

Forest Nursery Seedling Production in the United States—Fiscal Year 2013

Richard A. Harper, George Hernández, Justin Arseneault, Kea J. Woodruff,
Scott Enebak, Ronald P. Overton, and Diane L. Haase

Forest Resource Analyst, U.S. Department of Agriculture (USDA), Forest Service, Clemson, SC; Regional Regeneration Specialist, USDA Forest Service, Atlanta, GA; Graduate Student, Purdue University, West Lafayette, IN; Nursery Production and Logistics Associate, Center for Forest Nursery and Seedling Research, University of Idaho, Moscow, ID; Director, Southern Forest Nursery Management Cooperative, School of Forestry and Wildlife Sciences, Auburn University, Auburn, AL; Regional Regeneration Specialist, USDA Forest Service, West Lafayette, IN; Western Nursery Specialist, USDA Forest Service, Portland, OR

Background

This report is the second USDA, Forest Service, Forest Inventory and Analysis (FIA) and State and Private Forestry (S&PF) report of tree planting in the United States based on forest seedling production data gathered directly from forest nurseries. *Forest Nursery Seedling Production in the United States* replaces the USDA Forest Service, State and Private Forestry (S&PF) annual *Tree Planting in the United States* report that was discontinued in 2000. The original *Tree Planting in the United States* report was based on data reported each year by the 50 State forestry agencies and by Federal land management agencies.

In 2010, FIA and S&PF worked with land-grant universities located in the southern, northeast, and western regions to develop a means for collecting forest tree seedling production as a proxy for tree planting data. The data are reported in this new *Forest Nursery Seedling Production in the United States—Fiscal Year 2013* report and were developed using an empirical source and a calculated approximation.

Current Methodology

The empirical data for the *Forest Nursery Seedling Production in the United States—Fiscal Year 2013* report were produced using the same protocols that were used to generate the *Forest Nursery Seedling Production in the United States—Fiscal Year 2012* report. The Forest Service collected data in collaboration with Auburn University, the University of Idaho, and Purdue University, which are the same universities that collected data for the 2012 report. Each university was responsible for collecting forest tree seedling production

data directly from the forest and conservation nurseries that grow forest tree seedlings in its region of the United States (Auburn University collected from 12 States in the Southeast, University of Idaho collected from 17 States in the West, and Purdue University collected from 21 States in the Northeast and Midwest). The approximation of planted acres for each State is derived from FIA estimates of tree planting area based on ground plots collected by States during a 5-, 7-, or 10-year period and compiled as an average annual estimate for the 2011 evaluation. FIA estimates of acres of trees planted by State may not correlate with the estimates produced by nursery production surveys. Assessing total acres by region provides a reasonable comparison between the two methods, however. Data collected are reported by hardwood and conifer seedlings produced and acreage planted of each (table 1) and by bareroot and container seedlings produced (table 2).

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 2013 planting season (i.e., seedlings to be planted from the fall of 2012 to the spring of 2013).*

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, including any cull seedlings.

3. *Seedling production data were collected from all the major nurseries that produced forest and conservation tree seedlings for the 2013 planting season.*

Considerable effort was made to contact all producers of forest and conservation seedlings. 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 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 the Lake States (Michigan, Minnesota, and Wisconsin), a significant amount of container seedlings produced in Canada are used for planting on State- and county-owned land and industrial forest land. Estimates of the amount of seedlings shipped from Canada to the Lake States were obtained from the State nursery programs and industrial forest landowners in these States. Similarly, seedlings produced in forest industry nurseries in Canada are planted on industrial forest land in Maine. Estimates of the amount of

Canadian-grown seedlings planted in Maine were provided by the forest industry. Seedlings are also imported from Canada for planting in the Pacific Northwest, but no estimates of the amount of Canadian seedlings imported in 2013 were available for this region.

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 in the 2013 planting season.*

These estimations do not include direct seeding or natural forest regeneration activities.

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. The average number of stems planted per acre used to estimate acres planted may include shrubs in some operations. Using only tree production to estimate acres planted would result in an underestimate of planted acreage where a mixed planting of shrubs and trees occurred. For example, in the Northern United States, State-owned nurseries produced more than 4 million shrubs in addition to the more than 54 million trees reported for the 2013 planting season.

Address correspondence to—

George Hernández, Regional Regeneration Specialist, U.S. Department of Agriculture, Forest Service, State and Private Forestry, 1720 Peachtree Road NW, Atlanta, GA 30309; e-mail: gherandez@fs.fed.us; phone: 404-347-3554.

Acknowledgments

The authors thank the U.S. Department of Agriculture, Forest Service, Washington Offices of the Forest Inventory and Analysis program and the State and Private Forestry Deputy Area for their support.

Table 1. Hardwood and conifer tree seedling production and acres planted for each State and each region during the 2012–2013 planting year.

