

SURVEILLANCE FOR WNV

Two critical surveillance tools are in place for the detection of WNV.

Weekly **CDC mosquito traps** (#1) are set out in 15 different locations in Utah Valley. See locations on following map. These traps release carbon dioxide that attracts female mosquitoes looking for a blood meal. We also use a **collection rotator bottle trap** (#5) that is set on a timer and allows trapping during 8 different time intervals to determine which species of mosquitoes are most active at what time of the night.

- Mosquitoes are identified and sorted by species
- Two methods are currently used to detect WNV vector mosquitoes, *Cx. tarsalis*, *Cx. pipiens* and *Cx. erythrothorax*. They sorted (#2) placed in tubes of 50 (#3-4) and sent to Utah Public Health Laboratory (UPHL) that process samples by Rt-PCR testing for presence of the virus returning results in 1-4 days. Results are relayed to mosquito abatement districts for control and management efforts. We process mosquito pools in our own lab by Rapid Analyte Measurement Platform, (RAMP) test that provides results within 2 hours.





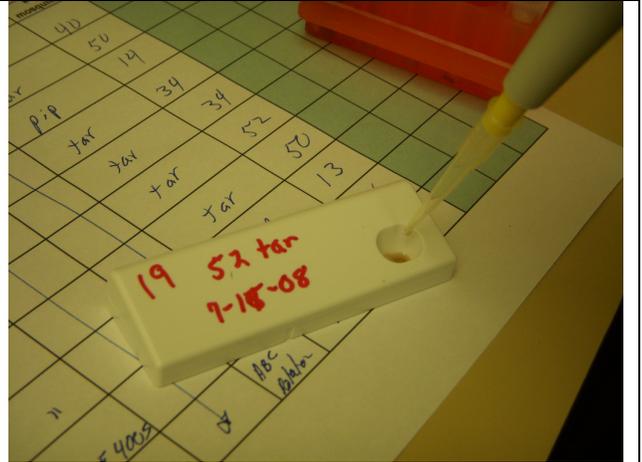
(#5)
Trap
gathers
weather
data and
mosquito
activity.



Centrifuged supernatant pipetted for cartridge.



Mosquito
sample
mixed with
buffer and
BB to break
up
mosquitoes



Applied to cartridge well and allowed to be absorbed and dry for 90 minutes. If WNV antigen present it will adhere antibodies in the cartridge.



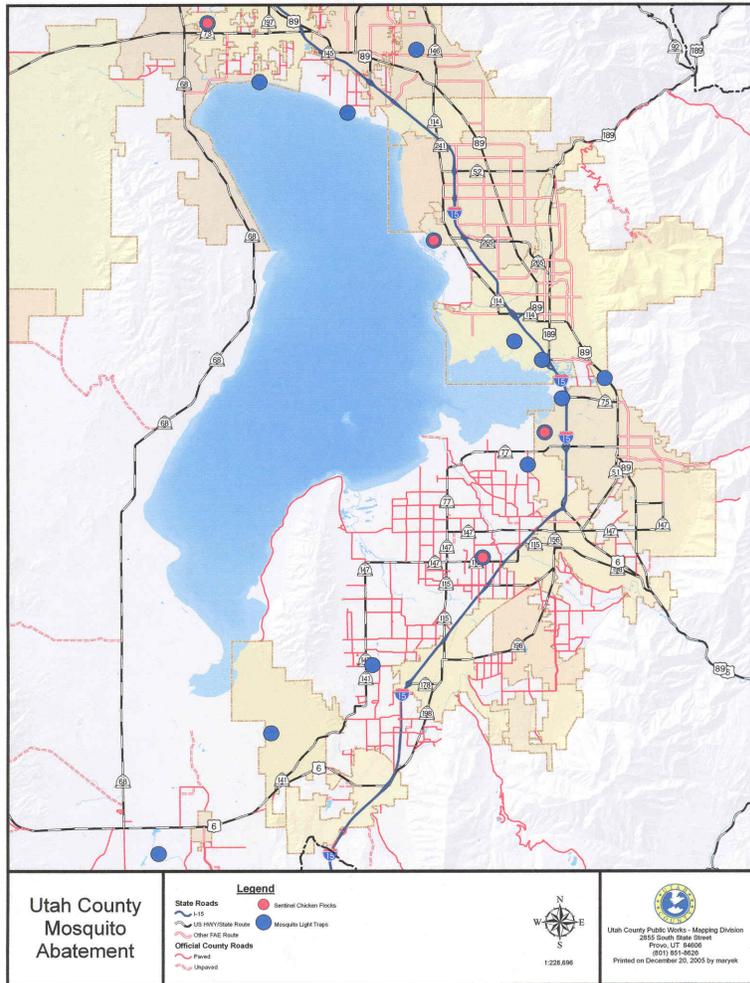
Sample transferred to new tube then centrifuged



Cartridge inserted into RAMP reader and results will be displayed.

