White Oak Volume in Arkansas: 2005 → 2023

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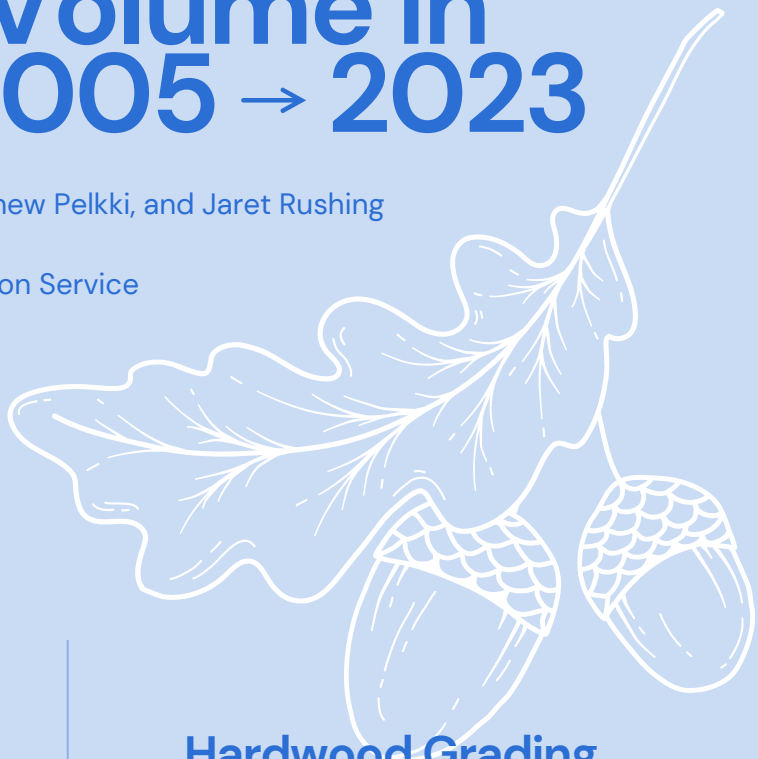


Introduction

White oak, *Quercus alba*, occurs naturally across eastern North America on a variety of soil types (Tirmenstein 1991). With the ability to grow on all upland aspects and slopes (Burns et al 1990), white oak is a common species across most of Arkansas.

Aesthetically pleasing and beneficial to humans and animals alike, white oaks are also an economically important timber species. Small white oak seedlings provide browse for wildlife and the acorns are preferred by many animals (Burns et al 1990).

Producing a heavy, dense wood, its uses include furniture, railroad ties, paneling, and fence posts. With its closed wood cells and naturally durable heartwood, it is a preferred species for the manufacture of whiskey barrels (cooperage).

Size and form are important qualities of any type of timber, but they are especially important in white oaks used in cooperage. Stands containing large, high-quality trees can provide landowners with premium stumpage prices.

Hardwood Grading

White oaks, as with most hardwoods, can be graded into one of five categories depending upon their size in diameter and number of defects. A common grading procedure used is the USFS Hardwood Grading Standards. In this standard, before evaluating a tree's quality, certain size requirements must be met. Therefore, high quality smaller trees which initially may not meet grade standards due to size restrictions (less than 11" dbh) can grow into the higher grades as they increase in diameter.

The data provided in this report were measured using this grading standard and obtained from the Forest Inventory and Analysis (FIA) database, specifically net sawlog volume of merchantable trees. The time frame analyzed covers the years from 2005 to 2023.

Volume Change: 2005 → 2023

In 2016, Arkansas saw its first stave mill in years open in Hot Spring County. More recently, in 2023, another stave mill opened in Independence County, Arkansas. With the growing interest in white oaks, it is important to look at the timber supply changes over time.

In Arkansas, the volume of white oaks on timberland increased significantly since 2005 (Figure 1). In 2005, the total volume of white oak was 6.9 BBF (International ¼" rule). Of this, 46% was considered Grade 3 quality, while 32% was considered Grade 1 or Grade 2. The remaining volume was in the Grade 4 or 5 categories.

By 2023, white oak volume had increased by 49%, reaching 10.4 BBF. Specifically, Grade 1 volume increased by 99%, Grade 2 by 52%, and Grade 3 by 57%. The distribution by grade also changed slightly: Grade 3 accounted for 49% of the total white oak volume, while Grades 1 and 2 combined accounted for 36%.

