

Geospatial and Demographic Risk Factors for West Nile Virus Infection, NW Texas, 2003

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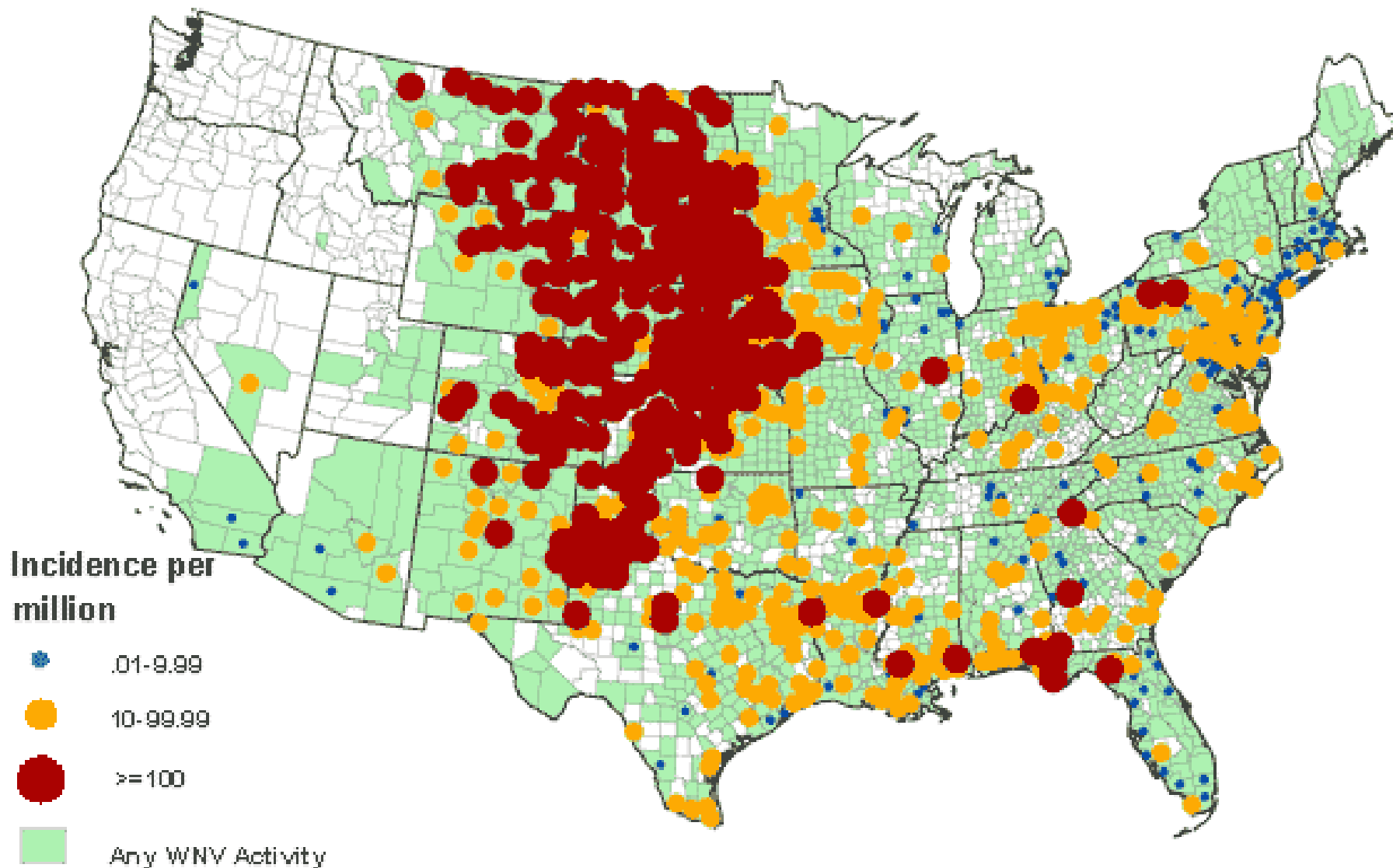
APHA, November 2007

Background

- Texas Panhandle and South Plains regions of West Texas (65 counties)
- 5.5% of the total state population

- 2002 8.4% of Tx WNND cases
- 2003 25.7% of Tx WNND cases

2003, West Nile Human Neuroinvasive Disease Incidence (CDC)

