	0	0	0	0	0
2006	459	3	3	0	0	0
2007	31	0	0	0	0	0
2008	104	1	0	0	0	0
Total	1,031	26 (2.5%)	17	5	2	1

Table 16: Flea Species Distribution

Flea Species	# Sampled	# Positive
<i>Aetheca wagneri</i>	2	0
<i>Eumolpianus eumolpi</i>	5	0
<i>Meringis dipodomys</i>	6	0
<i>Malaraeus sinomus</i>	1	0
<i>Malaraeus telchinus</i>	14	0
<i>Orchopeas sexdentatus</i>	30	0
<i>Orchopeas leucopus</i>	17	0
<i>Peromyscopsylla hesperomys</i>	3	0
<i>Thrassiss bacchi</i>	1	0
Total	79	0

Map 5: Plague and Hantavirus in Southern Nevada



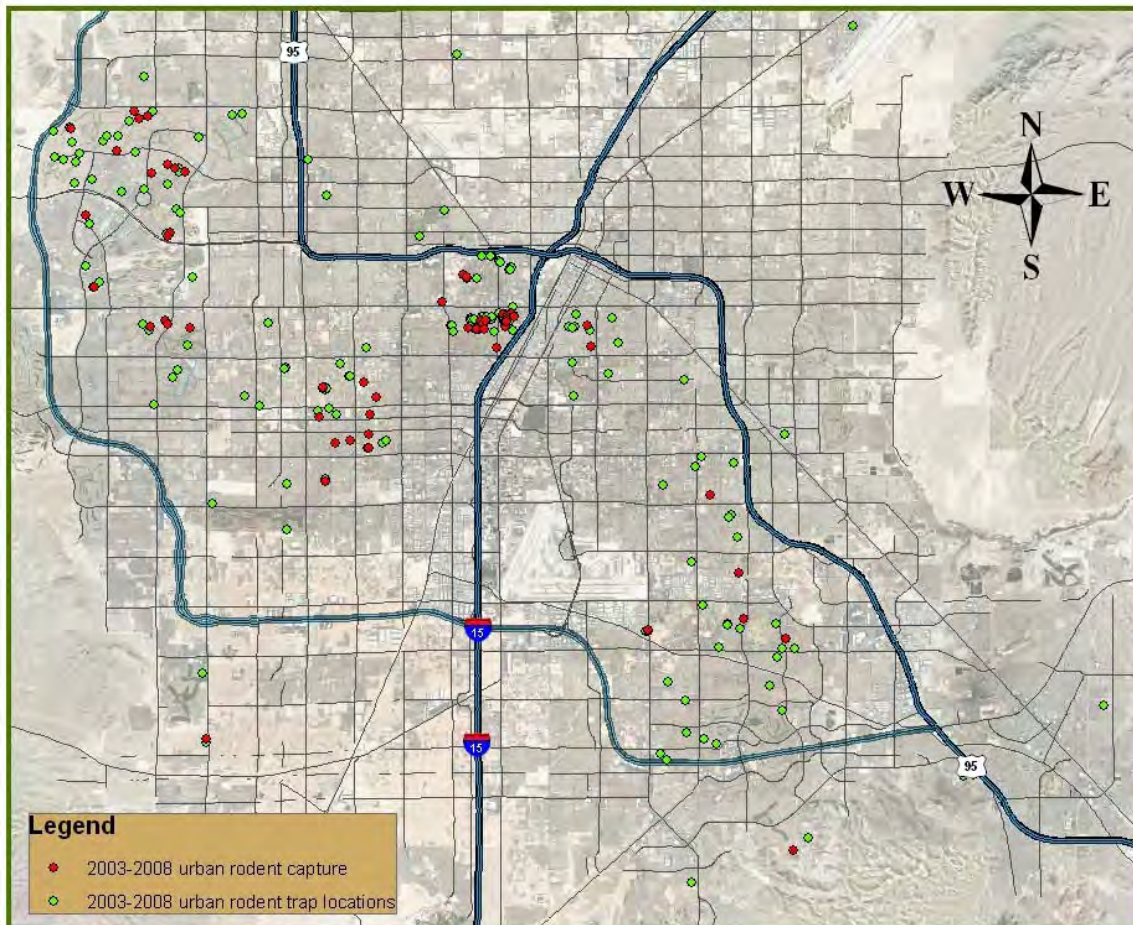
Urban Rodent Disease Surveillance

As part of its rodent disease surveillance program, staff traps roof rats (*Rattus rattus*) in urban Clark County. Roof rats are not native to the Las Vegas valley and have thrived in many lush neighborhoods where food, shelter and fresh water are readily available. Since 2003, staff has set live capture traps at 261 homes from 35 ZIP Codes where owners have complained about rat activity, as well as at schools and several wash channels.

