WEST NILE VIRUS SUMMARY REPORT 2011 SEASON
UTAH DEPARTMENT OF HEALTH

Report Purpose

The purpose of this document is to provide Utah West Nile virus (WNV) partners a concise summary of this season's major results. Information displayed in this report has been compiled by the Utah Department of Health (UDOH), but reflects information obtained from concerted joint efforts. All activities related to WNV during the 2011 season involved major contributions from many different agencies. These include as follows: blood banks of Utah, local health departments (LHDs), Utah Department of Agriculture and Food (UDAF), Utah Division of Wildlife Resources (UDWR), Utah Mosquito Abatement Association (UMAA), the Unified State Laboratories: Public Health (USL:PH), and the Utah Veterinary Diagnostic Laboratory (UVDL). In addition to the direct contribution of surveillance data, these agencies were also involved in systematic planning and preparation for the 2011 season. The intent of this report is to document the results of the efforts put forth by these entities during the 2011 WNV season.

Please note: the purpose of this report is to describe general trends that occurred during the 2011 season. Specific surveillance counts may be subject to change as data continues to be reconciled for the season.

Introduction to WNV

During the summer of 2011, WNV reemerged in Utah. This was the ninth year WNV activity was detected in Utah. WNV is a disease transmitted by mosquitoes. Birds are the natural hosts of the disease with humans and horses serving as accidental hosts. The majority of people infected with WNV never develop symptoms. A small percentage of infected individuals will display West Nile fever symptoms (i.e. fever, headache, and body aches). A more serious form of the disease, West Nile neuroinvasive illness, may also occur when the virus infects the central nervous system. People with this form of the disease will have high fevers, severe headaches, neck stiffness, and mental confusion. Hospitalization may be required and death is possible.

Introduction to WNV Surveillance in Utah

Surveillance for WNV activity involves several different components. Since the disease is zoonotic in nature, both human and animal surveillance occurs. In past years, WNV surveillance in Utah involved human, mosquito, wild bird, horse, and sentinel chicken populations. Due to the involvement of these different populations, surveillance efforts this season enlisted the expertise and abilities of many different agencies. Budget constraints again limited surveillance for the 2011 season, and in order to keep more critical surveillance running, wild bird testing and sentinel chicken testing were eliminated from routine surveillance. Local mosquito abatement districts (MADs), in conjunction with the UMAA, performed necessary trapping and identification for mosquito surveillance. Testing of these mosquitoes occurred at the USL:PH as well as in-house at some MAD facilities using the RAMP testing platform. Horse blood samples were collected and submitted by local veterinarians with the UDAF coordinating testing efforts at the UVDL-Logan. Major health care providers submitted human samples across the state with testing occurring at both the USL:PH and private laboratories such as ARUP (Associated Regional and University Pathologists). The three major blood banks servicing Utah (American Red Cross, ARUP, and Mountain Star) coordinated screening of donated blood for identification of viremic donors. All LHDs in Utah were involved with disseminating, investigating, and responding to surveillance data indicative of local WNV activity.

