

RESTORATION OF THE AMERICAN ELM IN FORESTED LANDSCAPES

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The Forestry Sciences Laboratory, Northeastern Research Station, initiated a project in 2003 to restore the American elm in the state of Ohio. This effort is being carried out in partnership with the Ohio Department of Natural Resources Division of Forestry, Franklin County Metro Parks, and The Wilds. American elm tree strains with high levels of tolerance to Dutch elm disease (DED) were established in areas where the trees can naturally regenerate and spread. The process of regeneration will allow the American elm to co-evolve with the DED fungal pathogen to ensure this valuable tree species will not be lost from the American landscape. Five restoration sites have been established to date in Ohio: Mohican State Forest, Ashland County; Maumee State Forest, Henry County; Highbanks Metro Park, Delaware County; Glacier Ridge Metro Park, Union County; and The Wilds, Muskingum County.

The American elm was once widely distributed throughout the eastern United States and was a preferred tree for use along city streets and in the yards of many homeowners. The Dutch elm disease fungal pathogen *Ophiostoma ulmi* was introduced into the United States in 1930 and in the subsequent years has destroyed millions of American elm trees in the United States and Canada. By 1976 only 34 million of the estimated 77 million elms present in the urban landscape before introduction of the DED pathogen remained, and far fewer are still present today. The American elm's tall height coupled with its vase-like shape provides for a

uniquely graceful tree that was a favorite tree used for planting along city streets and boulevards. The crowns of mature elms would span roadways, houses, and park recreation areas and provide the benefits of cleaner air and cooler temperatures. The American elm is one of few trees known that is capable of growing relatively well within the harsh urban environment of high summer temperatures, air pollution, and road salt present in northern latitudes.

One line of research on the American elm from the 1970s to the present focused on the identification of American elm isolates that could withstand the DED pathogen. Over 100,000 American elm trees were tested for resistance to Dutch elm disease. No trees were found that were resistant to DED; however, a few were identified that exhibited good levels of tolerance to the disease. Out of over 100,000 American elm trees screened for DED resistance, five trees were identified that exhibit the necessary levels of DED tolerance to withstand the disease. These five selections, Valley Forge, Princeton, New Harmony, R18-2, and Delaware 2, were used for the restoration effort.

The following aspects will be monitored at the restoration sites: tree growth, determination of basis for loss of planted trees, dates of first seed formation, number of regenerating trees and their distance from the planting site, incidence of DED at the restoration site in planted and seedling trees, and genetics of survivor trees.