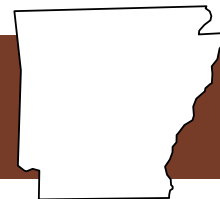


Arkansas's Forests, 2023: Annual Update



This resource update is a brief look at some of the basic metrics that describe the status of and changes to forest resources in Arkansas. Estimates presented are for the 2023 survey year with resource changes compared to the 2022 survey year (Rosson 2024). This information is based on field data collected by the U.S. Department of Agriculture, Forest Service, Forest Inventory and Analysis (FIA) annualized sample design, and it is updated yearly. Arkansas has about 5,700 sample plots across the State; each year, 20 percent of these plots (one panel) are visited and measured by field crews, the data compiled, and new estimates produced. Each year of new estimates, and the subsequent resource changes, are influenced by the newest 20 percent of the sample; the older, and unchanged, data make up the remaining 80 percent of the sample. This small sample may result in some rather sharp spikes in estimates when comparing successive survey years, but in most instances the annualized design should give a reasonable indication of directional trends in the resource such as increasing, decreasing, or no change. After 5 years of measurements, the full sample complement (a cycle) is complete, and a new survey cycle begins. Because the 20-percent panel sample size is rather small, the strongest and most reliable trend information (especially that concerning magnitude of change) comes from comparing two full cycles of data.

Data used in the 2023 update were accessed from the FIA database (USDA Forest Service 2024). Users can also access previously published Arkansas resource updates (2009–2022) to evaluate longer time spans (Rosson 2011a, 2011b; 2012, 2013, 2014, 2015, 2016, 2017, 2020a, 2020b, 2020c, 2021, 2022, 2024). Most of the tables within the updates are similar to facilitate comparisons. Some of the data in the 2023 resource update may not match previously published reports because of changes made in reprocessing. Additionally, it is important to keep procedural changes in mind when comparing new resource updates in Arkansas with those published prior to the 2022 update. See an important note concerning trend on the last page of this resource update.

OVERVIEW

The 2023 update includes estimates of various parameters along with descriptive statistics (table 1), forest land area by survey unit (table 2), ownership (table 3), forest-type groups (table 4), forest plantation area (table 5), volume (tables 6 and 7), biomass (tables 8 and 9), and species volumes (table 10), along with maps of Arkansas's survey units (fig. 1) and percentage of county in forest area (fig. 2), plus information about stand-level mortality (table 11) and the distribution of this mortality across the State (figs. 3 and 4). Many of the 2023 estimates are presented by survey unit so users can assess resource attributes and change in a specific region of interest.

Table 1—Arkansas forest statistics, change between 2022 and 2023

Forest statistics		2022 estimate	Sampling error ¹ (percent)	2023 estimate	Sampling error ¹ (percent)	Change since 2022
Area (thousand acres)		18,819.0	0.55	18,829.3	0.56	70.3
Number of live trees ≥1.0 inch d.b.h. (million trees)		11,661.0	1.37	11,511.7	1.36	-149.3
Net volume of live trees ≥5.0 inches d.b.h. (million cubic feet)		37,492.3	1.21	38,169.7	1.21	677.4
Forest land	Live tree aboveground biomass ≥1.0 inch d.b.h. (thousand oven dry tons)	1,044,712.2	1.03	1,060,272.8	1.04	15,560.6
	Net annual growth of live trees ≥5.0 inches d.b.h. (million cubic feet per year)	1,583.8	1.88	1,592.5	1.91	8.7
	Annual removals of live trees ≥5.0 inches d.b.h. (million cubic feet per year)	816.4	5.24	816.2	5.25	-0.2
	Annual mortality of live trees ≥5.0 inches d.b.h. (million cubic feet per year)	294.8	4.40	310.6	4.61	15.8
Area (thousand acres)		18,301.4	0.62	18,311.6	0.63	10.2
Number of live trees ≥1.0 inch d.b.h. (million trees)		11,471.0	1.40	11,323.3	1.40	-147.7
Net volume of live trees ≥5.0 inches d.b.h. (million cubic feet)		36,056.1	1.27	36,735.5	1.27	679.4
Timberland	Live tree aboveground biomass ≥1.0 inch d.b.h. (thousand oven dry tons)	1,066,789.2	1.10	1,022,386.8	1.10	-44,402.4
	Net annual growth of live trees ≥5.0 inches d.b.h. (million cubic feet per year)	1,564.9	1.92	1,580.8	1.94	15.9
	Annual removals of live trees ≥5.0 inches d.b.h. (million cubic feet per year)	822.3	5.29	818.2	5.24	-4.1
	Annual mortality of live trees ≥5.0 inches d.b.h. (million cubic feet per year)	281.6	4.50	293.2	4.73	11.6

¹ At one standard error (0.6827). The 95-percent confidence interval can be derived by multiplying the sampling error by 1.96.

