Forestry Analytics for Carbon Tracking

FACT Guidance for Inferring Stand Age

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Introduction

Custom Forest Carbon Inventory Tool and the Default Forest Carbon Inventory Tool within the Forestry Analytics for Carbon Tracking Platform (FACT) require that users enter a forest stand age. This is because these tools employ age-based forest carbon growth models, built using Nationwide Forest Inventory (NFI) plot data from the USDA Forest Service Forest Inventory and Analysis Program (FIA).

However, stand age is not always obvious or known. The planting date may be unrecorded, the stand may have regenerated naturally, or the stand may contain two or more age classes. This guidance helps FACT users infer stand age based on an analysis of FIA plot data relating stand age to stand-size class, which reflects the predominant diameter of trees in a stand. Users can match the measured or estimated diameter range of their stand to the median age in FIA data for that class to derive an estimate of stand age. Because the median ages offered in this guidance are grouped by the same region, forest type group and stand origin combinations FACT age-based forest growth models are, the estimated ages offered in this guidance come from comparable FIA plots.

This guidance was prepared using data from the USDA Forest Service Forest Inventory and Analysis (FIA) Program. Stand age and field-recorded stand-size class were retrieved for each forested condition on FIA plots across the conterminous United States (CONUS) in the two most recent remeasurement periods (as of October 2026). Conditions without a recorded stand age, and nonstocked conditions, were excluded. The remaining conditions were grouped by region, forest type group, stand origin, and stand-size class, and the median stand age was calculated for each combination with at least five conditions. The median was used because it is less sensitive to outliers than the mean.

The median ages offered in this guidance are rough estimates from FIA stand age, which is based on field ring counts and is calculated somewhat differently across regions. They are intended to support inference, not to represent the true age of any individual stand.

How to infer stand age

The tables in Annex I of this document are organized by region, with forest types listed, broken out by diameter range and stand origin. These tables present the median stand ages and number of FIA plot conditions used to derive the medians in parentheses. Follow the steps below to select a stand age for entry into the Custom Forest Carbon Inventory Tool or the Default Forest Carbon Inventory Tool.

Step 1: Find the table that matches your tool inputs

Find the table in Annex I corresponding to the region within which your forest stand is located. Figure 1 describes the regional delineations applied within the FACT Default Forest Carbon Inventory Tool and the Custom Forest Carbon Inventory Tool.