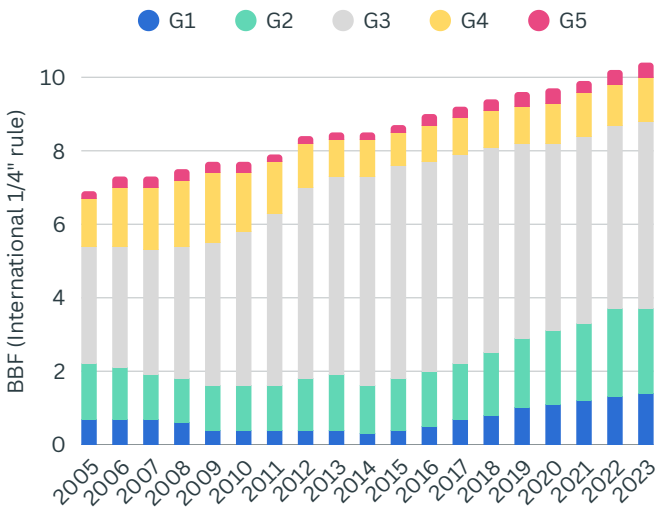


Figure 1. White Oak Net Sawlog Volume in Arkansas, 2005–2023

The only grade of timber that experienced a decline from 2005 to 2023 was Grade 4, which declined by 8%. In 2005, nearly 22% of white oaks in Arkansas were classified as Grade 4 or Grade 5. After peaking in 2009 with 28%, the percent of white oaks classified as Grade 4 or 5, lower grades began to decline reaching the lowest levels in 2018 when 13% of white oaks were classified as Grade 4 or 5. This level rose slightly over the next several years with 15% of white oaks classified as Grade 4 or 5 in 2023.

White oak in numbers!

6.9 BBF
total white oak volume in 2005

49%
increase in total white oak volume since 2005

10.3 BBF
total white oak volume in 2023

36%
of white oak volume was high-quality grade (G1+G2) in 2023

County Information

Since 2005, most Arkansas counties saw increases in white oak volumes (Figure 2). Only eight of Arkansas' 75 counties, witnessed decreases in white oak volumes from 2005-2023. The largest declines were observed in Bradley (-77%) and Hempstead (-45%) counties. Other counties which saw declines in white oak volume included Lee, Hot Spring, Logan, Jefferson, Drew, and Miller counties with volume declines ranging from -34% to -9%.

Geographically, the majority of white oak volume in Arkansas is located in the northern part of the state, particularly in the Ozark and Ouachita mountains and their foothills.

In southern Arkansas, counties such as Cleveland, Dallas, and Calhoun stand out for having higher volumes compared to surrounding counties in the region.

In northern Arkansas, Newton and Madison counties have consistently ranked among those with the largest volumes of Grade 1 or 2 white oak over the years (Figure 3 and Table 1). In 2005, Cleveland County ranked ninth statewide in Grade 1 or 2 white oak volume. By 2023, it had shifted to 13th place. In the Delta region, Lee and St. Francis counties were among the top ten in 2005, but by 2023, both had fallen out of the top rankings.

