USDA
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RESOURCE UPDATE FS-321

Arkansas's Forests, 2020: 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 here are for the survey year 2020 with resource changes compared against the 2019 survey year. This information is based on field data collected using the 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. It is important that users keep in mind that 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 this update were accessed from the FIA database on July 20, 2021 at https://fia.fs.fed.us/tools-data/. Some of the data may not match previously published reports because of changes made in reprocessing. Users can also access previously published Arkansas updates at https://www.fs.usda.gov/srsfia/states/arkansas.shtml to evaluate longer time spans: Resource Updates 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, and 2019. Most of the tables throughout the updates are similar to facilitate comparisons.

Overview

The update includes estimates of various parameters along with descriptive statistics (table 1), forest land area (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 percent of county in forest area (fig. 2) plus trends in tree species richness (diversity) (fig. 3 and 4). Many of the 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 2019 and 2020

Forest statistics	2019 estimate	Sampling error (percent)	2020 estimate	Sampling error (percent)	Change since 2019
Forest land					
Area (*thousand acres*)	18,926.3	0.54	18,883.2	0.54	-43.1
Number of live trees ≥1.0 inch d.b.h. (*million trees*)	11,978.7	1.37	11,854.6	1.37	-124.1
Net volume of live trees ≥5.0 inches d.b.h. (*million cubic feet*)	34,282.3	1.22	34,943.5	1.23	661.2
Live tree aboveground biomass ≥1.0 inches d.b.h. (*thousand oven dry tons*)	878,049.9	1.07	892,806.3	1.08	14,756.4
Net annual growth of live trees ≥5.0 inches d.b.h. (*million cubic feet per year*)	1,338.1	2.03	1,432.4	1.98	94.3
Annual removals of live trees ≥5.0 inches d.b.h. (*million cubic feet per year*)	711.2	5.58	759.5	5.35	48.3
Annual mortality of live trees ≥5.0 inches d.b.h. (*million cubic feet per year*)	316.5	3.42	293.7	3.64	-22.8
Timberland					
Area (*thousand acres*)	18,393.9	0.61	18,356.9	0.61	-37.0
Number of live trees ≥1.0 inch d.b.h. (*million trees*)	11,789.4	1.40	11,663.5	1.41	-125.9
Net volume of live trees ≥5.0 inches d.b.h. (*million cubic feet*)	32,937.7	1.28	33,585.8	1.29	648.1
Live tree aboveground biomass ≥1.0 inches d.b.h. (*thousand oven dry tons*)	844,430.4	1.13	858,944.3	1.14	14,513.9
Net annual growth of live trees ≥5.0 inches d.b.h. (*million cubic feet per year*)	1,323.9	2.07	1,420.3	2.00	96.4
Annual removals of live trees ≥5.0 inches d.b.h. (*million cubic feet per year*)	720.4	5.64	768.2	5.40	47.8
Annual mortality of live trees ≥5.0 inches d.b.h. (*million cubic feet per year*)	301.0	3.48	278.6	3.72	-22.4

Forest Area

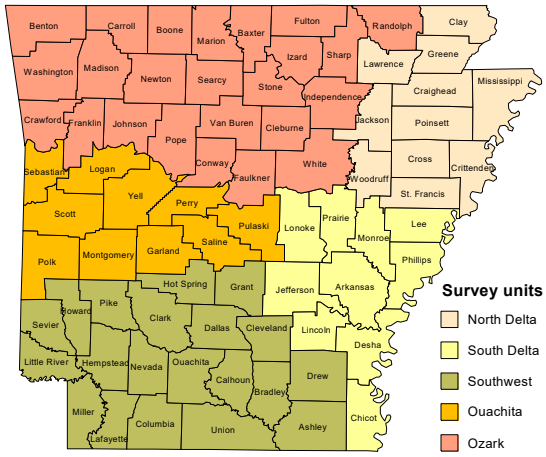

Figure 1—Forest survey units and counties in Arkansas.

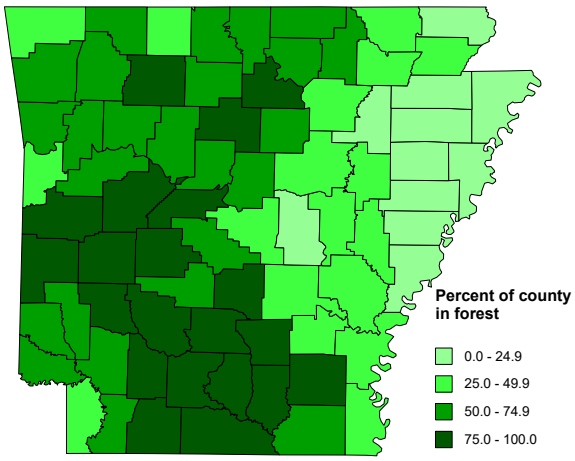

Figure 2—Percent of county area in forest land, 2020

Table 2—Area of forest land and change, by survey unit, Arkansas, 2019 and 2020

Survey unit	2019	2020	Change
	thousand acres		
South Delta	1,447.4	1,446.0	-1.4
North Delta	804.2	806.5	2.3
Southwest	6,938.5	6,944.8	6.3
Ouachita	3,434.3	3,419.0	-15.3
Ozark	6,301.9	6,266.8	-35.1
All units	18,926.3	18,883.2	-43.1

