

## **WEST NILE VIRUS SUMMARY REPORT 2010 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 2010 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 2010 season. The intent of this report is to document the results of the efforts put forth by these entities during the 2010 WNV season.

*Please note: the purpose of this report is to describe general trends that occurred during the 2010 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 2010, WNV reemerged in Utah. This was the eighth 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 2010 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.

### **2010 Season National Highlights**

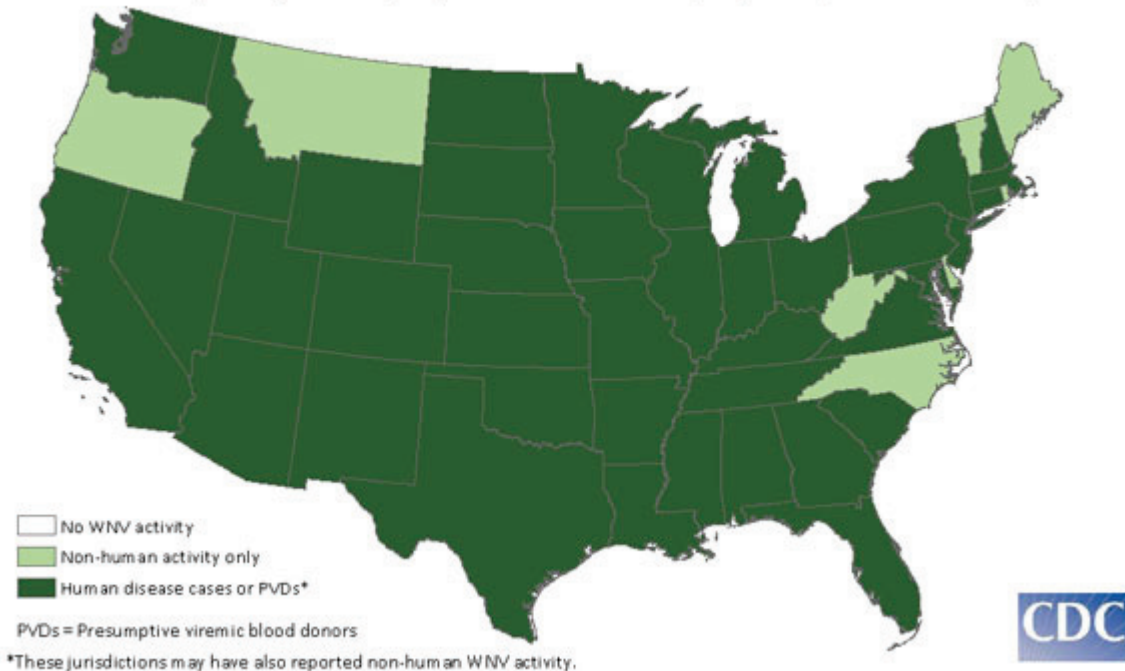
During the 2010 season avian, animal, or mosquito WNV infections were reported to CDC ArboNet from the following states: Arizona, Arkansas, California, Colorado, Connecticut, Delaware, District of Columbia, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, 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, District of Columbia, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oklahoma, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, Wisconsin, and Wyoming.

During the 2010 season, of the 1021 human cases reported to CDC, 629 (62%) were reported as West Nile meningitis or encephalitis (neuroinvasive disease), 392 (38%) were reported as West Nile fever (milder disease). A total of 57 cases were fatal in 2010.

### **2010 West Nile Virus Activity in the United States (Reported to CDC)**

**West Nile virus (WNV) activity reported to ArboNET, by state, United States, 2010**



Map shows the distribution of non human activity (shaded in light green) and human infections including PVDs (dark green) occurring during 2010 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.

Map shows the distribution of non human activity (shaded in light green) and human infections including PVDs (dark green) occurring during 2010 by state. If West Nile virus infection is reported from any area of a state, that entire state is shaded.

### **2010 Season Utah Highlights**

Activity during the 2010 WNV season was similar to what was detected during the 2009 season. The geographic spread of both human and animal activity was fairly evenly distributed throughout the state with the most concentration focused in the most populous region of the state (Salt Lake County). A total of five counties had activity detected during the 2010 season compared with 12 counties in 2009. For 2010, all RAMP tests for mosquitoes were confirmed by PCR at USL:PH.