State	Hardwood seedlings produced	Hardwood acres planted ^a	Conifer seedlings produced	Canadian conifer imports	Conifer acres planted ^a	Total seedlings produced	Total acres planted ^a	FIA data average acres planted ⁱ
SOUTHEAST								
Florida ^b	239,400	435	33,785,000	–	61,427	34,024,400	61,863	140,247
Georgia ^b	8,857,438	16,104	307,267,279	–	558,668	316,124,717	574,772	196,602
North Carolina ^b	404,700	736	65,464,000	–	119,025	65,868,700	119,761	108,286
South Carolina ^b	4,966,350	9,030	117,785,935	–	214,156	122,752,285	223,186	55,479
Virginia ^b	662,000	1,204	25,410,000	–	46,200	26,072,000	47,404	92,707
Regional Totals	15,129,888	27,509	549,712,214	–	999,477	564,842,102	1,026,986	593,320
SOUTH CENTRAL								
Alabama ^b	890,944	1,620	100,388,247	–	182,524	101,279,191	184,144	263,720
Arkansas ^b	14,626,125	26,593	90,250,500	–	164,092	104,876,625	190,685	156,973
Kentucky ^b	1,966,810	3,576	234,920	–	427	2,201,730	4,003	1,479
Louisiana ^b	4,929,468	8,963	15,951,102	–	29,002	20,880,570	37,965	166,984
Mississippi ^b	1,957,058	3,558	88,125,000	–	160,227	90,082,058	163,786	192,746
Oklahoma ^b	805,400	1,464	3,168,125	–	5,760	3,973,525	7,225	25,434
Tennessee ^b	1,635,000	2,973	5,093,000	–	9,260	6,728,000	12,233	22,489
Texas ^b	54,000	98	88,226,000	–	160,411	88,280,000	160,509	113,125
Regional Totals	26,864,805	48,845	391,436,894	–	711,703	418,301,699	760,549	942,949
NORTHEAST								
Connecticut	–	–	–	–	–	–	–	–
Delaware	–	–	–	–	–	–	–	–
Massachusetts	–	–	–	–	–	–	–	–
Maryland ^b	1,102,600	2,005	1,834,450	–	3,335	2,937,050	5,340	–
Maine ^{b, k}	–	–	–	17,660,000	22,075	17,660,000	22,075	8,284
New Hampshire ^b	13,555	25	255,760	–	465	269,315	490	–
New Jersey ^b	658,147	1,197	214,255	–	390	872,402	1,586	–
New York ⁱ	154,852	172	601,435	–	668	756,287	840	203
Pennsylvania ^b	5,797,925	10,542	22,861,947	–	41,567	28,659,872	52,109	1,391
Rhode Island	–	–	–	–	–	–	–	–
Vermont	–	–	–	–	–	–	–	–
West Virginia ^b	840,720	1,529	148,805	–	271	989,525	1,799	–
Regional Totals	8,567,799	15,468	25,916,652	17,660,000	68,771	52,144,451	84,239	9,878
NORTH CENTRAL								
Iowa ^e	722,850	1,205	173,850	–	290	896,700	1,495	–
Illinois ^h	1,168,495	2,686	219,420	–	504	1,387,915	3,191	5,062
Indiana ^d	2,329,271	3,583	1,369,168	–	2,106	3,698,439	5,690	1,331
Michigan ^{i, k}	1,492,800	2,714	10,850,050	1,546,500	12,397	13,889,350	15,111	11,899
Minnesota ^{e, k}	1,127,280	2,050	8,784,830	3,000,000	19,641	12,912,110	21,691	20,059
Missouri ^c	3,750,919	8,623	797,642	–	1,834	4,548,561	10,456	–
Ohio ^c	10,000	23	–	–	–	10,000	23	3,775
Wisconsin ^{f, k}	1,603,283	2,004	9,045,862	1,930,000	13,720	12,579,145	15,724	9,413
Regional Totals	12,204,898	22,888	31,240,822	6,476,500	50,492	49,922,220	73,380	51,540

Table 1. Hardwood and conifer tree seedling production and acres planted for each State and each region during the 2012–2013 planting year. (continued)

GREAT PLAINS								
Kansas ^b	88,925	162	146,000	–	265	234,925	427	–
North Dakota ^b	20,500	37	1,252,000	–	2,276	1,272,500	2,314	–
Nebraska ^b	112,000	204	1,493,249	–	2,715	1,605,249	2,919	–
South Dakota ^b	661,156	1,202	351,364	–	639	1,012,520	1,841	–
Regional Totals	882,581	1,605	3,242,613	–	5,896	4,125,194	7,500	0
INTERMOUNTAIN								
Arizona ^b	43,000	78	–	–	–	43,000	78	–
Colorado ^b	41,000	75	577,000	–	1,049	618,000	1,124	–
Idaho ^b	13,000	24	1,350,000	–	2,455	1,363,000	2,478	4,287
Montana ^b	213,650	388	41,600	–	76	255,250	464	5,142
New Mexico ^b	6,900	13	86,800	–	158	93,700	170	–
Nevada ^b	9,047	16	118	–	<1	9,165	17	–
Utah	–	–	–	–	–	–	–	–
Wyoming	–	–	–	–	–	–	–	–
Regional Totals	317,750	577	2,055,400	–	3,737	2,373,150	4,314	9,429
ALASKA								
Alaska	–	–	–	–	–	–	–	806
PACIFIC NORTHWEST								
Oregon ^g	1,301,000	3,717	37,508,827	–	107,168	38,809,827	110,885	88,379
Washington ^g	1,127,374	3,221	34,264,518	–	97,899	35,391,892	101,120	54,179
Regional Totals	2,428,374	6,938	71,773,345	–	205,067	74,201,719	212,005	142,558
PACIFIC SOUTHWEST								
California ^b	–	–	15,600,000	–	34,667	15,600,000	34,667	29,535
Hawaii ^h	44,000	97.78	–	–	–	44,000	98	–
Regional Totals	44,000	98	15,600,000	–	34,667	15,644,000	34,764	29,535
TOTALS	66,440,095	123,928	1,090,977,940	24,136,500	2,079,809	1,181,554,535	2,203,738	1,780,014