Table 2—Area of forest land and change, by survey unit, Arkansas, 2022 and 2023

Survey unit	2022	2023	Change
<i>thousand acres</i>			
South Delta	1,449.5	1,447.1	-2.4
North Delta	808.9	822.2	13.3
Southwest	6,937.5	6,932.9	-4.6
Ouachita	3,413.7	3,414.0	0.3
Ozark	6,209.4	6,213.1	3.7
All units	18,819.0	18,829.3	10.3

Numbers in columns may not sum to totals due to rounding.

Table 3—Area of forest land and change, by ownership, Arkansas, 2022 and 2023

Ownership	2022	2023	Change
<i>thousand acres</i>			
National forest	2,531.5	2,532.9	1.4
Other public	1,182.9	1,190.2	7.3
Forest industry	2,574.1	2,540.1	-34.0
NIPF	12,530.5	12,566.1	35.6
All owners	18,819.0	18,829.3	10.3

NIPF = nonindustrial private forest.

Numbers in columns may not sum to totals due to rounding.

Table 4—Area of forest land and change, by forest-type group, Arkansas, 2022 and 2023

Forest-type group	2022	2023	Change
<i>thousand acres</i>			
Loblolly-shortleaf pine	6,176.9	6,201.8	24.9
Eastern redcedar	259.9	254.0	-5.9
Oak-pine	1,918.6	1,903.8	-14.8
Oak-hickory	7,332.8	7,300.7	-32.1
Bottomland hardwoods	2,925.7	2,959.3	33.6
Miscellaneous types	53.2	60.9	7.7
Nontyped	151.9	148.8	-3.1
All groups	18,819.0	18,829.3	10.3

Numbers in columns may not sum to totals due to rounding.

Table 5—Area of forest land in forest plantations and change, by survey unit, Arkansas, 2022 and 2023

Survey unit	2022	2023	Change
<i>thousand acres</i>			
South Delta	229.1	235.8	6.7
North Delta	48.1	54.5	6.4
Southwest	2,939.0	2,949.9	10.9
Ouachita	588.2	565.0	-23.2
Ozark	205.8	210.2	4.4
All units	4,010.1	4,015.6	5.5

Numbers in columns may not sum to totals due to rounding.

Table 6—Volume of softwoods on forest land and change, by survey unit, Arkansas, 2022 and 2023

Survey unit	2022	2023	Change
<i>million cubic feet</i>			
South Delta	689.0	700.1	11.1
North Delta	202.5	212.2	9.7
Southwest	8,628.0	8,814.4	186.4
Ouachita	4,065.5	4,190.3	124.8
Ozark	2,436.5	2,477.2	40.7
All units	16,021.6	16,394.2	372.6

Numbers in columns may not sum to totals due to rounding.

Table 7—Volume of hardwoods on forest land and change, by survey unit, Arkansas, 2022 and 2023

Survey unit	2022	2023	Change
<i>million cubic feet</i>			
South Delta	2,827.8	2,795.1	-32.7
North Delta	1,626.7	1,675.7	49.0
Southwest	5,052.8	5,120.9	68.1
Ouachita	3,025.6	3,093.5	67.9
Ozark	8,937.8	9,090.3	152.5
All units	21,470.7	21,775.5	304.8

Numbers in columns may not sum to totals due to rounding.

Table 8—Biomass dry weight of softwoods on forest land and change, by survey unit, Arkansas, 2022 and 2023

Survey unit	2022	2023	Change
<i>thousand tons</i>			
South Delta	11,451.9	11,757.2	305.3
North Delta	3,149.9	3,286.2	136.3
Southwest	182,792.0	185,794.0	3,002.0
Ouachita	85,922.9	88,196.5	2,273.6
Ozark	57,185.3	58,062.1	876.8
All units	340,501.9	347,095.9	6,594.0

Numbers in columns may not sum to totals due to rounding.

