Forest Nursery Seedling Production in the United States—Fiscal Year 2022

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Abstract

Forest nursery production for the 2022 planting season was more than 1.4 billion tree seedlings (including more than 18 million container seedlings imported from Canada). Approximately 70 percent of seedlings were produced as bareroot stock. Only a small portion (3 percent) of seedlings were hardwood species. Based on this total number of seedlings and estimated planting densities in each State, more than 2.7 million ac (1,127,348 ha) were planted. Approximately 82 percent of production and planting occurred in the Southern States, while 14 and 4 percent were planted in the Western and Eastern States, respectively. In 2022, number of tree seedlings planted increased in the Western and Southern States and decreased in the Eastern States compared with the previous year.

Background

This annual report summarizes forest nursery seedling production in the United States. The number of seedlings reported is used to estimate the number of acres of forest planting per year. Prepared by the U.S. Department of Agriculture, Forest Service, Forest Inventory and Analysis (FIA) and State, Private, and Tribal Forestry, this report includes State-by-State breakdowns, regional totals, and an analysis of data trends. Universities in the southern, eastern, and western regions of the United States made an effort to collect data from all the major producers of forest and conservation seedlings in the 50 States. Forest and conservation nursery managers provided the information presented in this report. Because all data are provided voluntarily by outside sources and some data are estimated, caution must be used in drawing inferences.

Methodology

State, Private, and Tribal Forestry, in collaboration with Auburn University, the University of Idaho, and Purdue University, produced the data for this report. These universities collected forest tree seedling production data directly from the forest and conservation nurseries that grow forest tree seedlings in their region of the United States (Auburn University collected from 12 States in the Southeast, the University of Idaho collected from 17 States in the West, and Purdue University collected from 21 States in the Northeast and Midwest). The estimate of planted acres for each State was calculated using FIA estimates of planting densities. In addition, FIA average annual estimates of tree planting area based on ground-plot data that States collected during 5-, 7-, or 10-year periods is included. FIA estimates of acres of trees planted by State may not correlate with nursery production surveys because nurseries do not report shipments across State lines. Total acres by region, however, provide a reasonable estimate of planted acreage. Data collected are reported for both hardwood and conifer species by bareroot and container seedlings produced (table 1) and by estimated acreage planted of each (table 2).

Table 1. Hardwood and conifer tree seedling production for each State and each region during the 2022 planting year.