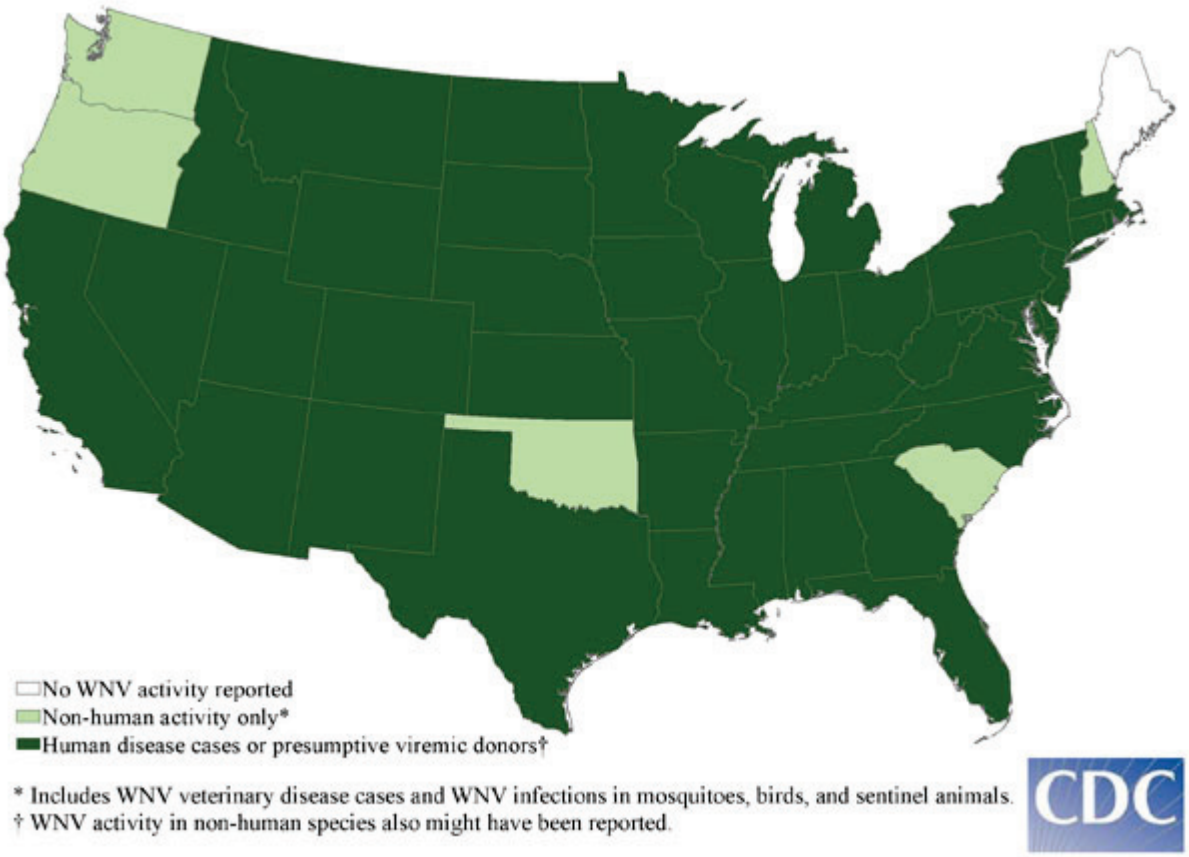
2011 Season National Highlights

As of December 13, 2011, season avian, animal, or mosquito WNV infections were reported to CDC ArboNet from the following states: Arizona, California, Colorado, Connecticut, DC, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin and Wyoming.

Human cases (including positive viremic donors) were reported in Alabama, Arizona, Arkansas, California, Colorado, Connecticut, DC, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Pennsylvania, Rhode Island, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, West Virginia, Wisconsin, and Wyoming.

As of December 13, 2011, of the 667 human cases reported to CDC, 458 (69%) were reported as West Nile meningitis or encephalitis (neuroinvasive disease), 209 (31%) were reported as West Nile fever (milder disease). A total of 42 cases were fatal in 2011.

West Nile virus (WNV) activity reported to ArboNET, by state, United States, 2011 (as of December 13, 2011)



Map shows the distribution of non human activity (shaded in light green) and human infections including PVDs (dark green) occurring during 2011 by state as reported to CDC's ArboNET system for public distribution by state and local health departments. If West Nile virus infection is reported from any area of a state, that entire state is shaded.

2011 Season Utah Highlights

Activity during the 2011 WNV season was similar to what was detected during the 2010 season. The geographic spread of both human and animal activity was fairly evenly distributed throughout the state with the most concentration focused in the southern portion of the state. A total of six counties had activity detected during the 2011 season compared with five counties in 2010. For 2011, all RAMP tests for mosquitoes were confirmed by PCR at USL:PH.

Table 1: 2011 WNV Activity in Utah (Positive Counts Only)

Total West Nile Virus Positive Samples: Utah 2011					
County of Residence	**Human**	**Chicken***	**Horse**	**Mosquito**	**Total**
Beaver	–	–	–	–	0
Box Elder	–	–	–	–	0
Cache	1	–	–	–	1
Carbon	–	–	–	–	0
Daggett	–	–	–	–	0
Davis	–	–	–	–	0
Duchesne	–	–	–	–	0
Emery	–	–	–	–	0
Garfield	–	–	–	–	0
Grand	–	–	–	23	23
Iron	–	–	1	–	1
Juab	–	–	–	–	0
Kane	–	–	–	–	0
Millard	–	–	–	–	0
Morgan	–	–	–	–	0
Piute	–	–	–	–	0
Rich	–	–	–	–	0
Salt Lake	1	–	–	–	1
San Juan	–	–	–	–	0
Sanpete	–	–	–	–	0
Sevier	–	–	–	–	0
Summit	–	–	–	–	0
Tooele	1	–	–	–	1
Uintah	–	–	–	1	1
Utah	–	–	–	–	0
Wasatch	–	–	–	–	0
Washington	–	–	–	1	1
Wayne	–	–	–	–	0
Weber	–	–	–	–	0
State Total	***3***	***0***	***1***	***25***	***29***

Human Cases of WNV: Utah 2011					
Age Group	**Total**	**% Total**	**Fever**	**Death**	**Neuroinvasive**
< 18	–	–	–	–	–
18-39	2	67%	2	–	–
40-64	–	–	–	–	–
≥ 65	1	33%	–	–	1
State Total	***3***	**–**	***2***	**–**	***1***

* The state is not conducting sentinel chicken surveillance in 2011. However, some counties still maintain sentinel chicken flocks.