Table 9—Biomass dry weight of hardwoods on forest land and change, by survey unit, Arkansas, 2022 and 2023

Survey unit	2022	2023	Change
<i>thousand tons</i>			
South Delta	81,831.7	81,261.6	-570.1
North Delta	48,717.7	50,089.4	1,371.7
Southwest	167,336.6	168,856.1	1,519.5
Ouachita	105,227.0	107,474.0	2,247.0
Ozark	301,095.9	305,494.4	4,398.5
All units	704,208.8	713,175.6	8,966.8

Numbers in columns may not sum to totals due to rounding.

Table 10—Volume of 15 most dominant species on forest land by 5-inch diameter classes, Arkansas, 2023

		Diameter class (inches)					
Species	Total	5.0–9.9	10.0–14.9	15.0–19.9	20.0–24.9	25.0–29.9	30+
million cubic feet							
Loblolly pine	10,161.6	2,769.5	3,779.8	2,277.8	966.3	318.0	50.3
Shortleaf pine	4,721.0	672.5	1,869.2	1,665.2	489.6	24.5	0.0
White oak	3,360.3	584.9	1,183.3	959.5	434.8	137.4	60.5
Sweetgum	2,511.3	640.6	790.6	581.1	288.5	120.3	90.3
Post oak	1,854.7	421.6	714.4	430.8	238.8	22.8	26.4
Northern red oak	1,106.7	120.7	346.1	395.2	158.3	78.6	7.8
Southern red oak	944.2	112.8	254.4	295.8	147.2	94.3	39.7
Black oak	890.9	117.3	316.7	260.7	120.3	59.7	16.1
Water oak	877.1	157.5	203.8	239.7	131.4	75.3	69.4
Cherrybark oak	833.3	61.7	121.5	142.3	233.7	110.1	164.0
Black hickory	830.3	373.6	321.5	116.4	11.1	7.6	0.0
Eastern redcedar	770.9	436.0	275.2	55.5	4.2	0.0	0.0
Mockernut hickory	758.4	281.8	287.1	132.6	50.6	6.3	0.0
Baldcypress	734.8	22.5	84.2	112.2	108.8	128.0	279.3
Willow oak	643.1	73.5	126.5	156.3	181.7	71.9	33.1
Other species	7,170.5	1,950.1	1,911.4	1,457.4	934.0	520.2	397.2
All species	38,169.1	8,796.6	12,585.7	9,278.5	4,499.3	1,775.0	1,234.1

0.0 = no sample for the cell or a value >0.0 but <0.05.

Numbers in columns may not sum to totals due to rounding.

Table 11—Area of forest land by survey unit and stand mortality class, Arkansas, 2018–2023

Stand mortality class ¹	Survey units					
	All units	South Delta	North Delta	Southwest	Ouachita	Ozark
<i>percent</i>	<i>thousand acres</i>					
0.0	5,219.0	513.5	259.7	2,301.0	899.2	1,245.6
>0.0–9.9	8,490.7	555.9	348.8	3,038.4	1,688.0	2,859.6
10.0–19.9	3,330.5	196.7	126.6	974.4	610.2	1,422.6
20.0–29.9	1,028.1	99.8	48.1	313.1	113.8	453.2
30.0–39.9	371.6	47.7	17.8	113.8	69.4	123.0
40.0–49.9	187.8	18.7	8.1	105.8	10.4	44.7
50.0–59.9	73.1	6.9	3.0	24.8	4.7	33.6
60.0–69.9	39.6	3.0	0.0	26.7	7.2	2.7
70.0–79.9	21.7	0.0	4.5	3.6	6.0	7.6
80.0–89.9	10.9	3.0	5.6	0.3	0.0	2.0
≥90.0	56.4	1.9	0.0	30.9	5.2	18.5
All classes	18,829.3	1,447.1	822.2	6,932.9	3,414.0	6,213.1

0.0 = no sample for the cell or a value >0.0 but <0.05.

Numbers in columns may not sum to totals due to rounding.

¹Percentage of total stand basal area lost to mortality.

