

Abstract

Climate change is expected to increase drought events that can lead to mortality of oak trees, an important economic and ecological group. This study evaluated the duration in years of oak tree decline after severe droughts by comparing the post drought annual ring width to the average ring width in the five-year period before the drought in 116 sites across eastern North America. The duration of recovery was broken into three groups, based on if recovery from the drought was immediate (0-3 years), protracted (5-10 years), or improbable recovery (over 10 years). The percentage of trees at each site in each recovery class was compared across four sub-regions in eastern North America to evaluate differences across the range of oak species. Improbable recovery was significantly lower in the north-east part of the distribution than the north-west or south-west. Improbable recovery was significantly higher for the western distribution than the eastern. These results suggest that oaks in the west are more likely to be weakened or injured by a drought and susceptible to other stresses, such as disease or insect attack.

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