From these locations, 126 roof rats have been captured and tested for plague and hantavirus, combed for fleas, and when possible, fecal matter has been collected and tested for *Salmonella*, *Shigella* and *Campylobacter*. All rodents tested negative for disease and fleas were found only on one animal. Map 6 shows the spatial distribution of all urban rodent trapping locations since 2003, including locations where roof rats were captured. On several occasions roof rats have been captured at the same location as desert wood rats, a native rat species. As residential areas around Clark County continue to expand and the interface between rural and urban rodents occurs, the potential introduction of diseases identified in rural rodent populations, including plague, cannot be overlooked.

The health district maintains rodent prevention and control information on its website and homeowners are directed to pest control companies for remediation of rodent problems. Staff will continue to monitor the health status of *Rattus rattus* populations in urban Clark County along with its rural rodent surveillance program.

Map 6: Urban Rodent Trapping 2003-2008



Raccoon Roundworm Surveillance

Baylisascaris procyonis is a roundworm that lives in the intestines of raccoons. The worm does not harm the raccoon, but can cause serious illness in humans. The adult worms shed millions of microscopic eggs that are passed in the raccoon's feces. These eggs are resistant to most environmental conditions, and with adequate water, can survive from months to years. People become infected with *Baylisascaris* when they ingest eggs that are in soil, water or on objects that have been contaminated with raccoon feces. After human ingestion, these eggs can hatch into larvae in the person's intestine and migrate throughout the body, affecting the organs and muscles.

In 2008, the health district submitted one raccoon fecal sample to the ADL for *Baylisascaris* testing, which was negative. Table 17 is a year-by-year comparison of raccoon roundworm submissions since 2004. No human cases of *Baylisascaris* infection were reported to the health district.

Table 17: 2004-2008 Raccoon Parasite Distribution

Year	# Raccoon Fecals Sampled	# Roundworm Present	# <i>Baylisascaris</i> Present	# <i>Capillaria</i> Present	# <i>Trichuris</i> Present	# <i>Toxocara canis</i> Present
2004	16	3	2	1	0	0
2005	17	5	2	0	2	1
2006	23	4	2	2	0	0
2007	2	1	0	0	1	0
2008	1	0	0	0	0	0
Total	58	13 (22%)	6	3	3	1

Conclusion

Public health education outreach is a crucial component of the zoonotic disease surveillance and control program. Outreach was accomplished throughout the year, using formal and informal methods including media interviews, community group presentations, health fair booths, school presentations and citizen contact through routine field activities. A timeline of educational outreach and public information activities are listed in Appendices A and B respectively.

Zoonotic diseases such as rabies, plague, hantavirus, West Nile virus and raccoon roundworm are endemic in Southern Nevada. The Environmental Health Division continues to develop and expand its zoonotic infectious disease surveillance program, identifying areas of disease and looking for emerging pathogens.

Appendix A

Time Line of Educational Outreach and Staff Training

January

- 76th Annual Mosquito & Vector Control Association of California Conference – Palm Springs, CA

March

- Center for Disease Control and Prevention's 6th International Conference on Emerging Infectious Diseases – Atlanta, GA
- 74th Annual American Mosquito Control Association meeting – Reno, NV
- Career Day presentations at Kay Carl Elementary

April

- Medical entomology training by a University of Nevada, Las Vegas professor of entomology (10 hours)

May

- Annual Nevada GIS Conference – Las Vegas, NV

June

- Mosquito control and West Nile virus prevention presentation at the Bunkerville Town Board advisory meeting

July

- "Microbial Larvicide" presentation by Valent BioSciences

August

- Mosquito control and West Nile virus prevention presentation for the Copper Creek Home Owners Association
- Mosquito control and West Nile virus prevention presentation for the Moapa Band of Paiutes

October

- Utah Mosquito Abatement Association meeting, Park City, Utah
- "Rodents, Mosquitoes, Public Health and Your Neighborhoods" presentation for a group of Home Owner Association executive board members
- Panel member at the City of Henderson's Neighborhood Leadership Recognition and Awards meeting, addressing questions from HOA members about foreclosed and abandoned homes, including swimming pools.

November

- Distributed information on West Nile virus prevention and mosquito control at the Moapa Band of Paiute's Annual Health Fair

Appendix B

Time Line of WNV Surveillance and Mosquito Control Media Releases

Public Information Activities

The Southern Nevada Health District continued its risk communication and informational strategies in order to educate the public about illnesses related to West Nile virus and prevention measures. These strategies were implemented using a multi-media approach consisting of print and broadcast news stories, paid advertisements and a special section for the website.

