extension
ALABAMA A&M & AUBURN UNIVERSITIES

Costs & Trends of Southern Forestry Practices 2022

► One concern landowners may have when making forestland management decisions is the cost of forestry practices. They may worry that they cannot afford to complete activities such as planting or understory control, so they choose to do nothing. Knowing even a range of costs for forestry practices can help make decisions and lead to better forest management.

This document summarizes the results of a 2022 survey examining the cost of forestry practices across the southeastern United States. The 2022 survey underwent online formatting changes from previous versions to make the questionnaire more tabular and giving respondents more opportunities to describe costs further. The survey link was also disseminated through more outlets to access more participants.

For this survey, three physiographic regions in the South were considered: the Southern Coastal Plain, Northern Coastal Plain, and Piedmont regions (figure 1). The results presented are based on 296 usable responses. Of those, 54 percent were from private family landowners, 29 percent from consulting firms, 12 percent from private forestry firms, 2 percent from publicly funded organizations, and 2 percent of respondents reported "other" for their organizational type. Results presented are adapted from the "2022 Cost and Trends for Forestry Practices in the South" Special Report in the November/December 2023 edition of *Forest Landowner* magazine.

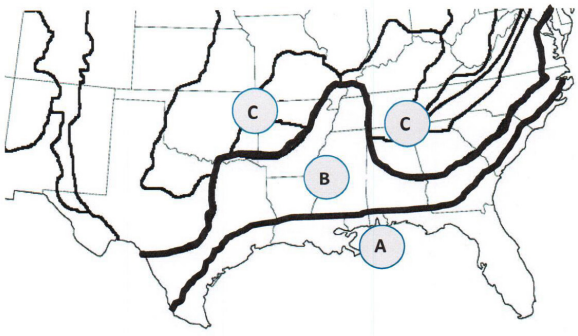

Figure 1. Physiological regions in the South that were used in the 2022 Cost of Forestry Practices survey showing (A) the Southern Coastal Plain, (B) Northern Coastal Plain, and (C) Piedmont or similar uplands.

Results

Mechanical Site Preparation

Mechanical site preparation was reported on 99,363 acres at an average cost per acre of $172.83 (table 1) and included 42 percent of the survey respondents. This included practices such as bedding, drum chopping, and shear and bed activities. Of the total acres reported, 58,217 of those acres included information on the number of passes, all of which were single-pass operations. There were not enough responses to report double-pass or triple-pass operations.

Table 1. Mechanical Site Preparation Costs Per Acre

Site Preparation Treatment	Number of Passes	Acres	Southern Coastal Plain	Northern Coastal Plain	Piedmont	Overall Average
			Average Cost Per Acre			
Bedding, all types	1	10,067	158.03	*	*	154.22
Drum chopping	1	7,732	124.55	*	*	128.08
Shear and bed	1	40,418	237.50	235.70	*	246.12
All	All	99,363	162.83	203.90	151.58	172.83

* Too few responses

Planting

Pine seedlings were the only seedling type planted with enough data to report in 2022. A total of 185,315 acres of pine seedlings were planted (table 2) and included 71 percent of the survey respondents. Most of the pine seedlings planted were bareroot loblolly pine (*Pinus taeda*), which made up 55 percent of the total acres reported. Pine seedlings planted averaged 561 per acre for both hand planting and machine planting (table 2). Overall, hand planting costs 29 percent less than machine planting. The average cost of machine planting bareroot pine species on cutover land was 45 percent more than the average cost of hand planting all bareroot pine seedlings on similar sites.

Table 2. Hand and Machine Planting Costs Per Acre and Cost Per Seedling to Plant

Planting Method	Acres	Southern Coastal Plain	Northern Coastal Plain	Piedmont	Overall Average Planting Cost	Cost Per Seedling to Plant	Cost Per Seedling to Purchase	Overall Average Seedlings Per Acre
Hand Planting		Average Cost Per Acre						
Cutover land, all pine, bareroot	56,664	107.44	99.43	124.74	107.12	0.11	0.09	568
Cutover land, all pine, container	47,849	167.98	104.92	132.68	140.87	0.11	0.18	545