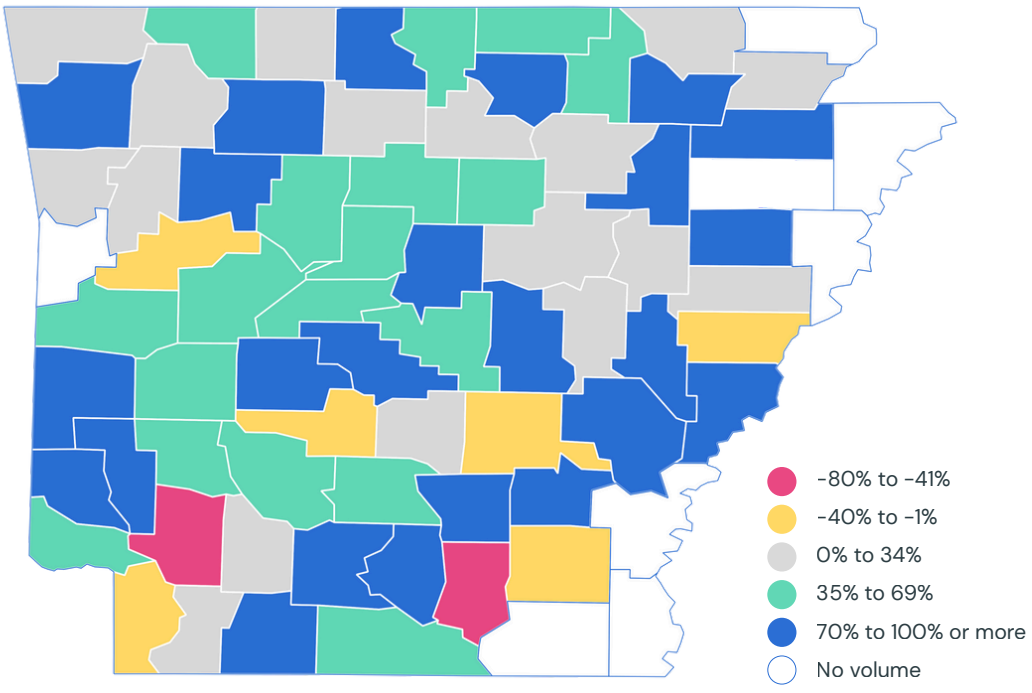
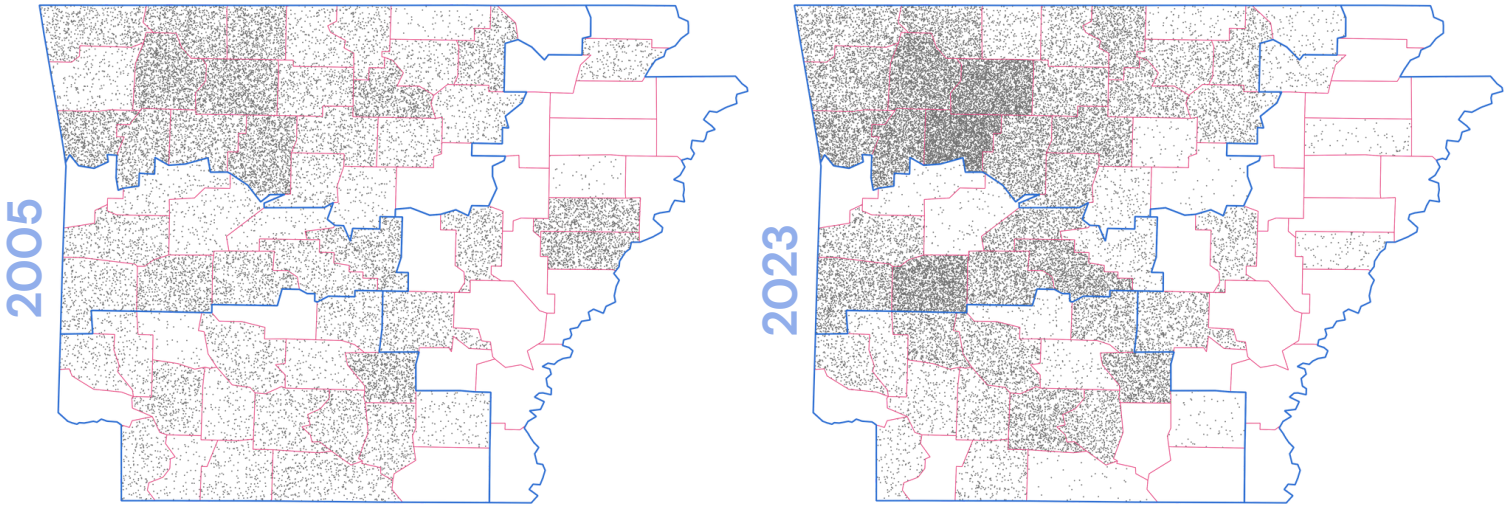


Figure 2. Percentage Change in Total White Oak Volume in Arkansas, 2005–2023

Figure 3. Changes in High-Quality White Oak Volume by County in Arkansas, 2005–2023



High Quality Volume (Grade 1 + Grade 2) ranged from 3.7 million board feet in Cross county to 133.6 in Madison county.

High Quality Volume (Grade 1 + Grade 2) ranged from 3.3 million board feet in White county to 306.8 in Johnson county.

FIA Survey Unit

County Line

Table 1. Top 10 ranking of high-quality white oak volume by county

Ranking	2005	2023
1	Madison	Johnson
2	Newton	Newton
3	Pope	Montgomery
4	Lee	Madison
5	Crawford	Franklin

Ranking	2005	2023
6	St. Francis	Saline
7	Stone	Pope
8	Boone	Crawford
9	Cleveland	Washington
10	Carroll	Polk

Conclusion

White oak volume has grown significantly since 2005, and the quality of the timber has improved as well on timberland in Arkansas. Most of the volume is located in the northern portion of the state though south central Arkansas has seen increases in high quality white oak volume since 2005.

With the current operation of two stave mills in Arkansas and the relative slow growth of white oak, more study is needed to determine the future supply of white oak in the state. This document provides a snapshot view of the white oak supply in Arkansas. Sustainable harvesting practices, like ensuring harvested areas are regenerated using natural or artificial regeneration, are important in maintaining this economically important timber species for generations to come.

Burns, Russell M.; Honkala, Barbara H.; [Technical coordinators] 1990. Silvics of North America: Volume 2. Hardwoods. United States Department of Agriculture (USDA), Forest Service, Agriculture Handbook 654

Tirmenstein, D. A. 1991. Quercus alba. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: https://www.fs.usda.gov/database/feis/plants/tree/quealb/all.html [2025, May 21].