State	Hardwood bareroot seedlings produced	Hardwood container seedlings produced	Total hardwood seedlings produced	Conifer bareroot seedlings produced	Conifer container seedlings produced	Conifer container seedlings imported	Total conifer seedlings produced	Total seedlings produced
Southeast								
Florida	1,111,000	60,000	1,171,000	40,703,000	896,000	—	41,599,000	42,770,000
Georgia	5,399,000	—	5,399,000	191,740,000	146,129,000	90,460	337,959,460	343,358,460
North Carolina	373,000	—	373,000	55,725,000	13,628,000	—	69,353,000	69,726,000
South Carolina	—	—	—	220,218,000	3,000	—	220,221,000	220,221,000
Virginia	1,128,000	—	1,128,000	25,916,000	570,000	—	26,486,000	27,614,000
Regional Totals	**8,011,000**	**60,000**	**8,071,000**	**534,302,000**	**161,226,000**	**90,460**	**695,618,460**	**703,689,460**
South Central								
Alabama	3,674,000	15,000	3,689,000	97,023,000	68,963,528	—	165,986,528	169,675,528
Arkansas	11,685,000	—	11,685,000	92,288,000	—	—	92,288,000	103,973,000
Kentucky	469,030	—	469,030	78,920	—	—	78,920	547,950
Louisiana	—	—	—	—	45,708,000	—	45,708,000	45,708,000
Mississippi	—	178,000	178,000	69,047,000	11,503,000	—	80,550,000	80,728,000
Oklahoma	606,000	4,000	610,000	3,570,000	85,000	—	3,655,000	4,265,000
Tennessee	2,164,000	—	2,164,000	2,075,000	—	—	2,075,000	4,239,000
Texas	—	—	—	68,769,000	—	—	68,769,000	68,769,000
Regional Totals	**18,598,030**	**197,000**	**18,795,030**	**332,850,920**	**126,259,528**	**0**	**459,110,448**	**477,905,478**
Northeast								
Connecticut	—	—	—	—	—	—	—	—
Delaware	—	—	—	—	—	—	—	—
Maine[1]	—	5,500	5,500	—	3,516	4,300,000	4,303,516	8,609,016
Maryland	992,775	310,000	1,302,775	947,175	10,000	—	957,175	2,259,950
Massachusetts	300	—	300	3	—	—	3	303
New Hampshire	18,800	—	18,800	347,025	—	—	347,025	365,825
New Jersey	36,025	15,000	51,025	1,960	10,000	—	11,960	62,985
New York	249,100	—	249,100	329,100	24,500	—	353,600	602,700
Pennsylvania	300,445	1,125	301,570	1,278,988	300	—	1,279,288	1,580,858
Rhode Island	—	—	—	—	—	—	—	—
Vermont	2,000	400	2,400	120,200	100	—	120,300	122,700
West Virginia	—	—	—	—	—	—	—	—
Regional Totals	**1,599,445**	**332,025**	**1,931,470**	**3,024,451**	**48,416**	**4,300,000**	**7,372,867**	**13,604,337**
North Central								
Illinois	807,550	5,175	812,725	98,000	965	—	98,965	911,690
Indiana	1,849,664	65	1,849,729	723,925	—	—	723,925	2,573,654
Iowa	644,625	—	644,625	165,825	—	—	165,825	810,450
Michigan[1]	3,187,834	10,000	3,197,834	9,609,174	12,977,410	65,800	22,652,384	25,850,218

Table 1 *(continued).* Hardwood and conifer tree seedling production for each State and each region during the 2022 planting year.

State	Hardwood bareroot seedlings produced	Hardwood container seedlings produced	Total hardwood seedlings produced	Conifer bareroot seedlings produced	Conifer container seedlings produced	Conifer container seedlings imported	Total conifer seedlings produced	Total seedlings produced
Minnesota[1]	589,854	—	589,854	2,081,820	—	270,340	2,352,160	2,942,014
Missouri	737,410	—	737,410	460,830	—	—	460,830	1,198,240
Ohio	2,500	10,000	12,500	—	—	—	—	12,500
Wisconsin[1]	701,301	2,065	703,366	2,840,567	50,700	31,000	2,922,267	3,625,633
Regional Totals	**8,520,738**	**27,305**	**8,548,043**	**15,980,141**	**13,029,075**	**367,140**	**29,376,356**	**37,924,399**
Great Plains								
Kansas	—	8,100	8,100	—	36,825	—	36,825	44,925
Nebraska	425,000	2,000	427,000	901,483	1,134,446	—	2,035,929	2,462,929
North Dakota	28,450	20,300	48,750	733,100	68,000	—	801,100	849,850
South Dakota	—	—	—	—	—	—	—	—
Regional Totals	**453,450**	**30,400**	**483,850**	**1,634,583**	**1,239,271**	**0**	**2,873,854**	**3,357,704**
Intermountain								
Arizona	—	—	—	—	—	—	—	—
Colorado	21,800	5,166	26,966	8,275	71,976	—	80,251	107,217
Idaho[1]	—	11,797	11,797	2,249,019	4,704,632	4,910,555	11,864,206	11,876,003
Montana[1]	90,125	28,612	118,737	—	614,366	128,685	743,051	861,788
Nevada	—	1,318	1,318	—	174	—	174	1,492
New Mexico	—	20,684	20,684	—	75,000	—	75,000	95,684
Utah	—	—	—	—	—	—	—	—
Wyoming	—	—	—	—	—	—	—	—
Regional Totals	**111,925**	**67,577**	**179,502**	**2,257,294**	**5,466,148**	**5,039,240**	**12,762,682**	**12,942,184**
Alaska								
Alaska	—	—	—	—	—	445,460	—	445,460
Pacific Northwest								
Oregon[1]	3,505,300	927,675	4,432,975	39,091,958	34,211,403	3,802,375	77,105,736	81,538,711
Washington[1]	1,817,500	65,030	1,882,530	35,076,240	37,783,002	4,167,445	77,026,687	78,909,217
Regional Totals	**5,322,800**	**992,705**	**6,315,505**	**74,168,198**	**71,994,405**	**7,969,820**	**154,132,423**	**160,447,928**
Pacific Southwest								
California	—	15,000	15,000	1,300,000	27,484,550	—	28,784,550	28,799,550
Hawaii	—	10,000	10,000	—	200	—	200	10,200
Regional Totals	—	**25,000**	**25,000**	**1,300,000**	**27,484,750**	**0**	**28,784,750**	**28,809,750**
Totals	**42,617,388**	**1,732,012**	**44,349,400**	**965,517,587**	**406,747,593**	**18,212,120**	**1,390,031,840**	**1,439,126,700**