Table 3—Area of forest land and change, by ownership, Arkansas, 2019 and 2020

Ownership	2019	2020	Change
	thousand acres		
National forest	2,532.4	2,532.3	-0.1
Other public	1,168.9	1,182.2	13.3
Forest industry	2,650.1	2,675.7	25.6
NIPF	12,574.9	12,493.0	-81.9
All owners	18,926.3	18,883.2	-43.1

NIPF = nonindustrial private forest.

Table 4—Area of forest land and change, by forest-type group, Arkansas, 2019 and 2020

Forest-type group	2019	2020	Change
	thousand acres		
Loblolly-shortleaf pine	6,105.8	6,189.0	83.2
Eastern redcedar	299.0	279.2	-19.8
Oak-pine	1,898.5	1,878.1	-20.4
Oak-hickory	7,486.8	7,419.0	-67.8
Bottomland hardwoods	2,959.1	2,943.9	-15.2
Miscellaneous types	35.8	33.9	-1.9
Nontyped	141.5	140.1	-1.4
All groups	18,926.3	18,883.2	-43.1

Table 5—Area of forest land in forest plantations and change, by survey unit, Arkansas, 2019 and 2020

Survey unit	2019	2020	Change
	thousand acres		
South Delta	185.1	190.3	5.2
North Delta	53.3	49.2	-4.1
Southwest	2,675.8	2,761.9	86.1
Ouachita	605.4	580.6	-24.8
Ozark	205.9	210.3	4.4
All units	3,725.5	3,792.3	66.8

Volume, Biomass, and Trends

Table 6—Volume of softwoods on forest land and change, by survey unit, Arkansas, 2019 and 2020

Survey unit	2019	2020	Change
	million cubic feet		
South Delta	631.8	620.8	-11.0
North Delta	180.5	177.8	-2.7
Southwest	8,021.3	8,219.3	198.0
Ouachita	3,576.9	3,645.0	68.1
Ozark	2,124.2	2,239.4	115.2
All units	14,534.7	14,902.3	367.6

Table 7—Volume of hardwoods on forest land and change, by survey unit, Arkansas, 2019 and 2020

Survey unit	2019	2020	Change
	million cubic feet		
South Delta	2,735.5	2,728.8	-6.7
North Delta	1,492.6	1,523.2	30.6
Southwest	4,794.7	4,859.0	64.3
Ouachita	2,702.3	2,784.0	81.7
Ozark	8,022.4	8,146.2	123.8
All units	19,747.6	20,041.2	293.6

Table 8—Biomass dry weight of softwoods on forest land and change, by survey unit, Arkansas, 2019 and 2020

Survey unit	2019	2020	Change
	thousand tons		
South Delta	12,701.3	12,490.1	-211.2
North Delta	3,594.4	3,544.3	-50.1
Southwest	169,778.7	173,179.4	3,400.7
Ouachita	74,407.1	75,683.1	1,276.0
Ozark	45,252.5	47,546.4	2,293.9
All units	305,734.0	312,443.3	6,709.3

Table 9—Biomass dry weight of hardwoods on forest land and change, by survey unit, Arkansas, 2019 and 2020

Survey unit	2019	2020	Change
	thousand tons		
South Delta	70,710.5	70,446.2	-264.3
North Delta	40,131.7	40,936.1	804.4
Southwest	141,915.9	143,692.0	1,776.1
Ouachita	82,516.0	84,832.9	2,316.9
Ozark	237,044.4	240,453.9	3,409.5
All units	572,318.5	580,361.1	8,042.6

Table 10—Volume of 15 most dominant species on forest land by 5-inch diameter classes, Arkansas, 2020

		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	9,373.9	2,788.3	3,465.5	1,989.5	833.3	256.0	41.3
Shortleaf pine	4,151.7	681.7	1,694.2	1,399.0	361.9	14.9	0.0
White oak	3,084.3	573.5	1,104.4	856.7	380.9	116.0	52.8
Sweetgum	2,358.9	597.6	753.1	544.0	243.6	123.6	96.8
Post oak	1,642.7	409.9	634.2	377.3	180.0	19.5	21.9
Northern red oak	1,004.0	127.1	322.5	336.7	145.4	65.8	6.5
Southern red oak	885.6	109.9	242.2	285.9	139.5	70.9	37.2
Water oak	807.3	142.0	189.6	213.9	142.5	65.2	54.1
Black oak	774.3	111.2	276.2	224.4	107.3	40.0	15.4
Cherrybark oak	746.5	60.5	114.9	137.3	197.3	88.5	148.0
Eastern redcedar	694.1	390.5	248.2	54.4	1.0	0.0	0.0
Black hickory	681.6	313.3	261.9	91.5	7.5	7.5	0.0
Willow oak	660.2	79.7	113.2	166.2	174.2	87.9	39.0
Baldcypress	644.8	25.4	85.0	77.8	116.5	78.7	261.4
Overcup oak	605.1	38.9	91.0	118.2	156.2	121.5	79.3
Other species	6,828.5	2,009.8	1,915.4	1,356.3	805.3	383.4	358.1
All species	34,943.5	8,459.3	11,511.5	8,229.1	3,992.4	1,539.4	1,211.8