Past Season Comparison

2003 was the first year WNV activity was established in Utah. Similar to many initial seasons in other states, activity was muted. One human case was reported for the 2003 season in Utah, in addition to one viremic donor who did not develop symptoms. Horse activity was the main indication of WNV presence in 2003. 2004 was the first year WNV activity was established in northern Utah along the Wasatch Front. The majority of activity for 2004 occurred in extreme southern and eastern areas of Utah such as Washington and Grand counties. During 2005, activity expanded into more northern regions of the state and Utah and Uintah counties served as focal points for detected activity. The 2006 season was the most active season. Activity was focused along the Wasatch Front in the more populated areas, Salt Lake County and Utah County. With an increase in activity, there was also an increase in fatalities, with Utah experiencing five. 2007 started the decline in the number of cases, as well as a decrease in the number of fatalities. 2007 also showed that the virus was moving into the more northern parts of the state, with the bulk of the cases being in the Cache and Box Elder counties. Activity during the 2008 WNV season decreased compared to activity detected during the 2007 season. The 2009 - 2011 seasons saw an even more dramatic decrease in the level of activity. Due to inconsistencies with RAMP testing, it was decided that mosquito pools would only be counted if they were confirmed by PCR. This led to a decrease in the number of positive mosquito pools throughout the state. The southwestern portion of Utah saw the most animal (mosquito) activity for the 2010 and 2011 seasons. The most dramatic decrease in activity was seen in the total number of counties affected. In 2009, a total of 12 counties had activity detected. In 2010, only five counties had activity detected, and the 2011 season had six.

Table 2: Utah WNV Season Comparison, 2003-2011

	2003	2004	2005	2006	2007	2008	2009	2010	2011
Human	1	11	52	158	70	27	2	2	3
Horse	35	5	68	59	18	8	6	3	1
Bird*	2	8	22	76	19	3	0	0	0
Chicken*	9	32	79	107	74	16	1	1	0
Mosquito Pools	3	181	80	466	225	140	284	31	23
Counties with Detection	9	11	17	19	19	14	12	5	6

*Wild bird and sentinel chickens were not part of Utah's active surveillance in 2011.

2011 Utah Activity Timeline

The majority of surveillance measures began in June 2011. West Nile virus activity was detected the week of July 20, 2011 in one mosquito pool, confirmed by PCR, from Grand County. Activity was detected throughout July through September with WNV activity being detected in most surveillance measures (horse, mosquito) by August. Utah's first human case was reported the week of September 7, 2011. Human, mosquito and equine cases continued to be reported into October. All active surveillance for the 2011 season had ceased by the end of October. However, testing of suspect human and horse cases continues year-round.

Human Surveillance

Human surveillance occurs primarily through reporting of results indicative of acute infection from major laboratories. LHDs were immediately notified in these instances for the initiation of case investigations. Due to issues with testing kits from a major reference laboratory from the 2008

season, it was again determined that all human samples would be confirmed at USL:PH. Additionally, major blood banks servicing Utah screened donations for the presence of WNV.

The total Utah human case count for the 2011 season currently stands at three identified cases.

There were no individuals identified as being infected with WNV through blood donation screening.

Table 3: 2011 WNV Season, Clinical Comparison of Human Cases, United States versus Utah