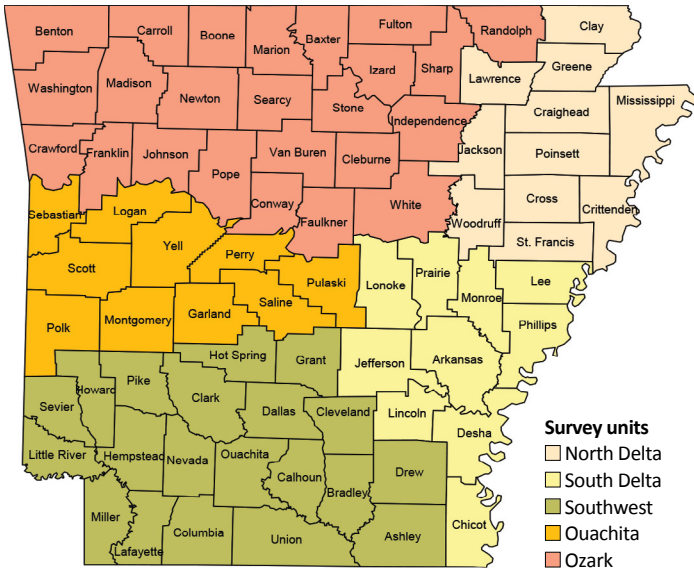


Figure 1—Arkansas counties and forest survey units.

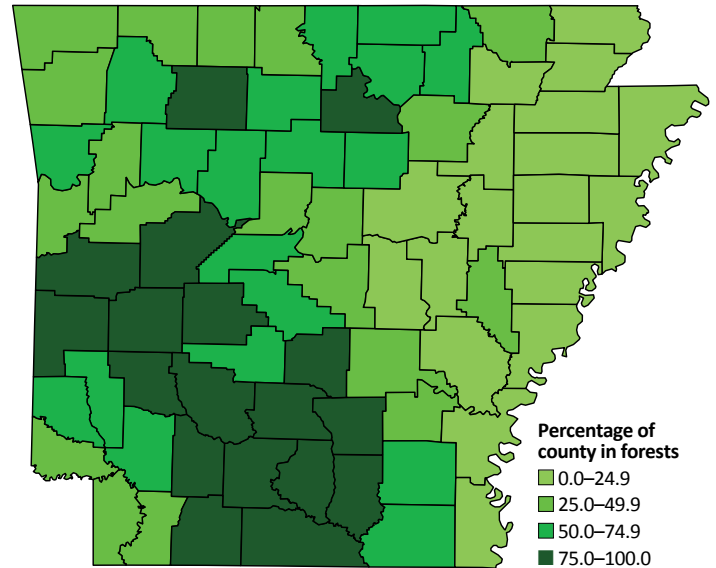


Figure 2—Percentage of county spatial area in forest land, Arkansas, 2023.

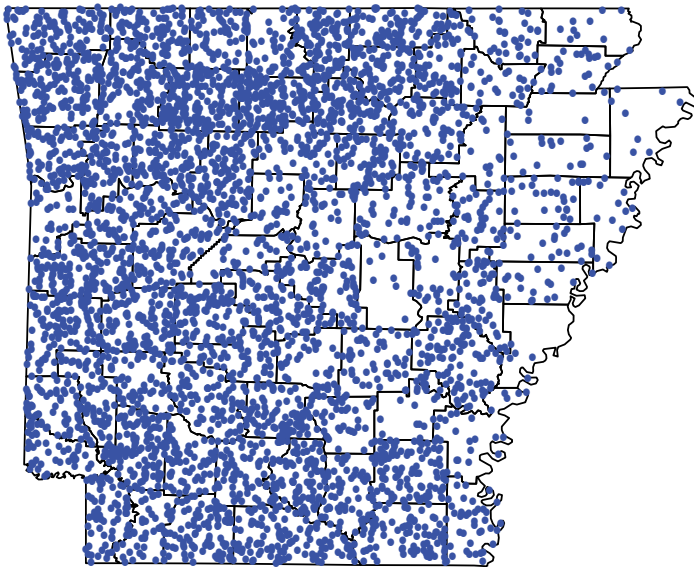


Figure 3—Spatial distribution of forest land that had ≥ 10.0 but < 40.0 percent of stand basal area lost in tree mortality, 2018–2023. Each dot represents 1,000 acres of forest land. There are 4,730.3 thousand acres represented in this map.