Chickens flocks have been used by many mosquito districts throughout the state to monitor for the presence of WNV. **Recent cuts in CDC funding have eliminated this testing for most districts.** Chickens may harbor the virus but it does not reach high enough levels to make them sick. Utah County uses four flocks of five chickens each. See red dots for locations.

- Blood is drawn from each chicken weekly, from June to mid September.
- These vials are taken to Utah Veterinary Diagnostic Laboratory (UVDL) in Nephi for testing for presence of antibodies of WNV, WEE and SLE.
- The results are relayed to mosquito abatement districts.



In addition to these two diagnostic surveillance methods, additional monitoring has occurred.

- **Wild bird surveillance** was coordinated by the Utah Division of Wildlife Resources (UDWR) & Utah Department of Health (UDOH). Throat swabs are

made from recently dead or dying birds, particularly of the Corvidae family (ravens, crows, jays, magpies) and raptors, (eagles, hawks, falcons, etc) sent to the UDOH lab for testing. **This monitoring has also been stopped since 2009.**

- **Equine Surveillance** is reported to the Utah Department of Agriculture & Foods (UDAF) state veterinarian. Reports of EEE, WEE, VEE and WNV submitted by veterinarians and labs throughout the state.
 - Utah County reported 39 horse cases of 68 statewide in 2005
 - Utah County reported 19 horse cases of 62 statewide in 2006
 - Utah County reported 1 horse case of 18 statewide in 2007
 - Utah County has had no horse cases reported the past four years.
- **Human Surveillance** coordinated by the UDOH. Before a positive diagnosis of WNV can be determined a blood test must be conducted. Currently a validated IgM enzyme linked immunosorbant assay (ELISA) test for the presence of WNV antibodies must be found to confirm the disease. Hospitals, physicians, clinics, labs and local health departments are essential in gathering this information. The Utah County Health Department accumulates and researches potential cases via assigned epidemiologists.
 - Utah County reported 16 human cases of 52 statewide in 2005
 - Utah County reported 65 human cases of 158 statewide in 2006
 - Utah County reported 2 human cases of 68 statewide in 2007
 - Utah County reported 1 human cases of 28 statewide in 2008
 - Utah County reported 0 human cases of 2 statewide in 2009
 - Utah County reported 0 human cases of 2 statewide in 2010
 - Utah County reported 0 human cases of 3 statewide in 2011

WNV Historical Data (CDC)

Year	USA Total Cases	USA Fatal Cases	Utah Total Cases	Utah Fatal cases	Utah County Total Cases
1999	62	7			
2000	21	2			
2001	66	10			
2002	4156	284			
2003	9862	264	1	0	
2004	2539	100	11	0	1
2005	3000	119	52	1	16
2006	4269	177	158	5	66
2007	3630	124	70	2	2
2008	1356	44	26/27*	0	1
2009	720	32	2	0	0
2010	1021	57	2	0	0
2011	658	40	3	0	0

*state data

ADDITIONAL INFO ON MOSQUITO BORNE DISEASES IN UTAH

1. Three forms of mosquito transmitted encephalitis may occur in Utah: Western Equine Encephalitis (WEE) and St. Louis Encephalitis (SLE). WEE effects both humans and horses; SLE effects only humans and some birds (emu's).
2. The last outbreak of WEE in humans in Utah was in 1958. There has never been a human outbreak of SLE in Utah. The first Utah human WNV case was 2003.
3. WEE and SLE are characterized in their most severe form by signs and symptoms of long-term residual neurological damage, which may include paralysis, memory loss, deterioration of fine motor skills or death.
4. The Utah Mosquito Abatement Association (UMAA), Utah State Health Department (USHD) and the Utah State Agricultural Department (USAD) have had a cooperative encephalitis surveillance program since 1983.
5. The virus that causes WEE or SLE is naturally found in wild bird populations. This virus does not harm the bird, but multiplies within their blood. If a *Culex tarsalis* female mosquito (only female mosquitoes bite) takes a blood-meal from an infected bird and later take a blood-meal from a human or horse then those animals may become infected. WNV may kill certain groups of birds.
6. Early detection of encephalitis viral activity will provide the mosquito abatement districts a chance to concentrate their efforts in reducing the populations of the mosquito species *Culex tarsalis*, which transmits the virus.