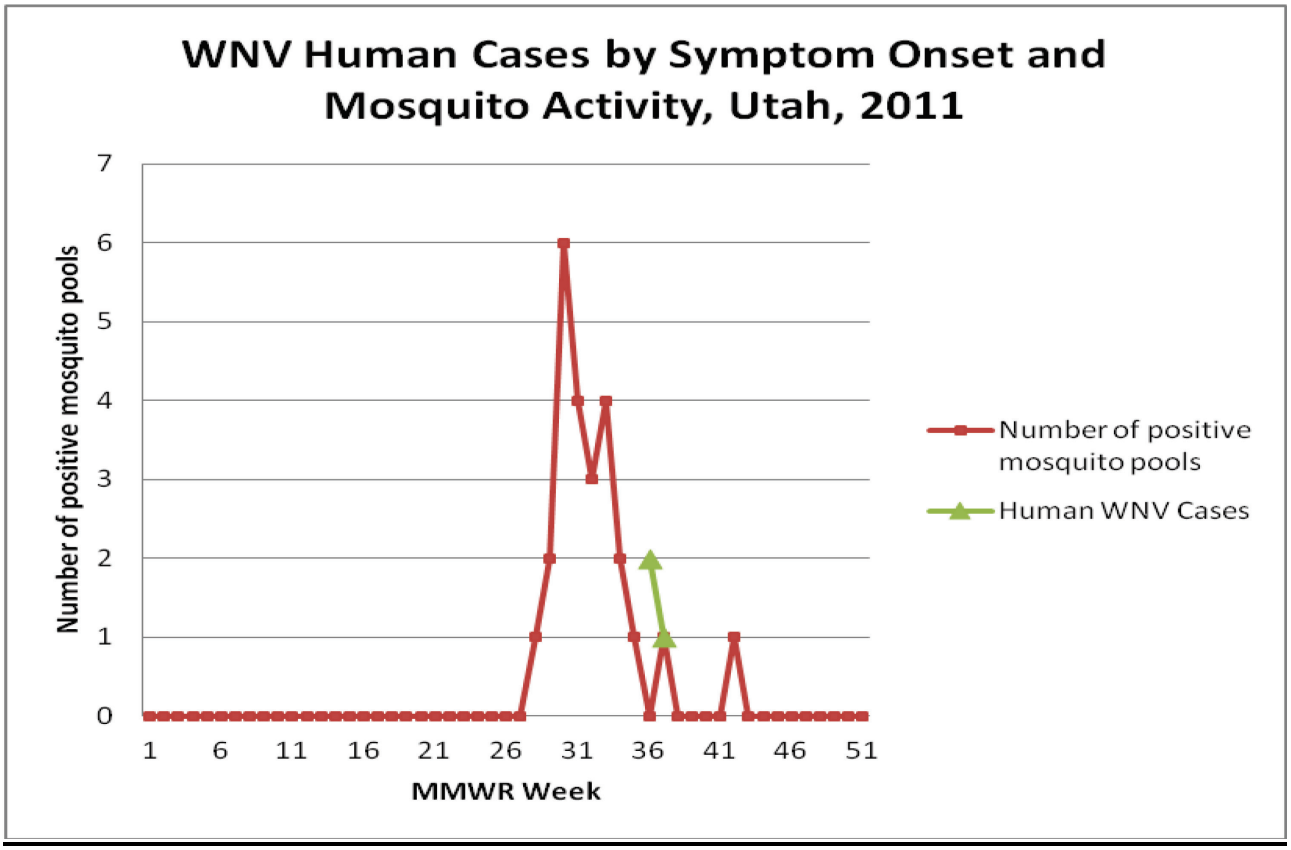
	Utah	United States
Case Number	3	667
Fatalities	0	42
Percent Fatalities	0%	6%
Percent Neuroinvasive Disease	33%	69%