Trends in Tree Species Richness

An assessment of tree species richness (diversity) is one important element in describing and assessing forest ecosystem health. In this application species richness is the diversity metric applied to the 2015 and 2020 Arkansas data. Here, the richness measure is applied to every forest plot condition. This metric is the count of unique tree species ≥1.0 inch d.b.h. on each forest sample plot condition. Because forest conditions may differ in size (not a desirable sample situation for diversity measures) the derived averages were weighted by the size of the forest condition. This lessened the negative impact of small sample conditions in the descriptive statistics.

Figure 3 illustrates the range of tree species richness values and the amount of forest land in each respective richness level. For example, in 2015 there were 704,754 acres of forest land with 0 species present in the sample. By 2020 the amount of forest land at this richness level had dropped to 513,749 acres. Of the 13 species richness levels, 5 had declines in forest land area and 8 had increases. Any increases in species richness would, in general, be a positive outlook on forest ecosystem health. However, the best trend situation would be to have declines in forest land in the lower richness levels and increases in the upper richness levels.

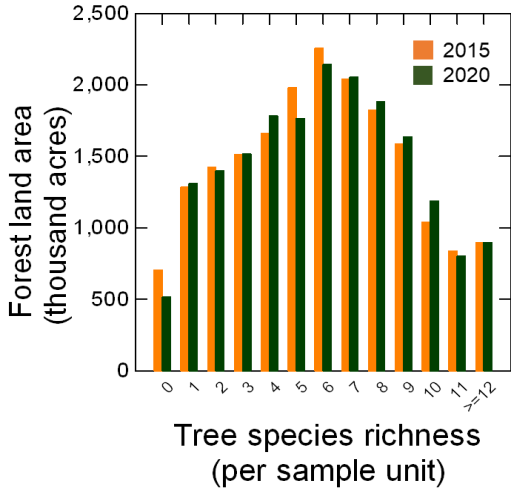

Figure 3—Area of forest land by tree species richness levels, Arkansas, 2015 and 2020. In this case a sample unit is a forest plot condition. This graph represents all trees ≥1.0 inch d.b.h.

It is interesting to study the differences in species richness between plantations and natural stands. Intuitively, it seems reasonable to expect forest plantations to be much less diverse than natural stands, mostly because a single target species is chosen for planting. Figure 4 quantifies this fact for Arkansas. The biggest difference is in the overstory trees, where natural stands average 5.6 species per forest sample unit while plantations average only 1.7 species per sample unit. There is little difference in the understory richness, 2.5 for natural stands versus 2.0 for plantations. This is mostly because young plantations are often overcome with volunteer tree species, which will be eliminated later during stand treatment. Combining natural stands and plantations dramatically lowers the overall tree diversity for the State, from 6.8 to 5.3 species per sample unit. Continued increases in plantation establishment will continue to lower the overall richness levels of Arkansas forests at the State level of assessment.

The tree species richness metric is just one important facet in assessing the forest health of a State. Monitoring changes in the FIA sample over time, as shown in figures 3 and 4, is an important function and provides baseline data from which to evaluate forest health and judge future assessments of species diversity. These baseline estimates are important tools to help forest managers and State officials shape forest policy into the future.

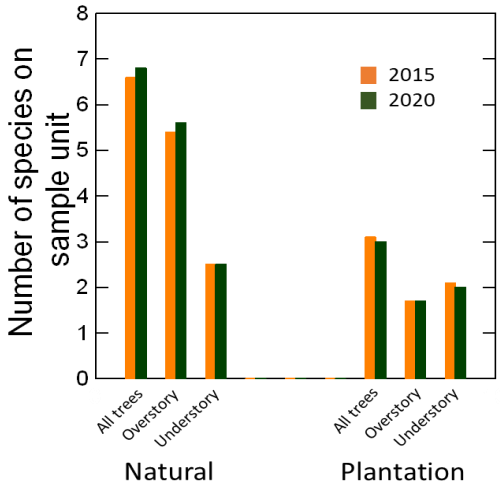

Figure 4—The average tree species richness by natural stands and plantation stands, Arkansas, 2015 and 2020. All trees are ≥1.0 inch d.b.h.; overstory trees are ≥5.0 inches d.b.h.; understory trees are ≥1.0 inch d.b.h. but <5.0 inches d.b.h. The average estimates are weighted by the forest plot condition proportion.

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