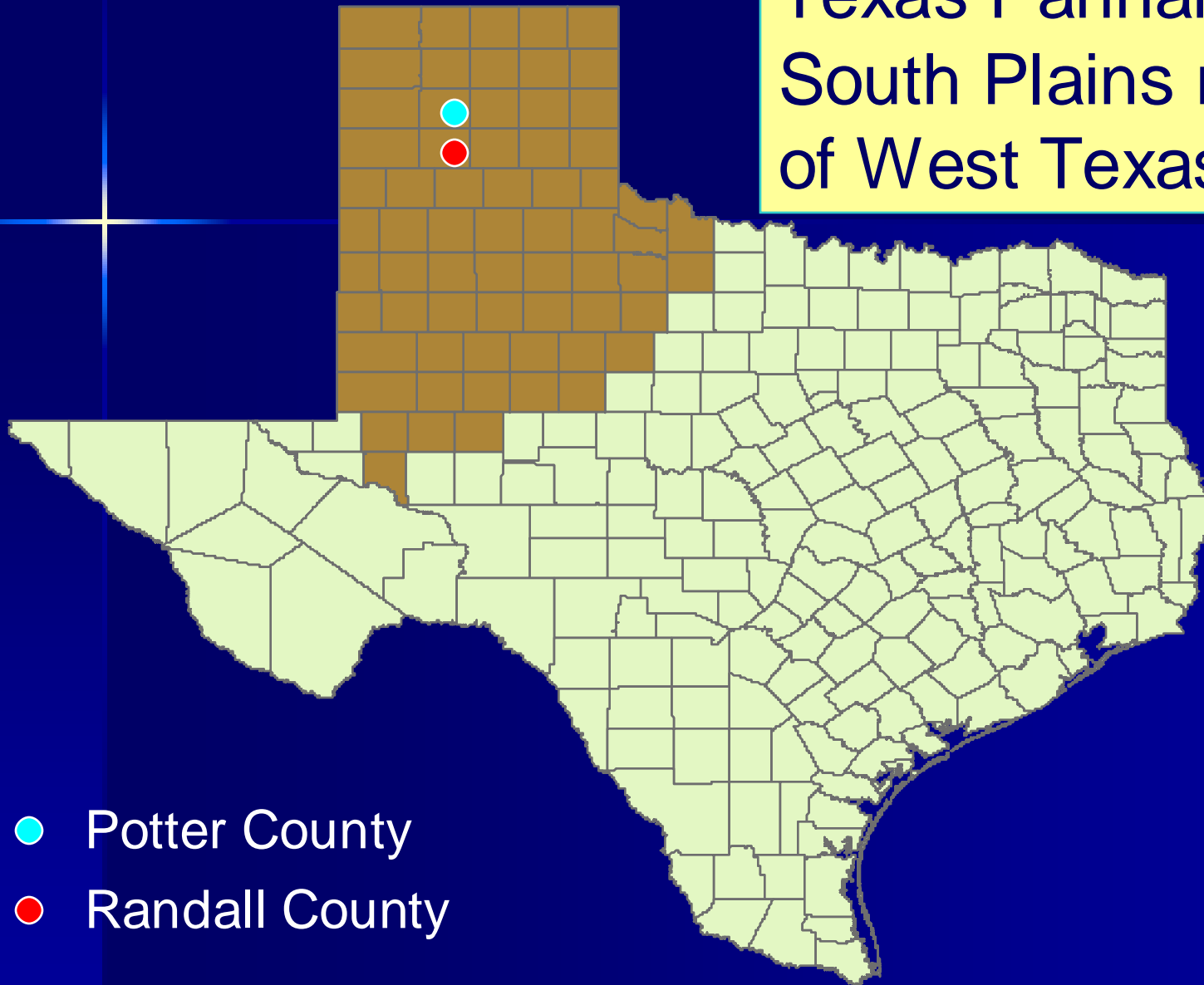


Plains Environment



- Semi-arid, annual rainfall less than 20" per year
- rural, low population density
- ranching / farming
- much of the available surface water occurs in seasonal playa lakes.