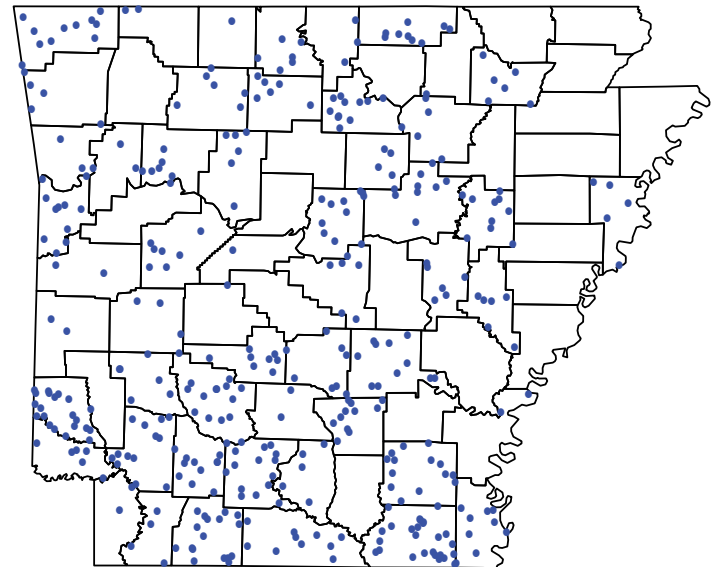


Figure 4—Spatial distribution of forest land that had ≥ 40.0 percent of stand basal area lost in tree mortality, 2018–2023. Each dot represents 1,000 acres of forest land. There are 389,339 acres represented in this map.

FOREST LAND STAND-LEVEL MORTALITY

Tree mortality can be depicted several different ways: (1) by the amount of timber volume lost, (2) by the number of trees that died, or (3) by the area of forest land impacted. This brief overview reports the amount of forest land area impacted with the presence of tree mortality between 2018 and 2023. In addition, the degree of mortality, expressed as the percentage of total stand basal area lost, is reported (table 11). This helps clarify that mortality levels are quite variable between forest stands across the State.

Between 2018 and 2023, 13,610.3 thousand forest land acres had forest stands with trees lost to mortality (>1 percent of stand basal area lost). A majority of these acres, 8,490.7

thousand acres, had less than 10 percent of stand basal area in mortality (table 11). But a substantial amount of forest land, 4,730.2 thousand acres, had mortality loss ranging from 10 to 40 percent in stand basal area. Most of this mortality loss was in the Ozark unit, occurring on 1,998.8 thousand acres, 46 percent of all mortality in this mortality range. The spatial distribution of this level of mortality was spread evenly across the State with the exception of the less forested Delta units (fig. 3).

There were 389,339 acres of forest land that had stand basal area losses with mortality greater than 40 percent. Most of this area was in the Southwest unit: 192,100 acres. Again, this high level of stand mortality was spread fairly evenly across the State (fig. 4).

Beyond natural and anthropogenic disturbances, tree mortality is a natural part of stand development. Mortality rates are complicated by the different stages of stand development and specific silvics of individual species. However, it is important to monitor forest land mortality patterns to understand when levels are outside natural ranges. Analyses like this, especially over time, can help policymakers and forest managers determine when corrective action and intervention may be needed.

A NOTE ON TREND

Beginning with the 2022 resource update, FIA has adopted new models and equations to derive volume, biomass, and carbon estimates. The older Arkansas data in the FIA database, beginning with implementation of the new sample design (2000), have been reprocessed to reflect these changes. However, the written publications (2009–2021 resource updates) were not updated and revised.

Users can see the impact of these equation changes by comparing the 2021 estimates in the 2022 resource update with the 2021 estimates published in the 2021 resource update (Rosson 2022). Area estimates were not impacted; only volume, growth, removal, mortality, biomass, and carbon estimates changed. The largest impact was in biomass and carbon with much smaller differences in volume, growth, removals, and mortality. Absolute comparisons, especially for biomass and carbon, would not be valid.

As noted, the changes in Arkansas were greatest for biomass and carbon. There was a 13-percent increase in the total biomass estimate. For example, the 2021 biomass estimate (new equations) is 1,029,610.9 thousand tons (table 1). The 2021 biomass estimate with old equations was 910,027.6 thousand tons (Rosson 2022). This equates to a 119,583.3 thousand-ton difference, a 13-percent increase. The net volume change was much less at only 3 percent. The smallest differences were in growth (1 percent), removals (slightly <1 percent), and mortality (2 percent). Users can compare other unit-level estimates between tables in the 2022 resource update and the 2021 resource update Rosson (2024).

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FIA: <https://www.fs.usda.gov/research/programs/fia>
Southern FIA: <https://www.fs.usda.gov/srsfia/>

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