

[Home](#) > [Journal](#) > [Earth & Environmental Sciences](#) > [OJF](#)
[Indexing](#) | [View Papers](#) | [Aims & Scope](#) | [Editorial Board](#) | [Guideline](#) | [Article Processing Charges](#)
[OJF](#) > Vol.2 No.2, April 2012



An Assessment of Flowering Dogwood (*Cornus florida* L.) Decline in the Eastern United States

PDF (Size: 477KB) PP. 41-53 DOI: 10.4236/ojf.2012.22006

Author(s)

Christopher M. Oswald, Sonja N. Oswald, Christopher W. Woodall

ABSTRACT

Cornus florida L. is one of the most numerous tree species in the Eastern United States (US). Multiple studies have reported localized declines in *C. florida* populations following the introduction of the destructive fungus *Discula destructiva* Redlin (dogwood anthracnose), but few, if any, have documented changes in *C. florida* populations across the species' entire natural range. Thus, a current assessment of the *C. florida* population in the Eastern US and implications for future sustainability is warranted. Our study's goal was to present *C. florida* population estimates across the natural range of the species (Little, 1971) in the Eastern US for two periods based on state-level forest land inventories conducted by the US Department of Agriculture Forest Service, Forest Inventory and Analysis (FIA) program. Rangewide, *C. florida* populations declined by approximately 49% over the time periods studied. At the State level, population declines occurred in 17 out of 30 states and biomass declines occurred in 20 out of 30 states studied. While declines were widespread in the substate units surrounding the Appalachians, the largest declines appeared to be centered within the Appalachian ecoregion.

KEYWORDS

 Forest Inventory; Population Decline; Tree Disease; *Discula destructiva*

Cite this paper

 Oswald, C. , Oswald, S. & Woodall, C. (2012). An Assessment of Flowering Dogwood (*Cornus florida* L.) Decline in the Eastern United States. *Open Journal of Forestry*, 2, 41-53. doi: 10.4236/ojf.2012.22006.

References

- [1] Anderson, R. L. (1991). Results of the 1990 dogwood anthracnose impact assessment and pilot test in the southeastern United States. Protection Report R8-PR 20. Atlanta, GA: US Department of Agriculture Forest Service, Southern Region.
- [2] Bechtold, W. A., & Patterson, P. L. (2005). The enhanced forest inventory and analysis program—National sampling design and estimation procedures. General Technical Report SRS-80. Asheville, NC: US Department of Agriculture Forest Service, Southern Research Station.
- [3] Britton, K. O. (1994). Dogwood anthracnose. In C. Ferguson, & P. Bowman (Eds.), Threats to forest health in the southern Appalachians (pp. 17-20). Gatlinburg, TN: Southern Appalachian Man and the Biosphere Co-operative.
- [4] Carr, D. E., & Banas, L. E. (2000). Dogwood anthracnose (*discula destructiva*): Effects of and consequences for host (*Cornus florida*) demography. *American Midland Naturalist*, 143, 169-177. doi:10.1674/0003-0031(2000)143[0169:DADDEO]2.0.CO;2
- [5] Chellemi, D. O., Britton, K. O., & Swank, W. T. (1992). Influence of site factors in dogwood anthracnose in the Nantahala Mountain range of western North Carolina. *Plant Disease*, 76, 915-918. doi:10.1094/PD-76-0915
- [6] Daughtrey, M. L., & Hibben, C. R. (1983). Lower branch dieback, a new disease of northern dogwoods. *Phytopathology*, 73, 365.

- [Open Special Issues](#)
- [Published Special Issues](#)
- [Special Issues Guideline](#)

[OJF Subscription](#)
[Most popular papers in OJF](#)
[About OJF News](#)
[Frequently Asked Questions](#)
[Recommend to Peers](#)
[Recommend to Library](#)
[Contact Us](#)

Downloads:	15,287
------------	--------

Visits:	72,890
---------	--------

[Sponsors, Associates, and Links >>](#)