Table 2. Hand and Machine Planting Costs Per Acre and Cost Per Seedling to Plant (cont.)								
Planting Method	Acres	Southern Coastal Plain	Northern Coastal Plain	Piedmont	Overall Average Planting Cost	Cost Per Seedling to Plant	Cost Per Seedling to Purchase	Overall Average Seedlings Per Acre
Hand Planting		Average Cost Per Acre						
Cutover land, loblolly pine, bareroot	52,107	106.44	99.43	124.74	106.79	0.11	0.09	560
Cutover land, loblolly pine, container	34,520	152.89	97.07	125.49	124.07	0.12	0.18	518
Cutover land, slash pine, bareroot	4,557	109.64	*	*	109.64	0.10	0.09	633
Cutover land, longleaf pine, container	9,922	193.64	110.40	150.68	172.60	0.11	0.20	604
Cutover land, all pine	104,513	142.49	101.85	128.44	124.19	0.11	0.13	557
Oldfield, all pine	2,910	*	*	*	254.94	0.20	0.16	618
All hand methods, all pine	107,423	146.92	108.80	155.78	133.92	0.12	0.14	561
Machine Planting								
Cutover land, all pine, bareroot	58,353	148.1	162.41	145.71	153.71	0.16	0.11	574
Cutover land, loblolly pine, bareroot	49,330	143.16	164.15	145.71	152.96	0.17	0.11	566
All machine methods, all pine	77,892	130.72	138.08	113.28	130.02	0.17	0.11	561

* Too few responses; overall planting costs per acre includes seedling costs and oversight.

Prescribed Burning

Forty-three percent of survey respondents reported prescribed burning costs for 2022. A ground drip torch was used in all cases for a total of 85,268 acres at an average cost per acre of $31.88 (table 3). Regional differences in costs were reported. In general, prescribed burning practices reported in the Piedmont region were more expensive than in other regions.

Table 3. Prescribed Burning Treatment Costs Per Acre by Ignition Type and Burning Purpose

Ignition Type	Burning Purpose	Acres	Southern Coastal Plain	Northern Coastal Plain	Piedmont	Overall Average
			Average Cost Per Acre			
Ground	Site preparation	31,602	33.93	40.63	41.32	38.29
Ground	Fuel reduction	52,836	25.91	27.86	32.73	28.14
Ground	All	85,268	28.38	33.36	35.74	31.88

Chemical Application

Chemical applications were reported by 94 percent of respondents who treated 617,659 acres in 2022 (table 4). Site preparation, invasive plant control, and herbaceous weed control were the top reasons for treatment with the majority of acres (53 percent) treated as part of site preparation activities. Fifty-two percent of acres treated were aerially sprayed. Overall average cost per acre for all treatment purposes and all methods was $89.64 (table 4). Overall, aerial application methods were less expensive than ground application methods. Additionally, the average cost per acre was lower in the Southern Coastal Plain region than in other regions.

Table 4. Chemical Application Costs Per Acre by Treatment Purpose and Method of Application

Treatment Purpose	Method of Application	Acres	Southern Coastal Plain	Northern Coastal Plain	Piedmont	Overall Average
			Average Cost Per Acre			
Site preparation	Ground	39,559	97.46	106.00	104.67	101.75
Site preparation	Aerial	213,323	94.14	97.57	94.25	95.86
Site preparation	All	326,040	92.83	94.11	93.15	93.47
Invasive plant control	All	2,739	90.7	140.41	128.62	124.26
Herbaceous weed control	Aerial	108,777	44.57	59.94	43.34	52.28
Herbaceous weed control	All	137,606	34.88	59.54	42.93	48.45
All	All	617,659	81.72	93.56	93.26	89.64

Fertilization

Twenty percent of respondents reported using fertilizer as a forestry practice in 2022. Those who indicated the use of fertilizer reported treating 212,266 acres at an average cost of $90.97 per acre (table 5). Aerial application of fertilizer accounted for 85 percent of all fertilization treatments reported for 2022.

Table 5. Fertilization Costs Per Acre by Purpose of Application, Application Method, and Fertilizer Type

Purpose of Application	Application Method	Fertilizer Type	Acres	Southern Coastal Plain	Northern Coastal Plain	Piedmont	Overall Average
				Average Cost Per Acre			
Post thinning	Aerial	DAP (18-46-0)	44,582	*	*	*	79.08
Post thinning	Aerial	Urea (45-0-0)	80,547	129.43	*	*	122.93
Post thinning	Aerial	All	125,129	108.33	98.25	98.25	102.57
Stand establishment	Aerial	DAP (18-46-0)	52,050	93.94	*	*	95.11
Stand establishment	Aerial	All	55,102	95.20	94.60	101.67	96.23
Stand establishment	Ground	DAP (18-46-0)	26,702	*	*	*	54.15
Stand establishment	Ground	All	32,035	*	*	*	53.79
Stand establishment	All	All	87,137	81.65	66.48	101.25	78.94
All	All	All	212,266	94.96	80.60	99.25	90.97

* Too few responses

Timber Cruising and Marking

Timber cruising was reported by 29 percent of 2022 survey respondents for a total of 148,684 acres. Fifty-four percent of the acres reported used the fixed area plot sampling method. Variable radius plot sampling cost on average 46 percent less than the fixed area plot sampling. The overall average cost per plot was $23.63. The overall average cost per acre for all methods was $9.12 (table 6).

