



In Partial Fulfillment of the Requirements for the Degree of

## **Master of Science**

**Colin Kunzweiler**

Will defend his thesis

### **West Nile Virus in Maricopa County, Arizona: Investigating Human, Vector, and Environment Interactions**

#### **Abstract**

Despite the arid climate of Maricopa County, Arizona, vector-borne diseases have presented significant health challenges to the residents and public health professionals of Maricopa County in the past, and will continue to do so in the foreseeable future. West Nile virus (WNV) was first reported in Maricopa County in 2003 and it is currently the only mosquito-borne disease transmitted within the state of Arizona. While WNV has been present in Maricopa County for the past ten years, due to financial and human resource constraints at the county and state levels only a limited body of research specific to Arizona is available to public health and mosquito control experts as they craft health messages and design interventions. In an effort to build upon the current efforts of the Arizona Department of Health Services and the Maricopa County Vector Control division, this thesis addresses the inherent complexity of WNV by examining human, mosquito vector, and environment interactions as they exist in Maricopa County. Because several personal protective behaviors are recognized by public health professionals as effective means of reducing one's exposure to mosquitoes and infection, the first study presented in this thesis identifies specific factors that influence individuals' performance of recommended health behaviors. In a second study, this thesis expands the concept of knowledge to signify an understanding of the spatial distribution of mosquito populations throughout Maricopa County. In a novel spatial assessment technique, individuals' perceptions regarding the distribution of local mosquitoes are compared with surveillance data collected by mosquito traps located throughout the county and important misconceptions are identified. In the final study presented in this thesis, specific ecological, demographic, socioeconomic, and treatment factors that influence mosquito abundance are identified and discussed. By identifying specific factors that impact human behavior and knowledge with regard to mosquito vectors, as well as factors that impact mosquito abundance throughout the study area, the results of this thesis not only complement current research and

surveillance efforts conducted throughout Maricopa County, but will inform future communication and control initiatives as well.

Tuesday, May, 7, 2013  
2:00 – 3:00 PM  
Wrigley Hall (WGHL), Room 481

Faculty, students, and the general public are invited.

Supervisory Committee:  
Dr. Christopher Boone, Chair  
Dr. Alexandra Brewis Slade  
Dr. Amber Wutich