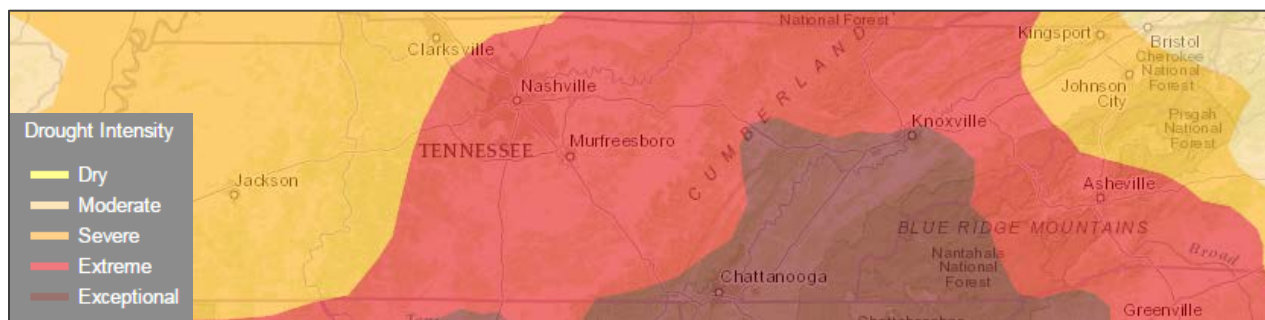


Drought and Oak Decline in Tennessee

Drought in Tennessee | Tennessee experienced “Moderate” to Exceptional drought (the highest classification from the U.S Drought Monitor) beginning in the fall of 2016 through the early spring 2017. The duration and severity of the drought resulted in decreased soil water potential and increased evaporative pressures on Tennessee forests. Lack of water impacts a host of tree physiological processes including its ability to retain and process nutrients. Ultimately it results in loss of leaf biomass without nutrient retention, root death (more specifically the majority of roots in the top 6” of soil), and loss of stored energy. Indirectly decreased energy stores puts trees at a disadvantage during winter dormancy and limits its growth during the rigors of spring leaf production. As a direct result of the above, trees become vulnerable to a host of insects and disease.

Hardwood decline following the 2016 drought in Sequatchie Co, TN



Oak Decline | In addition, drought impacts can be multiplied by pre-existing forest conditions including lack of management and pre-drought insects and disease. Unfortunately these 2 pre-existing forest conditions are commonplace across Tennessee. This is probably most commonly seen in Tennessee’s oak/hickory forests. This forest type comprises greater than 70% of forests. In many areas trees are reaching over-maturity. As these trees slowly decline they become susceptible to several insects and disease, cumulatively known as oak decline. This is a well-documented phenomena of several pests including oak anthracnose (*Discula quercinia*), armillarria root rot (*Armillaria mellea*), and twoline chestnut borer (*Agrilus bilineatus*). These secondary pests typically



(Above) Example of fall 2016 drought index

(Left) Armillaria root rot (*Armillaria mellea*)

(Below-Left) Oak anthracnose (*Discula quercinia*)

(Below) Twoline chestnut borer (*Agrilus bilineatus*)



attack weak trees however a regional decline in forest health has resulted in their increased prevalence. As the year progresses, a variety of tree species will display symptoms of drought and decline. The most noticeable symptoms are rapid browning of foliage and subsequent canopy dieback. Research has shown this is not endemic to Tennessee and lack of proper management has resulted in the decline and loss of oak/hickory forest across the Eastern U.S.

Management | Fortunately both oak and hickory, while negatively impacted by drought, have conservative growth strategies. These species root deeply and are well adapted to overcome disturbances such as drought in successive seasons. However oak decline will only accelerate with time resulting in lost forest value and shifts in species composition. Proper and timely silvicultural practices are necessary to keep forests healthy and maximize their value.

Drought Occurrence Dynamics in Tennessee from 2012 to 2017