**Table 1: 2010 WNV Activity in Utah (Positive Counts Only)**

| <b>Total West Nile Virus Positive Samples: Utah 2010</b> |              |                 |              |                 |                      |
|----------------------------------------------------------|--------------|-----------------|--------------|-----------------|----------------------|
| <b>County of Residence</b>                               | <b>Human</b> | <b>Chicken*</b> | <b>Horse</b> | <b>Mosquito</b> | <b>Total</b>         |
| Beaver                                                   | –            | –               | –            | –               | 0                    |
| Box Elder                                                | –            | –               | –            | –               | 0                    |
| Cache                                                    | –            | –               | –            | –               | 0                    |
| Carbon                                                   | –            | –               | –            | –               | 0                    |
| Daggett                                                  | –            | –               | –            | –               | 0                    |
| Davis                                                    | 1            | 1               | –            | 2               | 4                    |
| Duchesne                                                 | –            | –               | –            | –               | 0                    |
| Emery                                                    | –            | –               | –            | –               | 0                    |
| Garfield                                                 | –            | –               | –            | –               | 0                    |
| Grand                                                    | –            | –               | –            | –               | 0                    |
| Iron                                                     | –            | –               | –            | –               | 0                    |
| Juab                                                     | –            | –               | –            | –               | 0                    |
| Kane                                                     | 1            | –               | –            | –               | 1                    |
| Millard                                                  | –            | –               | –            | –               | 0                    |
| Morgan                                                   | –            | –               | –            | –               | 0                    |
| Piute                                                    | –            | –               | –            | –               | 0                    |
| Rich                                                     | –            | –               | –            | –               | 0                    |
| Salt Lake                                                | –            | –               | –            | 3               | 3                    |
| San Juan                                                 | –            | –               | –            | –               | 0                    |
| Sanpete                                                  | –            | –               | –            | –               | 0                    |
| Sevier                                                   | –            | –               | –            | –               | 0                    |
| Summit                                                   | –            | –               | –            | –               | 0                    |
| Tooele                                                   | –            | –               | –            | –               | 0                    |
| Uintah                                                   | –            | –               | 1            | 1               | 2                    |
| Utah                                                     | –            | –               | –            | –               | 0                    |
| Wasatch                                                  | –            | –               | –            | –               | 0                    |
| Washington                                               | –            | –               | 2            | 27              | 27                   |
| Wayne                                                    | –            | –               | –            | –               | 0                    |
| Weber                                                    | –            | –               | –            | –               | 0                    |
| <b>State Total</b>                                       | <b>2</b>     | <b>1</b>        | <b>3</b>     | <b>33</b>       | <b>39</b>            |
| <b>Human Cases of WNV: Utah 2010</b>                     |              |                 |              |                 |                      |
| <b>Age Group</b>                                         | <b>Total</b> | <b>% Total</b>  | <b>Fever</b> | <b>Death</b>    | <b>Neuroinvasive</b> |
| < 18                                                     | –            | –               | –            | –               | –                    |
| 18-39                                                    | –            | –               | –            | –               | –                    |
| 40-64                                                    | 1            | 50%             | 1            | –               | –                    |
| ≥ 65                                                     | 1            | 50%             | –            | –               | 1                    |
| <b>State Total</b>                                       | <b>2</b>     | <b>100%</b>     | <b>1</b>     | <b>–</b>        | <b>1</b>             |

\* The state is not conducting sentinel chicken surveillance in 2010. 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 and 2010 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 geographic spread of both human and animal activity was fairly evenly distributed throughout the state. The southwestern portion of Utah saw the most animal (mosquito) activity for the 2010 season. 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.