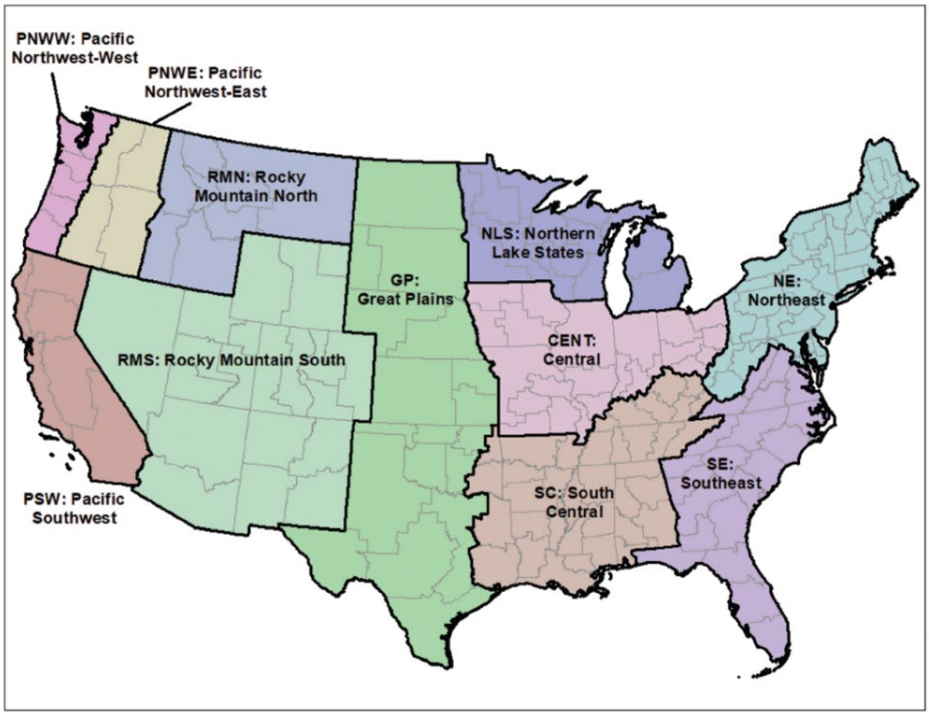


Figure 1: Map of broad CONUS regions applied in FACT Forest tools. Adapted from USDA Entity Guidelines, Quantifying greenhouse gas fluxes in agriculture and forestry: Methods for entity-scale inventory, Technical Bulletin 1939, 2nd ed., Chapter 5, Figure 5-4 (2024).

Within that table, find the forest type and stand origin (natural or planted) that matches your forest stand.

Where the forest type is unknown, you may need to review reference materials such as the FIA BIGMAP forest type group maps, the Forest Atlas of the United States, and other regional classification guides, or consult an extension forester or other forestry professional. If no exact match exists, choose the group that most closely reflects the stand's dominant species and conditions.

Stand origin can be inferred from spacing and structure. Trees in uniform rows with one or two distinct height classes indicate a planted stand. Irregular spacing with mixed ages and sizes indicates natural regeneration. If unknown, assume natural regeneration.

Step 2: Determine your stand-size class

Identify the diameter range that accounts for the largest share of your stand's growing space. Use Table 1 as a reference.

This does not require a formal inventory. Size class can be estimated from a stand walk-through or by measuring the diameter at breast height (DBH) of a sample of trees (see Box 1). Determining what qualifies as "most of the stand" should be based on the share of growing space the trees occupy, not by a simple count of stems. A few large trees can occupy as much of the site as many small ones. If the stand contains two or more clear age classes, choose the size class that occupies most of the stand. Give more weight to the larger trees, because they make up a significant part of the stand and hold a disproportionate share of its carbon. Where a stand contains substantial amounts of two size classes, it may make sense to select an age between the medians listed in the corresponding Annex I tables for those two classes.

Table 1 Stand size class determination			
Size class	Diameter at breast height (inches)	Circumference at breast height (inches)	Indicative conditions
Small	Less than 5"	Less than about 16"	Recently harvested, burned, or planted sites. Dense young regeneration or shrubby thickets. Canopy is low, often within reach or a few feet overhead, and trees can be grasped in one hand.
Medium	5" to 10"	About 16" to 31"	Closely spaced, pole-like trees competing for light. Canopy is closing or closed. Typical of young plantations at or near first thinning.
Large	10" to 20"	About 31" to 63"	Established forest with a well-defined canopy. Trees are more widely spaced and differ in crown size, and an understory may be developing.
Very large	More than 20"	More than about 63"	Mature or older forest with large, widely spaced trees and broad crowns. Often has a layered canopy, large standing dead trees, and large logs on the ground. Most adults can barely wrap their arms fully around the trunk.

Box 1: Measuring tree size

Diameter at breast height (DBH) is the trunk diameter 4.5 feet (1.37 m) above the ground, measured on the uphill side of the tree. While a specialized diameter tape (D-tape) is traditionally used, a flexible tape measure can be used to measure the trunk circumference instead. Hold the tape snug and level around the trunk at 4.5 feet. The measurement can be compared directly with the circumference column in Table 1 or divided by 3.14 to obtain DBH in inches. For leaning trees, measure 4.5 feet along the underside of the lean. If the trunk forks below 4.5 feet, measure each stem separately. If a branch, swelling, or wound occurs at 4.5 feet, measure just above the irregularity. To convert centimeters to inches, divide by 2.54.

Step 3: Evaluate the strength of the data

Before entering the median age, consider how well the median estimate is supported and whether it makes sense for your stand. The median ages listed within Annex I tables are accompanied by the number of FIA plot conditions from which the median was derived, shown in parentheses. Medians based on many plot conditions are more reliable than those based on few. Where a median is derived from fewer than 50 plot conditions, compare it with medians for the same forest type in a neighboring region, or for a closely related forest type. If the comparison median differs substantially and is supported by more plot conditions, consider shifting the age toward it.