[1]Totals include an estimate of container conifers produced in Canada; bareroot imports for Maine and containers for other States.

Table 2. Estimated hardwood and conifer tree seedling acres planted for each State and each region during the 2022 planting year.

State	Hardwood acres planted[1]	Conifer acres planted[1]	Total acres planted[1]	FIA estimated acres planted[9]
Southeast				
Florida[2]	2,129	75,635	77,764	150,006
Georgia[2]	9,816	614,472	624,288	212,353
North Carolina[2]	678	126,096	126,775	108,401
South Carolina[2]	—	400,402	400,402	88,362
Virginia[2]	2,051	48,156	50,207	57,031
Regional Totals	**14,675**	**1,264,761**	**1,279,435**	**616,153**
South Central				
Alabama[2]	6,707	301,794	308,501	218,748
Arkansas[2]	21,245	167,796	189,042	89,136
Kentucky[3]	1,078	143	1,222	1,142
Louisiana[2]	—	83,105	83,105	160,561
Mississippi[2]	324	146,455	146,778	140,495
Oklahoma[2]	1,109	6,645	7,755	31,659
Tennessee[2]	3,935	3,773	7,707	24,386
Texas[2]	—	125,035	125,035	126,044
Regional Totals	**34,398**	**834,746**	**869,144**	**792,171**
Northeast				
Connecticut[3]	—	—	—	—
Delaware[2]	—	—	—	515
Maine[5]	9	7,173	7,182	4,069
Maryland[2]	2,369	1,740	4,109	—
Massachusetts[3]	1	—	1	—
New Hampshire[3]	43	798	841	402
New Jersey[3]	117	27	145	—
New York[5]	415	589	1,005	2,077
Pennsylvania[3]	693	2,941	3,634	1,847
Rhode Island	—	—	—	—
Vermont[3]	6	277	282	—
West Virginia[3]	—	—	—	—
Regional Totals	**3,653**	**13,545**	**17,198**	**8,910**
North Central				
Illinois[3]	1,868	228	2,096	1,667
Indiana[4]	2,846	1,114	3,959	2,413
Iowa[5]	1,074	276	1,351	—
Michigan[2]	5,814	41,186	47,000	6,330
Minnesota[2]	1,072	4,277	5,349	8,403
Missouri[3]	1,695	1,059	2,755	223
Ohio[3]	29	—	29	2,173
Wisconsin[6]	879	3,653	4,532	8,256
Regional Totals	**15,278**	**51,793**	**67,071**	**29,465**

Table 2 *(continued)*. Estimated hardwood and conifer tree seedling acres planted for each State and each region during the 2022 planting year.