Table 6. Timber Cruising Costs Per Acre by Inventory Purpose and Method Used

Inventory Purpose	Species	Method Used	Acres	Southern Coastal Plain	Northern Coastal Plain	Piedmont	Overall Average	Overall Average Cost per Acre
				Average Cost Per Plot				
Timber sale	All pine	All	9,266	*	*	23.76	22.51	13.29
Continuous inventory	All pine	All	29,731	*	*	*	27.00	4.87
All	All pine	Fixed area plot	79,692	23.44	19.86	27.92	23.31	10.52
All	All pine	Variable radius plot	13,127	*	*	*	19.75	5.63
All	All pine	All	92,819	23.30	21.18	22.70	22.33	9.17
All	All	All	148,684	25.25	22.88	22.70	23.63	9.12

* Too few responses

For 2022, 8,367 acres were reported for marked timber operations, a decrease of more than 27,500 acres compared to those reported for 2020 (table 7). Only 11 percent of respondents reported completing any type of marking activity on their forest lands.

Table 7. Timber Marking Costs Per Acre

Timber Marking Purpose	Acres	Southern Coastal Plain	Northern Coastal Plain	Piedmont	Overall Average
		Average Cost Per Acre			
All pine	6,267	74.88	96.00	70.00	78.89
All	8,367	76.00	69.22	70.00	71.96

Precommercial Thinning

Precommercial thinning is often completed early during a rotation when trees may be in an overcrowded condition. For the 2022 survey, only 18 percent of survey respondents reported precommercial thinning on 12,305 acres (table 8).

Table 8. Precommercial Thinning Costs Per Acre

Primary Thinning Method	Acres	Southern Coastal Plain	Northern Coastal Plain	Piedmont	Overall Average
		Average Cost Per Acre			
Brush saw	7,550	*	147.20	161.96	155.75
Hack and squirt	3,304	*	80.33	*	89.53
All	12,305	214.93	108.24	136.51	139.40

* Too few responses

Custodial Management

Custodial management costs may include road construction and maintenance, boundary line maintenance or surveys, insect and disease management, property taxes, fire protection activities, or legal fees. For 2022, 86 percent of respondents reported custodial management activities (table 9). Due to the increase in respondents participating in this question, we could list average cost per unit and unit of cost for many operation types (table 9).

Table 9. Custodial Management Costs Per Acre by Operation Type

Operation Type	Unit of Cost	Total Units	Southern Coastal Plain	Northern Coastal Plain	Piedmont	Overall Average
		Average Cost Per Unit				
Installing fire lines	Acres	16,013	33.00	33.57	*	31.18
Maintaining fire lines	Acres	9,771	123.20	59.71	29.97	67.43
Legal fees	Acres	7,746	*	9.83	*	21.20
Property taxes	Acres	377,749	22.40	8.13	*	15.52
Installing fire lines	Miles	327	296.68	559.38	*	467.03
Maintaining fire lines	Miles	166	195.00	131.00	*	260.00
Maintaining property boundaries	Miles	689	*	*	*	191.40
Road maintenance	Miles	474	*	*	*	1,382.91
Road maintenance	Hours	7,219	*	*	*	98.86
Legal fees	Hours	240	*	*	*	275.64

* Too few responses

Changes in Costs Estimates

Compared to the 2020 survey results, the cost of forestry practices increased except for timber cruising, hand planting, and precommercial thinning (figure 2). Overall average costs of timber marking increased the greatest from 2020 to 2022 (figure 2). Similar to survey results of recent years, fertilization and precommercial thinning were two of the lowest-responded practices by participants. However, both practices showed relatively large increases in total acres reported in 2022. Herbicide application showed a large increase in total acres reported from 2020 (approximately 43,000) to 2022 (approximately 617,000). When comparing timber marking and timber cruising acreages reported in 2020 to 2022, both showed large increases: 77 percent and 78 percent, respectively.

