

AN ECONOMIC IMPACT ASSESSMENT FOR OAK WILT IN ANOKA COUNTY, MINNESOTA

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ABSTRACT

Sound economic assessments of damages caused by exotic invasive species provide a basis to determine whether management programs should be established, modified, or discontinued. Few analyses have attempted to carefully quantify those damages, especially for forest pests. Oak wilt is the most significant disease of oaks (*Quercus spp*) in the north central United States and is caused by a nonnative fungus, *Ceratocystis fagacearum*. Red oaks (section *Lobatae*) are more susceptible than white oaks (section *Quercus*) and can die within weeks after infection. Local spread occurs through root grafts and overland spread occurs by sap beetles (Family: *Nitidulidae*), thus, management typically relies on severing root grafts and removing infected or potentially infected trees.

We developed a measure of the economic impact of oak wilt in Anoka County, MN, over the next 20 years in the absence of management. The county was divided into grids of 1-km² cell. Each grid cell contained information on soil type, oak density, oak size, and the number of active infection centers. We assumed that the number of infected trees within each grid cell increased over

time following a logistic function. We also assumed that each infected tree died and was removed at an average cost of \$314/tree. In the model, tree removals did not affect disease dynamics. A discount rate of 0.05 was applied to express losses in current dollars.

Anoka County had nearly 3 million oak trees and 990 active infection centers in 2008. If oak wilt is not managed, our model predicts that 21,000-29,000 trees would die each year and approximately 20 percent of all oaks would be killed over the next 20 years. If all dead oaks are removed, we predict discounted damages of at least \$88.8 million in 5 years, \$111.1 million in 10 years, and \$143 million in 20 years. These damages do not include losses from other services that oaks may provide, such as carbon sequestration, energy conservation, or wildlife habitat. The value of these services is difficult to quantify. Removal costs require fewer assumptions and provide a reasonable, though incomplete, metric of the damages caused by invasive pests. By this single metric, projected damages can be severe. This metric may be adequate to inform decisions by policymakers and managers.