State	Hardwood acres planted[1]	Conifer acres planted[1]	Total acres planted[1]	FIA estimated acres planted[9]
Great Plains				
Kansas[2]	15	67	82	1,012
Nebraska[2]	776	3,702	4,478	—
North Dakota[2]	89	1,457	1,545	—
South Dakota[2]	—	—	—	164
Regional Totals	**880**	**5,225**	**6,105**	**1,176**
Intermountain				
Arizona[2]	—	—	—	—
Colorado[2]	49	146	195	669
Idaho[2]	21	21,571	21,593	10,016
Montana[2]	216	1,351	1,567	4,506
Nevada[2]	2	—	3	—
New Mexico[2]	38	136	174	—
Utah[2]	—	—	—	—
Wyoming	—	—	—	846
Regional Totals	**326**	**23,205**	**23,531**	**16,037**
Alaska				
Alaska[2]	—	810	810	—
Pacific Northwest				
Oregon[7]	12,666	220,302	232,968	118,350
Washington[7]	5,379	220,076	225,455	96,376
Regional Totals	**18,044**	**440,378**	**458,423**	**214,726**
Pacific Southwest				
California[8]	33	63,966	63,999	36,986
Hawaii[8]	22	—	23	568
Regional Totals	**56**	**63,966**	**64,022**	**37,554**
TOTALS	**87,310**	**2,698,429**	**2,785,739**	**1,716,192**

[1] Acres planted were estimated assuming:
[2] 550 stems/acre.
[3] 435 stems/acre.
[4] 650 stems/acre.
[5] 600 stems/acre.
[6] 800 stems/acre.
[7] 350 stems/acre.
[8] 450 stems/acre.
[9] FIA = Forest Inventory and Analysis; average annual acreage planted estimated for all States on 5-year cycles, except for Alabama, Louisiana, Mississippi, and North Carolina, which are on 7-year cycles, and for Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, and Washington, which are on 10-year cycles. Data generated by Andy Hartsell, USDA Forest Service.

Assumptions

The following assumptions were used in compiling this report.

1. *The number of seedlings reported by the participating forest and conservation nurseries was the number of shippable seedlings produced for distribution in the 2022 planting season (i.e., seedlings that were planted from fall of 2021 through spring of 2022).*

Some species of forest seedlings require two or more growing seasons to reach accepted forest and conservation seedling size standards, so not all seedlings in production at a nursery at any given time are considered shippable (i.e., available for distribution). Therefore, only shippable seedlings were counted.

2. *All seedling production reported in this survey met the grading standards for the respective nurseries (i.e., cull seedlings were not included in the estimates).*

Production estimates are often based on seedbed inventories of seedlings meeting grading standards. For cases in which nurseries ship seedlings by weight, as opposed to examining and counting each seedling, landowners and tree planters often plant every seedling that is shipped to them.

3. *Seedling production data were collected from all the major nurseries that produced forest and conservation tree seedlings for the planting season.*

Considerable effort was made to contact all major producers of forest and conservation seedlings (private, State, Federal, Tribal). The universities collecting the survey data reported, with few exceptions, that the major producers were included in the results.

4. *All seedlings reported in this survey were produced for reforestation and conservation projects.*

Some of the nurseries that participated in this survey also produce seedlings for ornamental use, Christmas tree production, or other horticultural purposes. Private nurseries were asked to report only seedling production destined for conservation and reforestation planting.

5. *Forest tree seedlings remain in the general area where they are produced.*

Forest and conservation seedlings are routinely shipped across State borders and at times across international borders. It is assumed that, on average, the number of seedlings imported into a State is equal to the number of seedlings exported from that State. In some States, a significant number of seedlings are produced in Canada and imported for planting in those States. Estimates of the number of seedlings shipped from Canada were obtained from Canadian nurseries that routinely export seedlings to the United States.

6. *Dividing the number of seedlings shipped from forest and conservation nurseries by the average number of stems planted per acre in a specific State is an appropriate proxy of the number of acres of trees planted during the planting season (table 2).*

These estimations do not include direct seeding or natural forest regeneration activities. Average tree planting densities for each State were provided by FIA.