**Table 2: Utah WNV Season Comparison, 2003-2010**

|                                | <b>2003</b> | <b>2004</b> | <b>2005</b> | <b>2006</b> | <b>2007</b> | <b>2008</b> | <b>2009</b> | <b>2010</b> |
|--------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Human</b>                   | 1           | 11          | 52          | 158         | 70          | 27          | 2           | 2           |
| <b>Horse</b>                   | 35          | 5           | 68          | 59          | 18          | 8           | 6           | 3           |
| <b>Bird*</b>                   | 2           | 8           | 22          | 76          | 19          | 3           | 0           | 0           |
| <b>Chicken*</b>                | 9           | 32          | 79          | 107         | 74          | 16          | 1           | 1           |
| <b>Mosquito Pools</b>          | 3           | 181         | 80          | 466         | 225         | 140         | 284         | 33          |
| <b>Counties with Detection</b> | 9           | 11          | 17          | 19          | 19          | 14          | 12          | 5           |

\*Wild bird and sentinel chickens were not part of Utah's active surveillance in 2010.

### **2010 Utah Activity Timeline**

The majority of surveillance measures began in June 2010. West Nile virus activity was detected the week of June 17, 2010 in a mosquito pool, confirmed by PCR, in Washington 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 23, 2010. Human, mosquito and equine cases continued to be reported into October. All active surveillance for the 2010 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 2010 season currently stands at two identified cases.

There were two individuals identified as being infected with WNV through blood donation screening.

**Table 3: 2010 WNV Season, Clinical Comparison of Human Cases, United States versus Utah**

|                                      | <b>Utah</b> | <b>United States</b> |
|--------------------------------------|-------------|----------------------|
| <b>Case Number</b>                   | 2           | 1,021                |
| <b>Fatalities</b>                    | 0           | 57                   |
| <b>Percent Fatalities</b>            | 0%          | 6%                   |
| <b>Percent Neuroinvasive Disease</b> | 50%         | 62%                  |

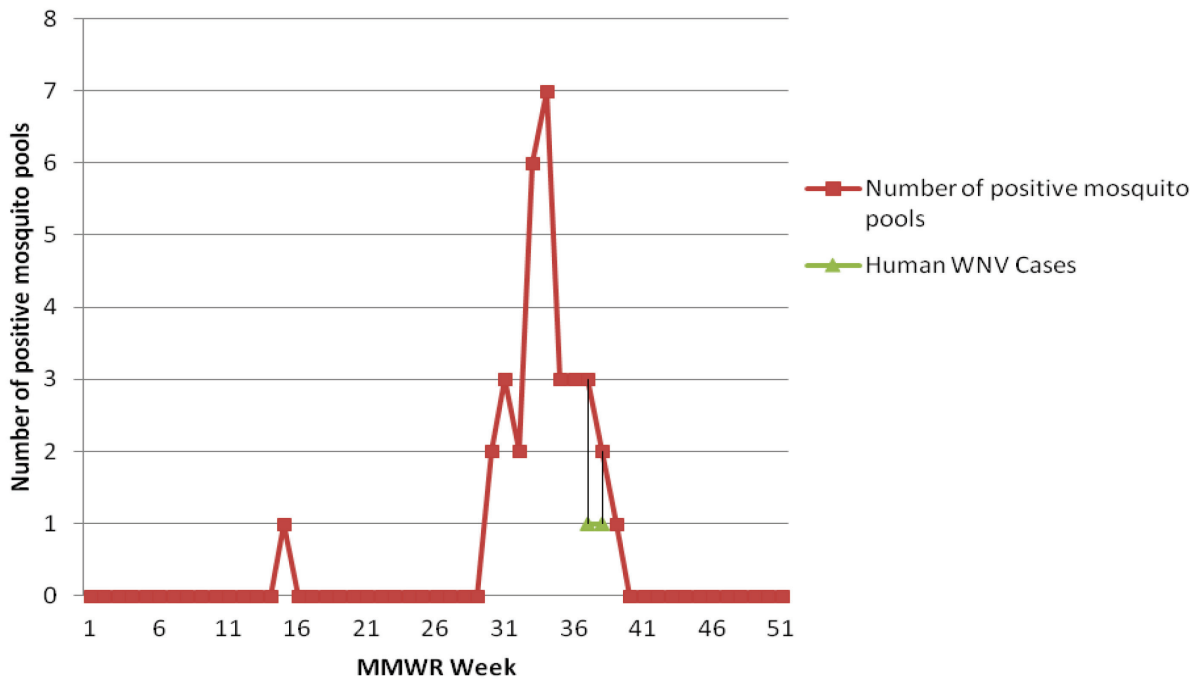
**Table 4: Clinical and Demographic Comparison of Human Cases, Utah 2003-2010**