- [7] Daughtrey, M. L., Hibben, C. R., Britten, K. O., Windham, M. T., & Redlin, S. C. (1996). Dogwood anthracnose, understanding a disease new to North America. *Plant Disease*, 80, 349-358. doi:10.1094/PD-80-0349
- [8] Fei, S., & Steiner, K. C. (2007). Evidence for increasing red maple abundance in the eastern United States. *Forest Science*, 53, 473-477.
- [9] Goebel, P. C., & Hix, D. M. (1996). Development of mixed-oak forests in southeastern Ohio: a comparison of second-growth and old-growth forests. *Forest Ecology and Management*, 84, 1-21. doi:10.1016/0378-1127(96)03772-3
- [10] Hannah, P. R. (1993). Composition and development of two Appalachian hardwood stands in North Carolina. *Journal of the Elisha Mitchell Scientific Society*, 109, 87-98.
- [11] Hepting, G. H. (1971). Diseases of forest and shade trees of the United States. *Agriculture Handbook*, US Department of Agriculture, Washington DC.
- [12] Hiers, J. K., & Evans, J. P. (1997). Effects of anthracnose on dogwood mortality and forest composition of the Cumberland Plateau (USA). *Conservation Biology*, 11, 1430-1435. doi:10.1046/j.1523-1739.1997.97009.x
- [13] Holzmueller, E., Jose, S., Jenkins, M., Camp, A., & Long, A. (2006). Dogwood anthracnose in eastern hardwood forests: What is known and what can be done? *Journal of Forest*, 104, 21-26.
- [14] Jenkins, M. A., & Parker, G. R. (1998). Composition and diversity of woody vegetation in silvicultural openings of southern Indiana forests. *Forest Ecology and Management*, 109, 57-74. doi:10.1016/S0378-1127(98)00256-4
- [15] Jenkins, M. A., & White, P. S. (2002). *Cornus florida* L. mortality and understory composition changes in western Great Smoky Mountains National Park. *Journal of the Torrey Botanical Society*, 129, 194206. doi:10.2307/3088770
- [16] Knighten, J. L., & Anderson, R. L. (1992). Results of the 1991 dogwood anthracnose impact assessment and pilot test in the southeastern United States. Protection Report R8-PR 23, US Department of Agriculture Forest Service, Southern Region.
- [17] Knighten, J. L., & Anderson, R. L. (1993). Results of the 1992 dogwood anthracnose impact assessment and pilot test in the southeastern United States. Protection Report R8-PR 24, US Department of Agriculture Forest Service, Southern Region.
- [18] Little, E. L. Jr. (1971). Atlas of United States trees, volume 1, conifers and important hardwoods. US Department of Agriculture Miscellaneous Publication 1146.
- [19] McCune, B., Cloonan, C. L., & Armentano, T. V. (1988). Tree mortality and vegetation dynamics in Hemmer Woods, Indiana. *American Midland Naturalist*, 120, 416-431. doi:10.2307/2426014
- [20] McEwan, R. W., Muller, R. N., Arthur, M. A., & Housman, H. H. (2000). Temporal and ecological patterns of flowering dogwood mortality in the mixed mesophytic forests of eastern Kentucky. *Journal of the Torrey Botanical Society*, 127, 221-229. doi:10.2307/3088759
- [21] McGee, C. E. (1986). Loss of *Quercus* spp. dominance in an undisturbed old-growth forest. *Journal of the Elisha Mitchell Scientific Society*, 102, 10-15.
- [22] Mielke, M. and Langdon, K. (1986). Dogwood anthracnose fungus threatens Catoclin Mountain Park. *Park Science*, 6, 6-8.
- [23] Muller, R. N. (1982). Vegetation patterns in the mixed mesophytic forest of eastern Kentucky. *Ecology*, 63, 1901-1917. doi:10.2307/1940129
- [24] Myers, B. R., Walck, J. L., & Blum, K. E. (2004). Vegetation change in a former chestnut stand on the Cumberland Plateau of Tennessee during and 80-year period (1921-2000). *Castanea*, 69, 81-91. doi:10.2179/0008-7475(2004)069<0081:VCIAFC>2.0.CO;2
- [25] Omernik, J. M. (1987). Ecoregions of the conterminous United States. Map (scale 1:7,500,000). *Annals of the Association of American Geographers*, 77, 118-125.
- [26] Orwig, D. A., & Abrams, M. D. (1994). Land-use history (1720-1992), composition, and dynamics of oak-pine forests within the Piedmont and Coastal Plain of northern Virginia. *Canadian Journal of Forest Research*, 24, 1216-1225. doi:10.1139/x94-160

- [27] Oswalt, C. M., & Oswalt, S. N. (2010). Documentation of significant losses in *Cornus florida* L. populations throughout the Appalachian ecoregion. *International Journal of Forestry Research*, 2010. doi:10.1155/2010/401951.
- [28] Pierce, A. A. (2001). Population dynamics of flowering dogwood (*Cornus florida* L.) and community structure at the Ross biological reserve. M.S. Thesis, West Lafayette, IN: Purdue University.
- [29] Quarterman, E., Turner, B. H., & Hemmerly, T. E. (1972). Analysis of virgin mixed mesophytic forests in Savage Gulf, Tennessee. *Bulletin of the Torrey Botanical Club*, 99, 228-232. doi: 10.2307/2484607
- [30] R Development Core Team (2009). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna. <http://www.R-project.org>
- [31] Reams, G. A., Smith, W. D., Hansen, M. H., Bechtold, W. A., Roesch, F. A., & Moisen, G. G. (2005). The forest inventory and analysis sampling frame. General Technical Report SRS-80, Asheville, NC: US Department of Agriculture Forest Service, Southern Research Station.
- [32] Redlin, S. C. (1991). *Discula destructiva* sp. nov., cause of dogwood anthracnose. *Mycologia*, 83, 633-642. doi: 10.2307/3760218
- [33] Schwegman, J. E., McClain, W. E., Esker, T. L., & Ebinger, J. E. (1998). Anthracnose-caused mortality of flowering dogwood (*Cornus florida* L.) at Dean Hills Nature Preserve, Fayette County, Illinois, USA. *Natural Areas Journal*, 18, 204-207.
- [34] Sherald, J. L., Stidham, T. M., Hadidian, J. M., & Hoeldtke, J. E. (1996). Progression of the dogwood anthracnose epidemic and the status of flowering dogwood in Catoctin Mountain Park. *Plant Disease*, 80, 310-312. doi:10.1094/PD-80-0310
- [35] Smith, W. B. (2002). Forest inventory and analysis: A national inventory and monitoring program. *Environmental Pollution*, 116, 233242. doi: 10.1016/S0269-7491(01)00255-X
- [36] Smith, W. B. (2006). An overview of inventory and monitoring and the role of FIA in national assessments. Proceedings RMRS-P=42CD. Fort Collins, CO: US Department of Agriculture Forest Service, Rocky Mountain Research Station.