7. *Respondents to the production survey reported only hardwood and conifer trees produced.*

Nurseries were asked not to include shrubs in their production estimates. Many conservation and restoration plantings include shrubs and herbaceous plants to address wildlife, biodiversity, or other management objectives. Using only tree production to estimate acres planted results in an underestimate of planted acreage where a mixed planting of shrubs and trees occurred.

Data Trends

More than 1.4 billion forest tree seedlings were planted in the United States in fiscal year 2022, an increase of approximately 3 percent from fiscal year 2021 and 10 percent higher than the 10-year average (figure 1). The increase is attributable, in part, to a resumption of near-normal operations following the coronavirus pandemic. Seedling production in the Southern United States has increased annually from 2012 through 2022 (figure 2). In the Eastern United States, seedling production generally declined from 2012 to 2020, but was 13 percent higher in 2022 compared with 2020 (figure 2). In the Western United States, production has fluctuated over time (figure 2) but increased 30 percent between 2020 and 2022 due to increases in reforestation after years of wildfire. Some of the year-to-year variation is attributed to inconsistent participation from

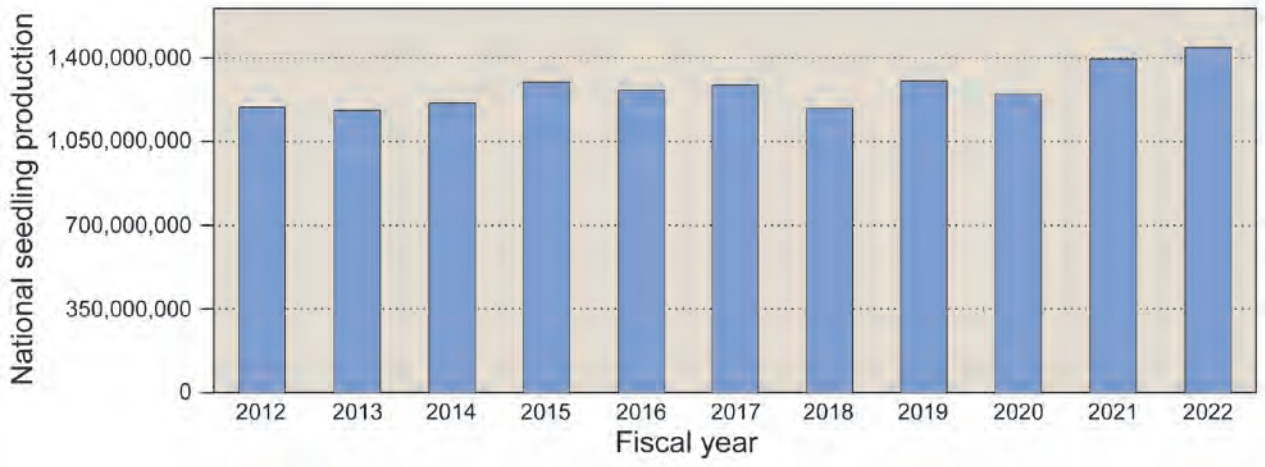

Figure 1. Total annual forest nursery seedling production in the United States for fiscal years 2012 through 2022. Sources: this report, Haase et al. (2019, 2020, 2021, 2022), Harper et al. (2013, 2014), Hernández et al. (2015, 2016, 2017, 2018)