Example 1

A landowner in New Hampshire has a naturally regenerated maple/beech/birch forest type stand of unknown age. A walk-through reveals that most of the stand consists of hardwoods between 5 and 10 inches DBH, placing it in the medium-diameter class. The table for the Northeast region, forest type maple/beech/birch, natural origin shows a median age of 62 years for medium-diameter stands, based on 2,121 plot conditions.

Example 2

A user in Colorado has a naturally regenerated Douglas-fir stand of unknown age. A walk-through shows that most of the stand's growing space is occupied by trees less than 5 inches in diameter, placing it in the small size class. The Annex I table for

the Rocky Mountain South region, Douglas-fir, natural origin, shows a median age of 25 years for small stands, based on only 15 conditions.

Because this is fewer than 50 conditions, the user compares it with the same forest type group, size class, and origin in a neighboring region. Rocky Mountain North shows a median age of 17 years, based on 118 conditions. The neighboring median is lower and supported by far more conditions, so the user shifts the estimate toward it, for example to about 20 years. The rationale for this adjustment is documented.

Annex I: Median Age Tables by Region

Each table below reports the median stand age for a combination of region, forest type group, stand origin, and stand-size class, based on FIA data. The number of FIA plot conditions contributing to each median is shown in parentheses.

A median age is shown only where at least five conditions were available. Cells with fewer are left blank.

Central States

Forest type group	Natural				Planted			
	Small (<5")	Medium (5"–10")	Large (10"–20")	Very Large (>20")	Small (<5")	Medium (5"–10")	Large (10"–20")	Very Large (>20")
Aspen / birch		33 (5)	61 (9)					
Elm / ash / cottonwood	16 (33)	42 (274)	67 (668)	81 (45)	15 (9)	22 (23)	59 (13)	
Exotic hardwoods		42 (14)	61 (7)					
Exotic softwoods								
Loblolly / shortleaf pine		36 (17)	74 (57)			11 (6)	57 (65)	
Maple / beech / birch	11 (7)	51 (70)	77 (374)	104 (11)				
Oak / gum / cypress		51 (26)	72 (35)					
Oak / hickory	16 (206)	53 (1565)	80 (3533)	109 (86)	19 (12)	27 (30)	59 (16)	
Oak / pine	17 (26)	58 (151)	77 (150)			44 (6)	61 (13)	
Other eastern softwoods	22 (24)	48 (104)	68 (22)					
Other hardwoods		43 (12)	70 (9)					
White / red / jack pine			74 (7)				60 (30)	

Great Plains

Forest type group	Natural				Planted			
	Small (< 5")	Medium (5"–10")	Large (10"–20")	Very large (> 20")	Small (< 5")	Medium (5"–10")	Large (10"–20")	Very large (> 20")
Aspen / birch	25 (8)	56 (30)	91 (11)					
Elm / ash / cottonwood	17 (64)	48 (493)	65 (396)	80 (34)				
Exotic hardwoods	25 (9)	41 (23)	57 (9)			57 (7)		
Exotic softwoods								
Loblolly / shortleaf pine			44 (5)					
Maple / beech / birch		40 (10)	58 (5)					
Oak / gum / cypress	15 (12)	56 (58)	80 (42)	137 (6)				
Oak / hickory	20 (237)	60 (1816)	75 (585)	86 (13)		46 (12)	87 (5)	
Oak / pine	20 (17)	49 (135)	80 (33)					
Other eastern softwoods	20 (36)	46 (167)	60 (51)			33 (5)		
Other hardwoods	20 (43)	52 (92)	80 (23)					
Other western softwoods								
Pinyon / juniper	24 (76)	60 (956)	75 (206)					
Ponderosa pine	20 (28)	72 (75)	97 (239)					
Spruce / fir		75 (6)	91 (19)					
Tropical hardwoods								
Woodland hardwoods	25 (750)	45 (2031)	65 (178)					