News Releases

Southern Nevada Health District:

- "Public Health Update – West Nile Virus," Feb. 1, 2008
- "Health District reminds Southern Nevadans to eliminate mosquito breeding sources," *Sandstone* June 2008
- "Southern Nevada Health District detects West Nile virus in mosquitoes," July 28, 2008
- "Southern Nevada Health District reports season's first West Nile case/Prevention is urged," Aug. 11, 2008
- "Public Health Update – West Nile positive mosquitoes," Aug. 13, 2008
- "Public Health Update #2 – West Nile Virus," Aug. 26, 2008
- "Public Health Update #3 – West Nile Virus," Aug. 27, 2008
- "Public Health Update #4 – West Nile Virus," Sept. 8, 2008
- "Public Health Update #5 – West Nile Virus," Sept. 12, 2008
- "Public Health Update #6 – West Nile Virus," Sept. 26, 2008

Nevada State Health Division:

- "Nevada's first positive West Nile virus samples of 2008," July 22, 2008
- "Nevada State Health Division announces first human case of West Nile virus in 2008," Aug. 7, 2008

Broadcast Media Coverage

Unless indicated, broadcast outlets are Las Vegas-based network affiliates. KVBC-TV 3/NBC, KVVU-TV 5/FOX, KLAS-TV 8/CBS, KTNV-TV 13/ABC, KINC-TV 15/Univision, KBLR-TV 39/Telemundo, KAZA-TV 63/AZTECA. Following are broadcast news coverage or interviews:

- Channel 9, KOLO-TV (Reno, NV ABC affiliate), Aug. 15, 2008
Station requested West Nile virus status in Southern Nevada
- Channel 3 KVBC-TV Wednesday, Aug. 13, 2008
Southern Nevada Health District has identified another West Nile Virus cluster of mosquitoes in the 89122 ZIP Code, 4pm v/o; 1:30am announcer read.

- Channel 8 KLAS-TV Wednesday, Aug. 13, 2008
Southern Nevada Health District has identified another West Nile Virus cluster of mosquitoes in the 89122 ZIP Code, 12pm v/o; 11pm v/o.
- Channel 13 KTNV-TV Wednesday, Aug. 13, 2008
Southern Nevada Health District has detected West Nile virus in another cluster of mosquitoes in the 89122 ZIP Code, 11am v/o; 4pm v/o; 5pm v/o; 6pm v/o with tips on protection from mosquito bites; 11pm v/o.
- Channel 15 KINC-TV Wednesday, Aug. 13, 2008
Southern Nevada Health District investigating possible West Nile Virus cases in CC – Jorge Viote comments, 11pm report.
- Channel 63 KAZA-TV Tuesday, Aug. 12, 2008
Jorge Viote, Southern Nevada Health District, comments on West Nile Virus with the growth of the LV mosquito population – stagnant water in flood channel shown, 6pm report.
- Channel 3 KVBC-TV, Monday, Aug. 11, 2008
Southern Nevada Health District reports probable West Nile case in the community. Prevention information provided. News announcement posted on station website.
- Channel 5 KVVU-TV, Monday, Aug. 11, 2008
Southern Nevada Health District reports probable West Nile case in the community. Prevention information provided. B. Labus comments.
- Channel 8 KLAS-TV, Monday, Aug. 11, 2008
Southern Nevada Health District reports probable West Nile case in the community. Prevention information provided. News announcement posted on station website.
- Channel 13 KTNV-TV, Monday, Aug. 11, 2008
Southern Nevada Health District reports probable West Nile case in the community. Prevention information provided. B. Labus comments.
- KDWN-AM 720, Monday, Aug. 11, 2008
Southern Nevada Health District reports probable West Nile case in the community. Prevention information provided. B. Labus comments.
- Channel 3 KVBC-TV Tuesday, July 29, 2008
Southern Nevada Health District discovered mosquitoes with the West Nile virus in the 89122 ZIP Code – Southern Nevada Health District as begun putting mosquito larvae eating fish in green pools at foreclosed homes, 4pm live report from the Flamingo Wash with comments from Jonathan Gore, Southern Nevada Health District Environmental Specialist; 5pm live report; 6pm v/o.
- Channel 3 KVBC-TV Monday, July 29, 2008
Southern Nevada Health District discovered mosquitoes with the West Nile virus in the 89122 ZIP Code, 12pm v/o; 4pm v/o; 5pm v/o.
- Channel 8 KLAS-TV Tuesday, July 29, 2008
Janet Oh interviewed J. Gore, vector control, called to do a follow up story regarding WNV, green pool complaints.
- Channel 8 KLAS-TV Monday, July 28, 2008
Southern Nevada Health District discovered mosquitoes with the West Nile virus in the 89122 ZIP Code, 12pm v/o; 4pm v/o; 4:30pm on-set report with comments from Southern Nevada Health District's Vivek Raman & Robert Cole; 5pm v/o; 6pm report; 11pm v/o.