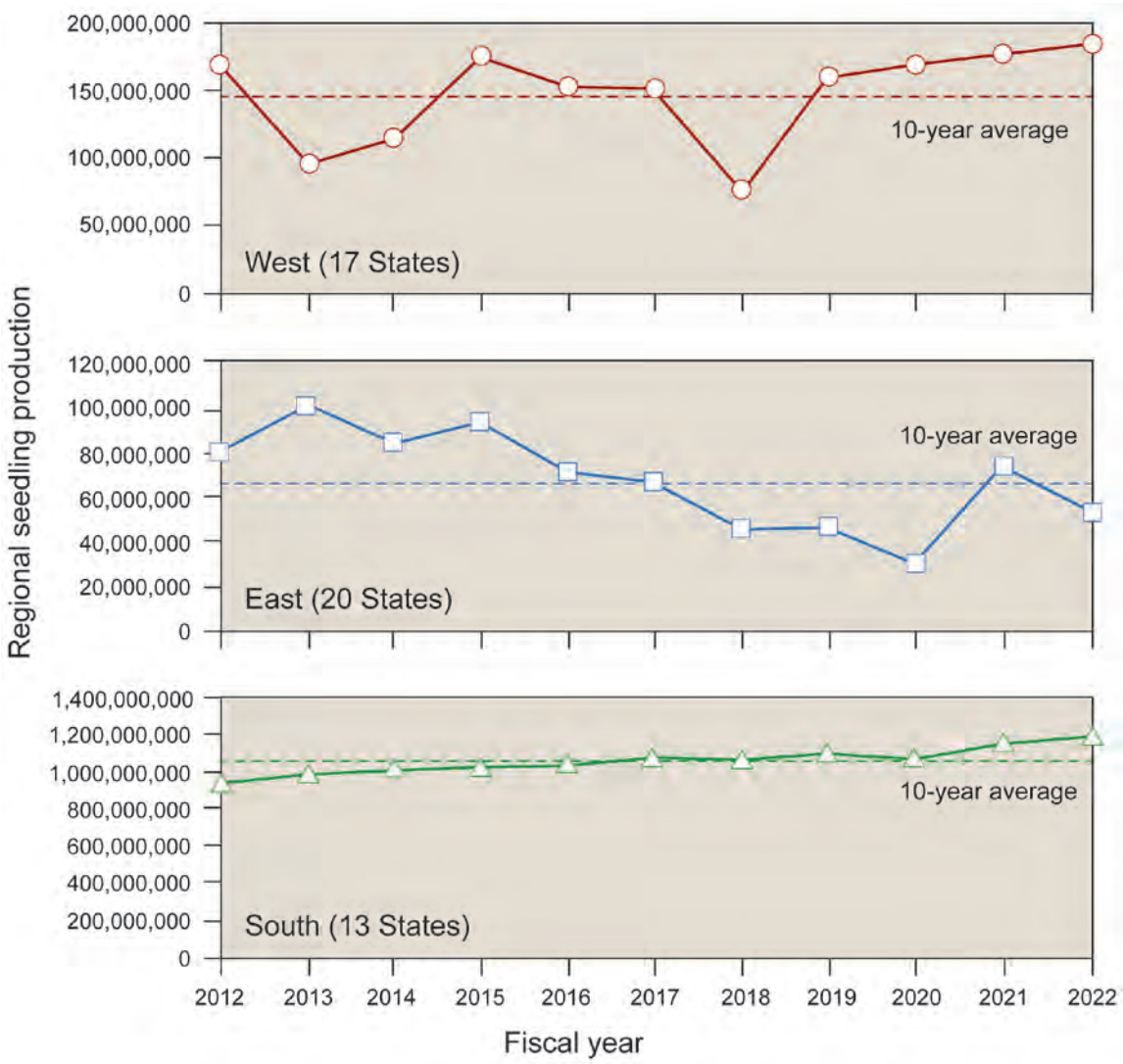

Figure 2. Annual forest nursery seedling production by region for fiscal years 2012 through 2022. Ten-year production averages are: 145,780,038 (west), 67,088,119 (east), and 1,068,908,254 (south). Sources: this report, Haase et al. (2019, 2020, 2021, 2022), Harper et al. (2013, 2014), Hernández et al. (2015, 2016, 2017, 2018)

nurseries during data collection and shifting planting needs following wildfires, pests, and harvests. Based on the total number of seedlings shipped and the average number of seedlings planted per acre in each State, nearly 2.8 million ac (1,127,348 ha) of tree seedlings were planted during the fall 2021 through spring 2022 planting season.

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