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

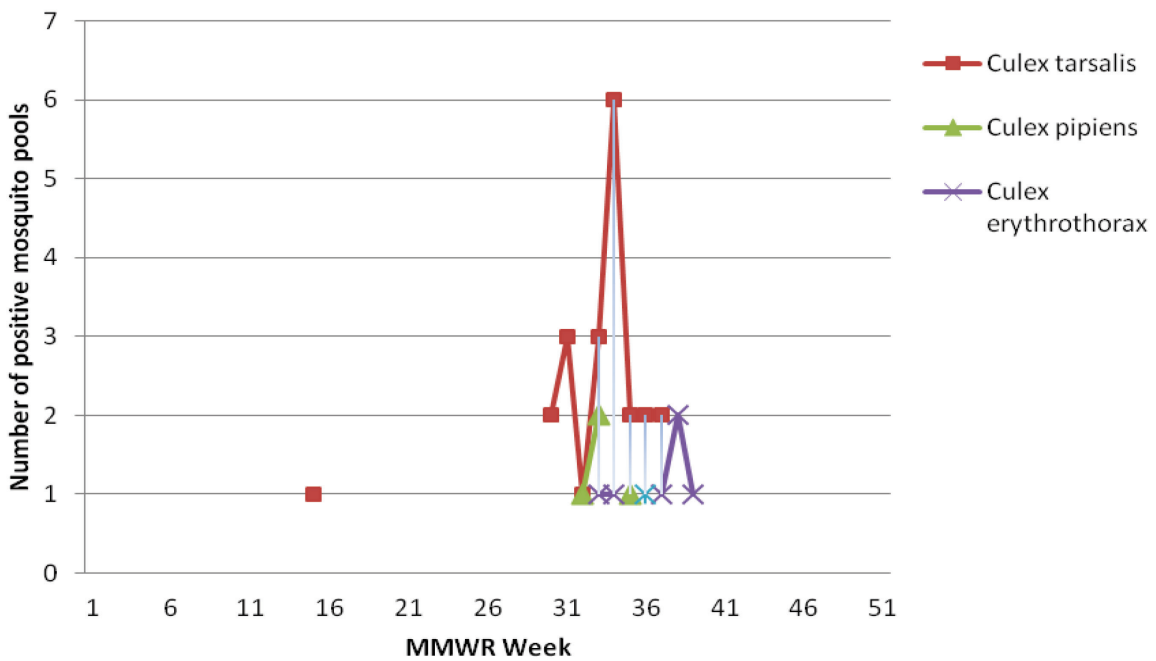
**Table 5: Clinical and Demographic Characteristics, by Age Group, Utah 2010**

|                            | <b>&lt; 18 years</b> | <b>18-39 years</b> | <b>40-64 years</b> | <b>≥ 65 years</b> |
|----------------------------|----------------------|--------------------|--------------------|-------------------|
| <b>Case Number</b>         | 0                    | 0                  | 1                  | 1                 |
| <b>Fatalities</b>          | 0                    | 0                  | 0                  | 0                 |
| <b>Neuroinvasive # (%)</b> | 0                    | 0                  | 0                  | 1 (50%)           |
| <b>Hospitalized # (%)</b>  | 0                    | 0                  | 0                  | 1 (50%)           |
| <b>Male # (%)</b>          | 0                    | 0                  | 1 (50%)            | 1 (50%)           |

## WNV Human Cases by Symptom Onset and Mosquito Activity, Utah, 2010



## Positive Mosquito Activity by MMWR Week and Mosquito Species, Utah, 2010



### **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 2010 season.

### **Sentinel chicken surveillance**

Due to budget constraints, sentinel chicken surveillance was discontinued for the 2010 season.

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