- Channel 39 KBLR-TV Monday, July 28, 2008
Southern Nevada Health District discovered mosquitoes with the West Nile virus in the 89122 ZIP Code, 6pm v/o.
- Channel 13 KTNV-TV Wednesday, July 23, 2008
Two mosquito pools have tested positive for West Nile virus in Lovelock, NV, 11am v/o; 4pm v/o; 5pm v/o; 6pm v/o.
- Channel 5 KVVU-TV Wednesday, July 23, 2008
Two mosquito pools have tested positive for West Nile virus in Lovelock, NV, 5:30 am v/o.
- Channel 15 KINC-TV Monday, July 7, 2008
Southern Nevada Health District responds to green pools, J. Viote interviewed.
- KDWN-AM 720, Thursday, July 3, 2008
Summer and holiday safety tips, including West Nile prevention, heat safety and food safety.
- Channel 13 KTNV-TV Monday, June 23, 2008
No cases of West Nile Virus have been reported in NV, 4:30pm v/o; 6pm v/o.
- Channel 15 KINC-TV Saturday, June 14, 2008
Foreclosed homes' stagnant pools becoming target for mosquito's dangers, Southern Nevada Health District Jorge Viote comments on health risks, 11pm report.
- Channel 13 KTNV-TV Thursday, May 29, 2008
Pools at foreclosed homes are becoming breeding grounds for mosquitoes, which can carry West Nile Virus, posing a health hazard, 4pm live report from Cactus & LV Blvd with comments from Southern Nevada Health District's Vivek Raman; 6pm live report; 6:30pm v/o; 11pm report.
- Channel 15 KINC-TV Tuesday, May 27, 2008
Southern Nevada Health District responds to green pool complaints, and offers mosquito control and West Nile prevention tips. (Interview is the result of a previous 30-minute West Nile-related interview on sister radio station). J. Viote comments.
- Entravision Radio/*Despierta Las Vegas*, Wednesday, May 21, 2008
J. Viote taped an interview about West Nile virus, prevention, tips to eliminate mosquito breeding sources, etc. This is a 30-minute interview for the station's *Despierta Las Vegas* public affairs show. Airdate Saturday May 21, Sunday, June 1.
- Channel 39 KBLR-TV, Monday May 12, 2008
Southern Nevada Health District has mosquito control/green pool complaint line. J. Viote comments.
- Channel 3 KVBC-TV Friday, May 9, 2008
Pools on foreclosed properties are becoming a breeding ground for mosquitoes that may carry the West Nile Virus, for the first time Southern Nevada Health District is imposing fines for dirty pools; 5pm & 6pm live reports from near Hollywood & Stewart with comments by Southern Nevada Health District's Environmental Specialist Brad Gore.
- Channel 13 KTNV-TV Monday, April 28, 2008
The risks of green pools and how the health district responds. V. Raman comments.
- Channel 8, KLAS-TV Tuesday, April 22, 2008
Expectations for the upcoming West Nile season, are foreclosures in the Valley affecting the number of green pool complaints, how many have we received, general discussion regarding protection, etc.

Comments by V. Raman regarding number of complaints, protection and prevention, how the vector control program works, etc.

Print Media

- Monday, Nov. 17, 2008
"Clean up foreclosed home or city will," *Las Vegas Sun*
- Tuesday, Aug. 12, 2008
"West Nile surfaces in county," *Las Vegas Review-Journal*
"West Nile virus detected in Nevada mosquitoes," *View on Health, Downtown View, Las Vegas Review-Journal*
- Monday, Aug. 11, 2008
"County has first probable human West Nile virus case," *Las Vegas Sun*
- Monday, July 28, 2008
"Mosquitoes test positive for West Nile," *Las Vegas Sun*
"West Nile found in mosquitoes in SE Las Vegas area," *Las Vegas Sun/AP*
- Wednesday, July 23, 2008
Mosquito surveillance, green pools and West Nile activity interview with P. Bondurant and Kathy Tomlin, *Boulder City News*
- Wednesday, July 16, 2008
"Health district's campaign against mosquitoes under way," *2008 Guide to Las Vegas, Las Vegas Review-Journal*
- Friday, June 27, 2008
"HOAs have recourse in lien times," *Las Vegas Sun*
- Monday, June 16, 2008
Effect of green pools and foreclosed homes related to West Nile and mosquito surveillance. Reporter Michelle Booth interviewed V. Raman, *El Tiempo*
- Monday, June 9, 2008
"Who dropped the ball?/ After homes are foreclosed, it's lenders, title companies, HOAs," *Las Vegas Sun*

Collateral Material

Placed mosquito/West Nile virus awareness advertisements in the following publications:

- June 1, *Las Vegas Review-Journal*
- June 6, *El Tiempo Libre*
- June 11, *Laughlin Nevada Times*
- June 11, *Moapa Valley Progress*
- June 12, *Las Vegas Asian Journal*
- June 13, *El Mundo*
- June 17, *Desert Valley Times*