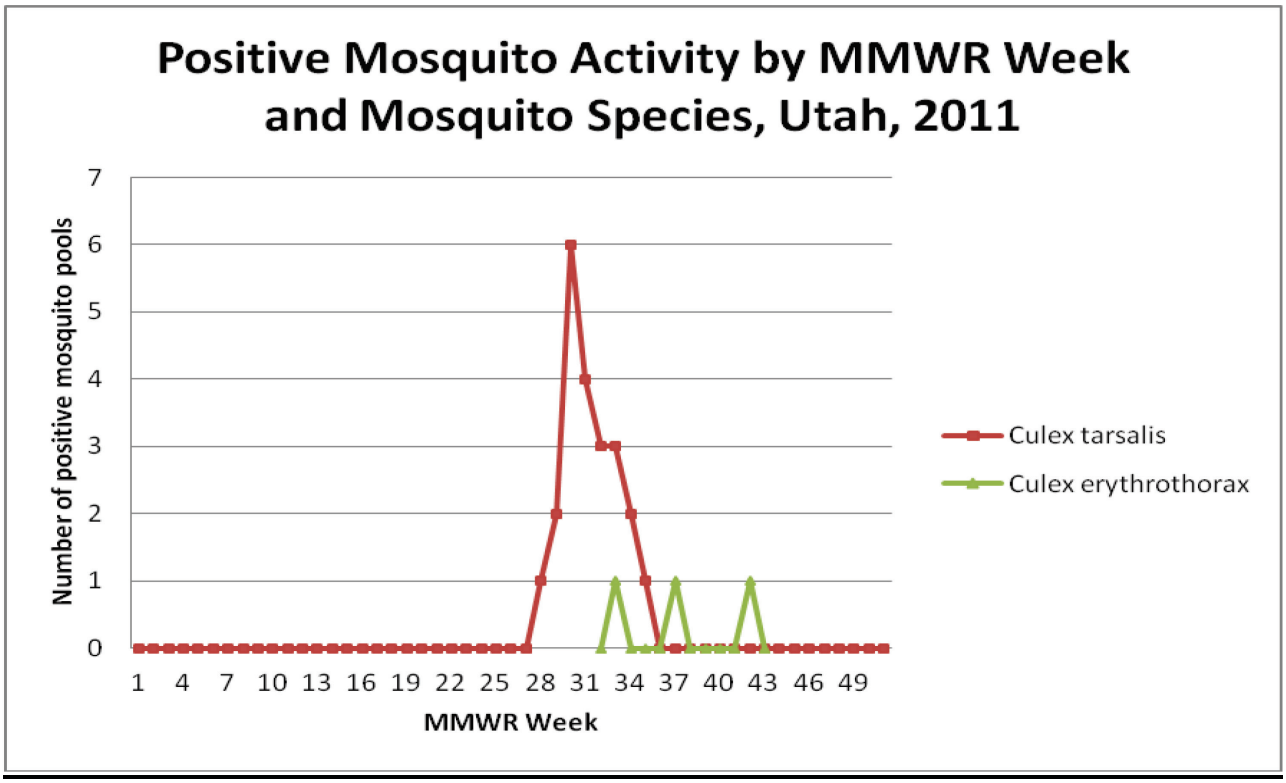
Table 4: Clinical and Demographic Comparison of Human Cases, Utah 2003-2011

	2003	2004	2005	2006	2007	2008	2009	2010	2011
Case Number	1	11	52	158	70	28	2	2	3
Fatalities	0	0	1	5	2	0	0	0	0
Percent Male	100%	45%	54%	51%	51%	79%	50%	100%	66%
Median Age	47 years	53 years	43 years	47 years	50 years	41 years	50 years	66 years	35 years
Age Range	NA	5-80 years	6-86 years	1-88 years	3-89 years	4-79 years	57-44 years	54-78 years	24-68 years

Table 5: Clinical and Demographic Characteristics, by Age Group, Utah 2011

	< 18 years	18-39 years	40-64 years	≥ 65 years
Case Number	0	2	0	1
Fatalities	0	0	0	0
Neuroinvasive # (%)	0	0	0	1 (33%)
Hospitalized # (%)	0	0	0	1 (33%)
Male # (%)	0	1 (33%)	0	1 (33%)


WNV Human Cases by Symptom Onset and Mosquito Activity, Utah, 2011
Number of positive mosquito pools
0
1
2
3
4
5
6
7
1
6
11
16
21
26
31
36
41
46
51
MMWR Week
Number of positive mosquito pools
Human WNV Cases


Positive Mosquito Activity by MMWR Week and Mosquito Species, Utah, 2011
Number of positive mosquito pools
0
1
2
3
4
5
6
7
1
4
7
10
13
16
19
22
25
28
31
34
37
40
43
46
49
MMWR Week
Culex tarsalis
Culex erythrothorax

Mosquito Surveillance

Personnel from mosquito abatement districts across the state performed the primary functions of trapping mosquitoes at various locations in their district. Trapped mosquitoes were identified and sorted into "pools" based on species. Each mosquito pool contained 50-100 individual mosquitoes. These pools were shipped to the USL:PH for testing by PCR.

Horse surveillance

Surveillance of equine disease related to WNV infection was again coordinated by the UDAF. Veterinarians across the state were encouraged to submit samples from suspect equine cases to the UVDL-Logan for testing. Results of these serum tests were reported by the UDAF to the UDOH with appropriate notification occurring for positive cases. The majority of samples submitted for testing were from domestic, privately owned horses with symptoms indicative of infection and no history of vaccination. Disease awareness among veterinarians and horse owners was accomplished through distribution of pamphlets and periodic updates using the Utah Veterinary Alert Listserver.

Wild bird surveillance

Due to budget constraints, wild bird surveillance was discontinued for the 2011 season.

Sentinel chicken surveillance

Due to budget constraints, sentinel chicken surveillance was discontinued for the 2011 season.

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