Texas Panhandle and South Plains regions of West Texas



- Potter County
- Randall County

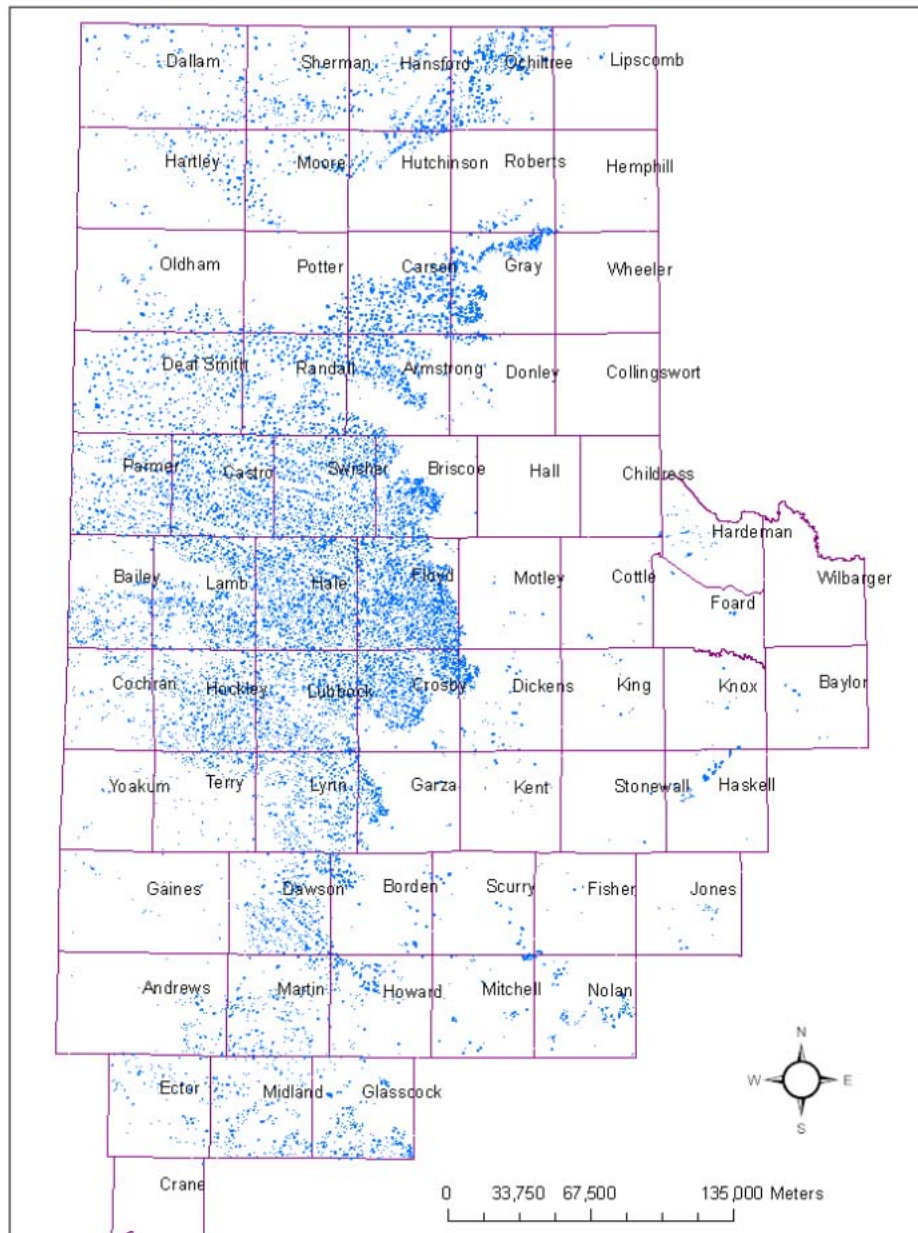
Playa lakes

- Ephemeral lakes
 - Shallow bowl shaped depressions that fill with water after spring thunderstorms
 - Impermeable clay bottoms allow retention of water for long periods during rainless months
 - Many are dry in the winter months



