APPLICATIONS OF GIS TO WEST NILE VIRUS SURVEILLANCE PROGRAMS
A Study of Disease Ecology

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Mosquito Trapping

Interpreting Vector Ecology

Proximity to water edge increases vector species diversity and competition for potential host species. This reduces the chance for West Nile spread from mosquitoes to humans during species-rich periods. This competition decreases for the most common West Nile vector, *Culex pipiens-restuans*, as distance from stream and water edge increases and seasonal or permanent wetlands share space with local residents.

Positive-testing animal hosts may be related to West Nile-infected mosquito populations

Clusters of positive-testing birds (crows) develop due to local demographic, ecologic and topographic features. A cluster or kernel density analysis of dead bird sites can be used to locate possible West Nile-infected sites based on dead crow clusters.

Using this method, a positive testing dead bird (host) cluster was identified.

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Weighted Mean points for West Nile vectors were then produced to approximate a disease origin or nidus. Use of aerial photography, ground-truthing and proper trap placement then led to the identification of the positive mosquito pool.

Local host-vector ecology was then monitored in relation to local human population features.

The goal of these activities: reduce the likelihood for the initiation of local West Nile Fever cases.

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References and spatial data sources:

- GIS: ArcView 3.2, with ESRI shapefiles and Avenue Extensions
- National Land Cover Data and state and company shapefiles from http://www.nysgis.state.ny.us/
- Shuttle Radar Topography Mission (SRTM) and Digital Orthophotos (in TIFF and MrSID format) from Geocommunity website (www.geocomm.com)
- Landsat 7 imagery obtained from http://seamless.usgs.gov/
- Additional GIS software, shareware and freeware in use: IDRISI32, GeoTiff, MultiSpecW32
- GPS: Garmin eTrex; Magellan Map 320
- Data management tools: MS Access and Excel-Analysis toolpack
- Vector data managed by Dutchess County Department of Health; Vector and Host Ecology Project self-supervised.

Source:

- http://www.rci.rutgers.edu/~insects/njspp.htm