

Using American Elm in Mixed-Species Plantings to Restore Above- and Below-Ground Function to Degraded Riparian Buffers¹

C.C. Pinchot,² D.J. Lodge,³ R. Minocha,⁴ T.W. Noon,⁵ V. D'Amico,⁶ C. Flower,⁷ K.M. Knight,² and J. Slavicek²

We recently established a study to evaluate the effects of several riparian restoration treatments on degraded streambanks located on the Finger Lakes National Forest (FLNF) in western New York. A legacy of cattle grazing has led to soil compaction, invasion by non-native invasive plant species (NNIP), as well as heavy nitrogen loading and increased bacterial levels in riparian corridors on the FLNF. These characteristics slow the conversion of non-native grassland to closed-canopy forest, a FLNF management goal for these sites. We are testing two planting treatments: tree vs. mixed tree and shrub plantings, and a mulch vs. no mulch treatment. We hypothesize that plantings with tree and shrub species will be better able to competitively exclude NNIPs than plantings without shrubs included, and that the mulch treatment will reduce the reinvasion of NNIPs by decreasing the C:N ratio and increasing soil fungi diversity and abundance. Indicators of restoration success will include successful establishment of planted and naturally regenerated seedlings, reduced reinvasion of NNIP, reduced soil nitrogen and bacterial levels, and increased diversity and abundance of insects, an indicator of bird habitat quality.

The study is also designed to evaluate the establishment success of Dutch-elm disease (caused by *Ophiostoma ulmi* and *O. novo-ulmi*) -tolerant American elm (*Ulmus americana*) on degraded riparian sites. Before the arrival of Dutch elm disease, American elm was a dominant component of riparian corridors and floodplains throughout the eastern half of the United States. Its tolerance of soil compaction, its ease of transplanting, and its competitive ability may enable American elm, when incorporated into mixed-species plantings, to effectively reclaim riparian sites invaded by NNIP.

¹ A version of this paper was presented at the Gene Conservation of Tree Species – Banking on the Future Workshop, May 16-19, 2016, Chicago, IL.

² USDA Forest Service, 359 Main Rd, Delaware, OH 43015.

³ USDA Forest Service, Rt. 983, Sabana Station, Luquillo, PR 00745.

⁴ USDA Forest Service, 271 Mast Road, Durham, NH 03824.

⁵ USDA Forest Service, 5218 State Route 414, Hector, NY 14841.

⁶ USDA Forest Service, 531 S College Ave, Newark, DE 19716.

⁷ University of Illinois at Chicago, 845 W. Taylor St, Chicago, IL 60607.

Corresponding author: corneliapinchot@fs.fed.us.