Habitat for local birds and migratory birds and water fowl



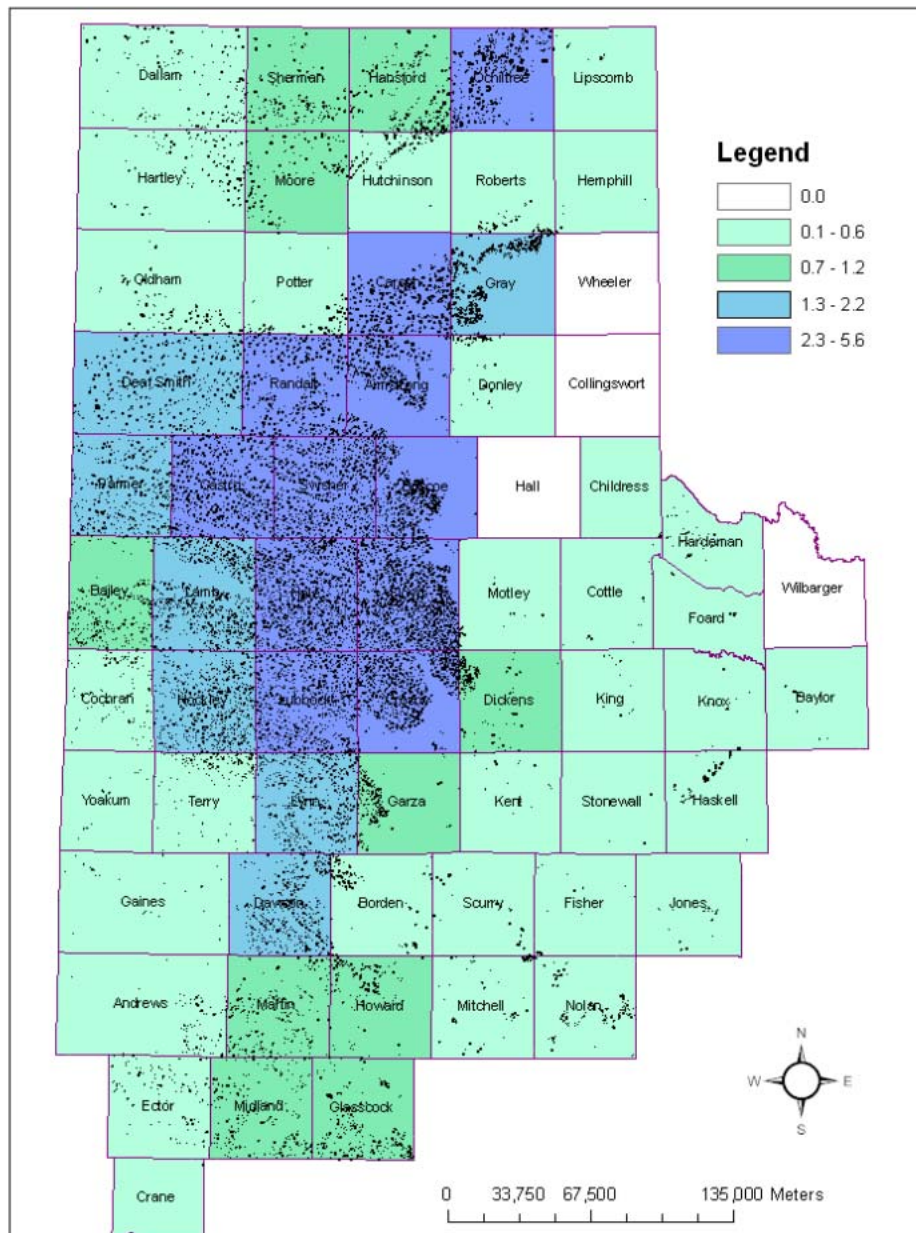


Playa Lakes of West Texas

- Playa Lake Database
 - Detailed geodatabase
- 1998 Playa Lake Mapping Project
- Ernest Fish, PhD
Texas Tech Univ.
Dept Range, Wildlife and Fisheries Management

Geographic Variables

- Playa lake area as a percentage of total county land area
- Area of surface water (mostly non-playa) as a proportion of total county land area