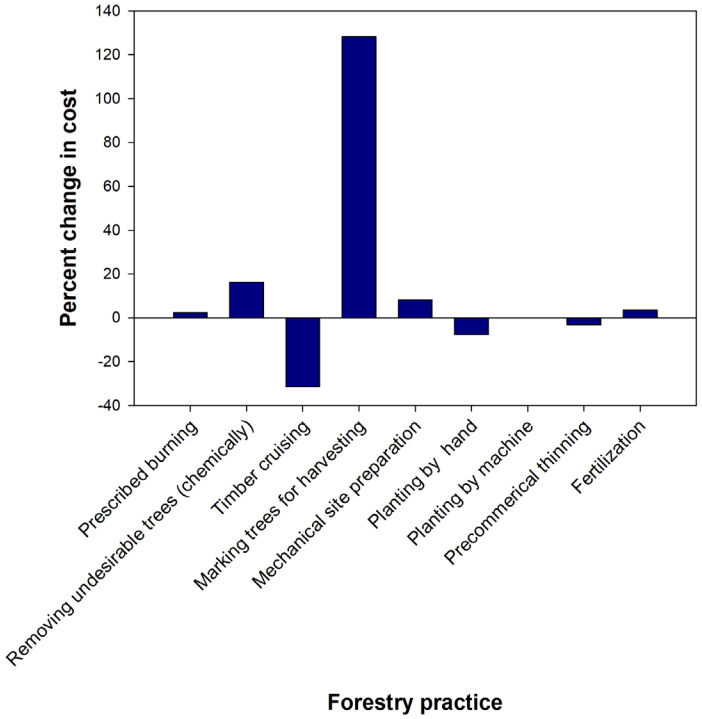

Figure 2. Percent change in the average cost of forestry practices from 2020 to 2022.

New Online Dashboard

In collaboration with the Forest Landowner Foundation, a new online dashboard was developed for the costs and trends of southern forestry practices (figure 3). The online and interactive platform that provides a comprehensive, data-driven experience to meet the needs of forest landowners, land managers, researchers, policymakers, and other forest enthusiasts seeking this valuable dataset. The platform offers a report of the 2022 Cost of Southern Forest Practices Survey, which is presented across various tabs, where you can explore regional bar charts and colored-coded maps, bar charts, and tables summarizing the average weighted cost per acre of various forest management activities. Moreover, you can filter data by up to three physiographic regions and five provider-landownership patterns. State-level data can be refined further by selecting the map, expanding the table, or drilling down on the bar chart. A helpful video visually demonstrates how to use this online platform on the Forest Landowner web page. Additionally, the platform provides summarized historical data from as far back as 1952, including trend data reported in nominal or historic dollars and real dollars, adjusted for inflation using the producer price index. The dashboard and demonstration video are available at https://www.forestlandowners.com/cost-and-trends-of-southern-forestry-practices/.

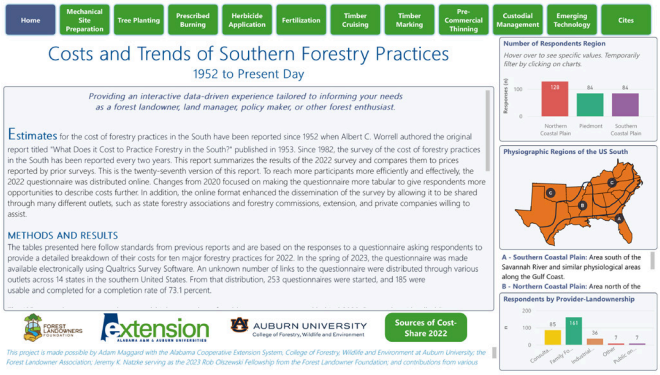

Figure 3. Landing page of the new online dashboard for costs and trends of southern forestry practices.

Summary

Forestry practice costs in the South have been more variable in the last 15 years than in past decades. This is due, in part, to the fact that the forest industry has been impacted during much of this time by suppressed stumpage prices. The economy and housing market crash in 2008 put financial pressure on corporate forest products companies. This pressure caused restructuring of many companies into timber investment management organizations (TIMO), real estate investment trusts (REIT), or to divest timberland management of investments completely. In addition, the low softwood stumpage prices during this time likely influenced decisions of landowners and managers that may have played a role in the variability of cost of forestry practices. Labor issues had a role in increased planting costs in recent years as cost per seedling to plant remains higher than costs observed before highs observed in 2018. Further, diesel and other petroleum products increased in price between 2020 and 2022, with the average annual price of crude oil in 2022 up approximately 141 percent compared to the annual average in 2020. Likewise, raw material costs have increased since the 2020 questionnaire. This can be attributed to many situations including the Russian-Ukraine war, extended COVID-19 shutdowns in China, and loss of capacity across many industries. Such events have had and still are having an impact on the cost of timber marking as solvents used in paints have increased by upwards of 150 percent over the last 2 years, causing the cost of tree marking paint to increase.

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