^a Acres planted were estimated assuming:

^b 550 stems/acre.

^c 435 stems/acre.

^d 650 stems/acre.

^e 600 stems/acre.

^f 800 stems/acre.

^g 350 stems/acre.

^h 450 stems/acre.

ⁱ 900 stems/acre.

^j 1,000 stems/acre.

^k Totals include an estimate of conifers produced in Canada for distribution to neighboring States, bareroot imports for ME, and container for other States.

^l Average annual acreage planted estimated for all States (2011 evaluation) on 5-year cycles, except AL, LA, MS, and NC are 7-year cycles and AZ, CA, CO, HI, ID, MT, NV, NM, OR, and WA are 10-year cycles; data generated by R. Harper.

Table 2. Bareroot and container tree seedling production for each State and each region during the 2012–2013 planting year.

State	Bareroot	Container ^a	Total seedlings produced	State	Bareroot	Container ^a	Total seedlings produced
SOUTHEAST				NORTH CENTRAL (CONTINUED)			
Florida	28,822,400	5,202,000	34,024,400	Michigan	12,342,850	–	12,342,850
Georgia	169,957,219	146,167,498	316,124,717	Minnesota	6,613,110	3,299,000	9,912,110
North Carolina	49,778,700	16,090,000	65,868,700	Missouri	4,177,243	371,318	4,548,561
South Carolina	121,131,535	1,620,750	122,752,285	Ohio	–	10,000	10,000
Virginia	26,072,000	–	26,072,000	Wisconsin	10,649,145	–	10,649,145
Regional Totals	395,761,854	169,080,248	564,842,102	Canada	–	6,476,500	6,476,500
SOUTH CENTRAL				Regional Totals	39,622,787	10,299,433	49,922,220
Alabama	97,305,069	3,974,122	101,279,191	GREAT PLAINS			
Arkansas	104,876,625	–	104,876,625	Kansas	–	234,925	234,925
Kentucky	2,201,730	–	2,201,730	North Dakota	1,200,000	72,500	1,272,500
Louisiana	20,300,570	580,000	20,880,570	Nebraska	870,000	735,249	1,605,249
Mississippi	82,257,058	7,825,000	90,082,058	South Dakota	997,501	15,019	1,012,520
Oklahoma	3,912,900	60,625	3,973,525	Regional Totals	3,067,501	1,057,693	4,125,194
Tennessee	6,728,000	–	6,728,000	INTERMOUNTAIN			
Texas	88,280,000	–	88,280,000	Arizona	–	43,000	43,000
Regional Totals	405,861,952	12,439,747	418,301,699	Colorado	–	618,000	618,000
NORTHEAST				Idaho	120,000	1,243,000	1,363,000
Connecticut	–	–	–	Montana	–	255,250	255,250
Delaware	–	–	–	New Mexico	–	93,700	93,700
Massachusetts	–	–	–	Nevada	–	9,165	9,165
Maryland	2,937,050	–	2,937,050	Utah	–	–	–
Maine	–	–	–	Wyoming	–	–	–
New Hampshire	269,315	–	269,315	Regional Totals	120,000	2,253,150	2,373,150
New Jersey	202,402	670,000	872,402	ALASKA			
New York	728,550	27,737	756,287	Alaska	–	–	–
Pennsylvania	28,305,872	354,000	28,659,872	PACIFIC NORTHWEST			
Rhode Island	–	–	0	Oregon	15,701,046	23,108,781	38,809,827
Vermont	–	–	0	Washington	14,351,288	21,040,604	35,391,892
West Virginia	989,525	–	989,525	Regional Totals	30,052,334	44,149,385	74,201,719
Canada	–	17,660,000	17,660,000	PACIFIC SOUTHWEST			
Regional Totals	33,432,714	18,711,737	52,144,451	California	–	15,600,000	15,600,000
NORTH CENTRAL				Hawaii	–	44,000	44,000
Iowa	896,700	–	896,700	Regional Totals	–	15,644,000	15,644,000
Illinois	1,387,300	615	1,387,915	TOTALS	907,919,142	273,635,393	1,181,554,535
Indiana	3,556,439	142,000	3,698,439				

^a ME, MI, MN, and WI include container seedlings produced in Canada.