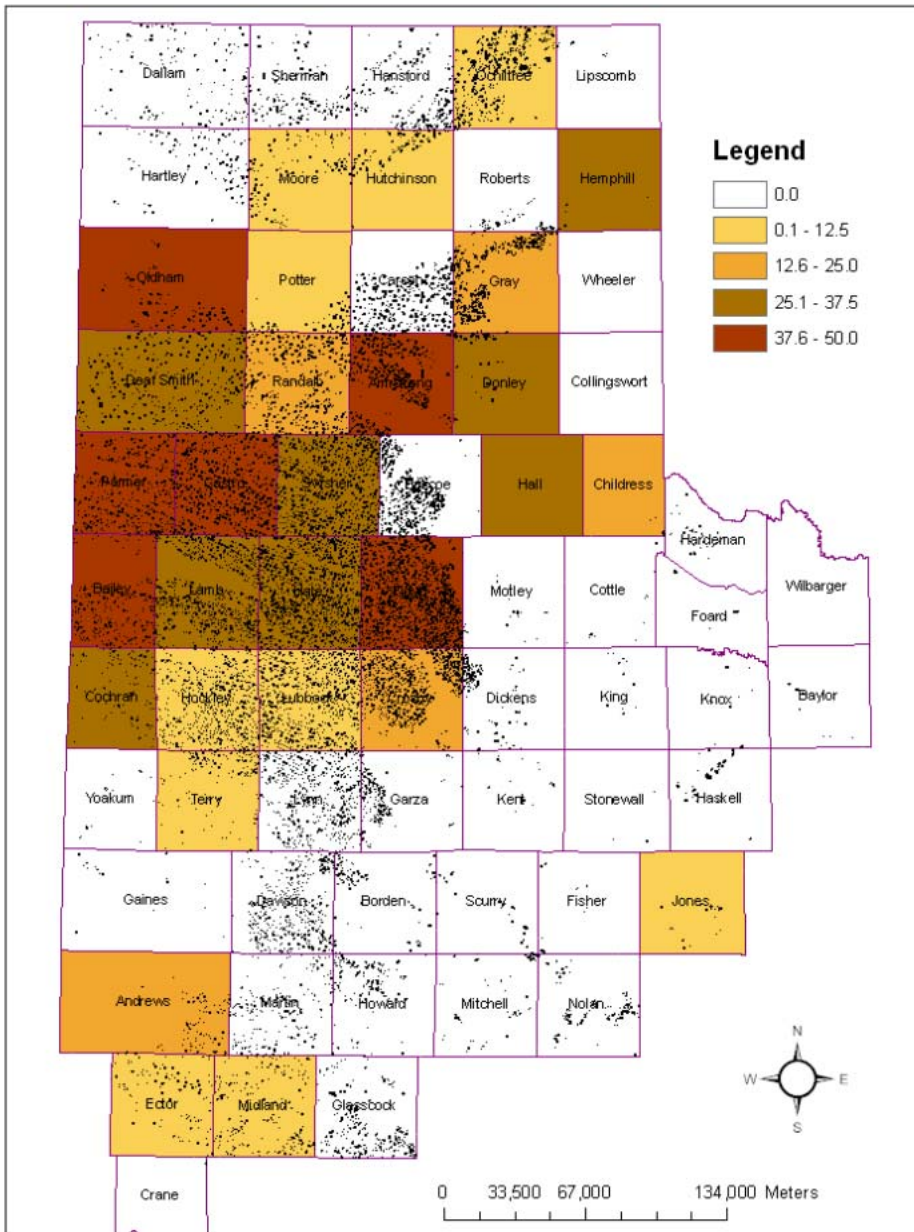
Index of Playa Lake Surface Area

Sociodemographic Variables

- Percent of county population = Non-Hispanic White (2000 U.S. census)
- Percent of county population age 50+ (2000 U.S. census)
- Percent of housing built prior to 1960 (U.S. census)
- Percent of adults living below federal poverty level (U.S. census)
- Percent of individuals with occupations of 'agriculture/fishing/hunting'
- Total county population

Cases

- By county from public access website
 - Texas Dept of Health Zoonosis Control
- Unit of analysis = county
- Outcome variable = 0,1 for 1 or more WN ME cases diagnosed in a county resident in 2003



Playa Lakes and WNV ME Human Case Rates 2003

Results

- Counties with a high percentage of playa lake acreage had an increased likelihood of human WNV cases as compared to those with low playa area after adjusting for county demographic characteristics. (AOR 7.06, 95%CI 1.07-42.81)

Culex tarsalis

- 'pasture mosquito'
- 'encephalitis mosquito'
- Predominant in 2003 species-specific pools of WNV(+) mosquitoes in NW Texas (82.9%)*
- Bites both birds and mammals
- Strong flier – up to 22 miles downwind



Plate 112. *Culex tarsalis* Coquillett, female.

**Warner et al. Human West Nile Virus Neuroinvasive Disease in Texas, 2003 Epidemic: Regional Differences. Annals of Epidemiology 2006;16(10):749-755*

Significance

- Intervention based on larviciding within MSA boundaries will not eliminate transmission
- Geographically specific nature of vector and environment
- Role of playa lakes in the amplification of avian zoonotic disease



Wyman Meizer (US FWS)