



West Nile Virus Mosquito Testing 2011 SENTINEL ZONE PROTOCOL

Sentinel Zone Concept

The goal of surveillance for mosquito-borne viruses (WNV, SLE, WEE) is to determine the human transmission risk in order to implement control and prevention strategies. To facilitate a standardized method of data collection and ensure continued operation during budget reductions, the mosquito sentinel site concept was launched in 2004. However, there were concerns that a single site poorly represented the region's mosquito populations and was vulnerable to environmental changes that could reduce its effectiveness.

To address these issues, the program was modified into a "Sentinel Zone" approach. Within a defined "sentinel zone" mosquito traps are set in strategic locations to ensure successful trapping of adequate numbers of mosquitoes throughout the WNV season. In the event your combined trapped mosquito collection numbers for the week are low, it is recommended that they are saved and combined with the following trap night within the same trap week. If one trap or site becomes inoperable, mosquitoes from other traps in the zone can still be tested and the poor trap site can be relocated to another location within the zone.

Following standardized trapping and testing protocols, a sentinel zone would provide data about mosquito population density, species make-up and arboviral activity that is comparable over the years. Furthermore, this approach will provide sufficient mosquito testing volume for calculating accurate infection rates to allow control decisions to be made (i.e. to spray or not to spray) in time to have a public health benefit. All *Culex* species mosquitoes collected in the sentinel zones will be tested for WNV by RT-PCR and a sample of the submitted pools will also be tested for Western equine encephalitis (WEE) and St. Louis encephalitis (SLE).

Scope of Work

- 1) Defining a zone: Local agencies can determine where a zone will be located and what geographic area it will encompass within the following parameters:
 - ✧ A zone will be a circle with a minimum radius of 1.5 miles and a maximum radius of 5 miles
 - ✧ The center point of the circle will be used as the geo reference point for the zone (latitude/longitude).
- 2) Trap placement: Each zone will consist of five CO₂ baited light traps. Local agencies can determine where within the zone these traps are located.
 - ✧ Gravid traps or additional light traps can be maintained in the zone, however mosquitoes from other traps cannot be combined with the five zone traps for either testing or calculation of infection rates.
 - ✧ The same location for each trap must be used throughout a season. However, when necessary a non-producing trap can be moved to another location within the zone although this should be minimized and occur early in the season.



- 3) Trapping schedule: To better reflect the WNV transmission season in Colorado AND ensure the majority of samples ($\geq 60\%$) are tested during the peak of the transmission season the following schedule will be used. This schedule will result in ~ 60 to 90 trap/nights per zone for the season. Agencies can decide which night of the week to use although the same day should be used each week when possible.
- ✧ Weeks of June 13th through July 1st, 2011 – trap one night per week
 - ✧ Weeks of July 4th through August 5th, 2011 –
 - for jurisdictions with mosquito control programs where decisions on adulticiding are made based on trapping & testing results- trap two nights per week
 - for jurisdictions without mosquito control programs- trap one night per week
 - ✧ Weeks of August 8th through August 31st, 2011 – trap one night per week
 - ✧ **Agencies can trap mosquito mosquitoes prior to June 13th or after August 31st (for identification, mosquito counts, internal RAMP, control decisions) or more frequently (for control decisions), but if these mosquitoes are submitted to CDPHE Laboratory, the submitting agency will be billed.**
- 4) Mosquito Submission: The 5 traps within the sentinel zone could be viewed as one large mosquito trap from which the pooled infection rate and vector index will be calculated.
- ✧ All female *Culex* mosquitoes trapped in a sentinel zone must be submitted to the state lab.
 - ✧ Submit mosquitoes in separate pools by *C. tarsalis* and other *Culex* (i.e. *C. pipiens*, *C. erythrothorax*, *C. resturans* combined).
 - ✧ **Pool size can be up to 65 mosquitoes per vial.**
 - CRITICAL -- the exact number of mosquitoes per vial must be recorded as this affects the infection rate calculations.
 - ✧ *Culex* mosquitoes captured in the 5 zone traps and the **captures from the 2 nights per week during the peak of the trapping period should be co-mingled into the minimum number of pools**. This will extend limited testing resources.
 - ✧ Agencies can submit mosquito samples/pools prior to June 13th for WNV testing, but the agency will be billed.
 - ✧ *Due to the possibility of limited WNV funding (for both the local health departments and CDPHE Laboratory), CDPHE laboratory may have to cease testing of mosquitoes before the season is complete. CDPHE staff will alert local health departments if this occurs. Until that time, there is no reason to call CDPHE to ask whether funding is still available.*
- 5) Data Maintenance: Accurate records of trapping results must be maintained to allow year-to-year comparisons and monitor trends in mosquito populations. Dramatic changes in *Culex* population densities can provide an early indication of increasing human risk.
- ✧ It is recommended that all mosquitoes in the traps be identified to species and that population data be maintained for all species. Estimating numbers is acceptable for non-*Culex*
 - ✧ At a minimum, data to maintain should include: trapping dates, # mosquitoes in the zone traps, *Culex* population density by species (*C. tarsalis* and other *Culex* at a minimum), and weather conditions on night of mosquito trapping.

6) Other Considerations:

- ✧ Sentinel zones should contain areas that are suitable for *Culex* mosquitoes to breed and are in close proximity to human populations.
- ✧ Sentinel zone traps should not be located in an area with regular, heavy spraying operations for adult mosquito or other arthropod control (orchards, tree farms/nurseries, or agriculture areas). Areas with ongoing larviciding are OK.
- ✧ Traps within a zone should have an availability of mosquito resting sites and protection from wind (i.e. culverts, fences, shrubbery, trees, sheds, etc) and should be placed away from competing sources of light and carbon dioxide (e.g., livestock, including equine, bovine, and swine).
- ✧ Traps should be placed on the leeward side of obstacles if possible. For example, if the prevailing wind is generally from the west just after dusk, try to place the trap on the east side of trees, sheds, etc.