

**OCCURRENCE, MANAGEMENT STRATEGIES, AND ECONOMIC
IMPACTS OF WEST NILE VIRUS IN HORSES IN NORTH DAKOTA**

**A Paper
Submitted to the Graduate Faculty
of the
North Dakota State University
of Agriculture and Applied Science**

By

Mafany Ndiva Mongoh

**In Partial Fulfillment of the Requirements
for the Degree of
MASTER OF SCIENCE**

**Major Program:
Natural Resources Management**

October 2005

Fargo, North Dakota

ABSTRACT

Mongoh, Mafany Ndiva, M.S., Program of Natural Resources Management, College of Graduate and Interdisciplinary Studies, North Dakota State University, October 2005. Occurrence, Management Strategies, and Economic Impacts of West Nile Virus in Horses in North Dakota. Major Professor: Dr. M.L. Khaita.

The 2002 West Nile virus outbreak in North Dakota included over 569 horse cases, clustered mainly in the eastern and northeastern parts of the state. The pattern of West Nile virus occurrence observed suggested the existence of specific environmental, ecological, economic, and managerial considerations. These considerations justify an in-depth study of West Nile virus infection and/or illness in the state. The objective of this study was to develop a predictive model of factors that explain the pattern of West Nile virus occurrence observed, evaluate management strategies used, and estimate the financial costs of the outbreak in the state. The study applied principal component regression to identify determinants of occurrence. A survey to identify management practices and their outcome was distributed, and an economic model was developed to estimate the cost of the disease. Surface elevation, temperature, precipitation, reported positive birds, reported positive humans, and reported positive mosquitoes were important predictors of West Nile virus occurrence in horses. Factors related to mosquito control and education were associated with management of the disease in horses. The economic costs incurred by horse owners were approximately \$1.04 million over the downtime period while the state spent about \$400,000 in 2002. These costs support the need for preventive strategies to minimize future costs. Despite present successes in controlling the outbreak, more studies into management and a definite program for West Nile virus surveillance in horses are needed.