Northeast

Forest type group	Natural				Planted			
	Small (< 5")	Medium (5"–10")	Large (10"–20")	Very large (> 20")	Small (< 5")	Medium (5"–10")	Large (10"–20")	Very large (> 20")
Aspen / birch	26 (157)	50 (351)	73 (99)		15 (6)	28 (5)	72 (5)	
Douglas-fir								
Elm / ash / cottonwood	30 (65)	59 (307)	75 (243)	83 (6)				
Exotic hardwoods	20 (17)	37 (19)	59 (7)					
Exotic softwoods	20 (7)	36 (6)	68 (7)			42 (14)	61 (45)	
Fir / spruce / mountain hemlock								
Loblolly / shortleaf pine	13 (11)	57 (91)	71 (186)			22 (13)	37 (29)	
Maple / beech / birch	31 (401)	62 (2121)	86 (3072)	101 (41)	17 (10)	44 (15)	68 (20)	
Oak / gum / cypress	8 (5)	65 (35)	85 (92)					
Oak / hickory	18 (186)	56 (1046)	87 (3507)	98 (86)	22 (14)	34 (16)	73 (17)	
Oak / pine	30 (19)	57 (149)	80 (372)			51 (8)	67 (14)	
Other eastern softwoods	19 (6)	50 (14)						
Other hardwoods	19 (66)	45 (97)	91 (136)					
Spruce / fir	35 (317)	60 (816)	96 (333)		13 (25)	30 (27)	63 (12)	
White / red / jack pine	25 (29)	60 (139)	87 (679)	100 (9)		38 (16)	64 (82)	

Northern Lake States

Forest type group	Natural				Planted			
	Small (< 5")	Medium (5"–10")	Large (10"–20")	Very large (> 20")	Small (< 5")	Medium (5"–10")	Large (10"–20")	Very large (> 20")
Aspen / birch	17 (1728)	47 (2498)	76 (667)		14 (62)	37 (28)	59 (7)	
Douglas-fir								
Elm / ash / cottonwood	25 (222)	67 (1222)	77 (517)	82 (19)	14 (7)	34 (9)		
Exotic hardwoods	18 (16)	43 (35)	62 (20)					
Exotic softwoods		25 (9)				37 (35)	57 (17)	
Fir / spruce / mountain hemlock								
Maple / beech / birch	15 (239)	73 (1440)	89 (1747)	127 (16)	12 (13)	49 (10)	66 (6)	
Oak / hickory	16 (319)	60 (1213)	84 (1945)	113 (47)	14 (23)	46 (35)	62 (14)	
Oak / pine	22 (57)	64 (172)	79 (175)	93 (8)	12 (34)	34 (28)	59 (23)	
Other eastern softwoods		54 (9)	59 (6)					
Other hardwoods	17 (53)	57 (43)	81 (21)		12 (12)			
Spruce / fir	55 (990)	80 (1553)	102 (425)	140 (5)	20 (33)	35 (66)	55 (23)	
White / red / jack pine	21 (155)	51 (352)	82 (461)	121 (28)	16 (102)	34 (363)	59 (545)	

Pacific Northwest East

Forest type group	Natural				Planted			
	Small (< 5")	Medium (5"–10")	Large (10"–20")	Very large (> 20")	Small (< 5")	Medium (5"–10")	Large (10"–20")	Very large (> 20")
Alder / maple		48 (5)	96 (5)					
Aspen / birch	13 (15)	55 (12)	94 (18)					
Douglas-fir	20 (66)	65 (230)	97 (1320)	130 (172)	15 (22)	34 (30)	52 (35)	
Elm / ash / cottonwood			83 (10)	83 (6)				
Fir / spruce / mountain hemlock	20 (86)	70 (228)	110 (979)	163 (192)	22 (15)	40 (14)	56 (10)	
Hemlock / Sitka spruce	23 (7)	62 (27)	107 (92)	250 (28)				
Lodgepole pine	25 (285)	65 (510)	85 (205)		25 (34)	33 (75)		
Other hardwoods	19 (14)	73 (10)	96 (33)	100 (5)				
Other western softwoods	30 (22)	75 (210)	100 (424)	210 (27)				
Pinyon / juniper								
Ponderosa pine	15 (87)	60 (330)	90 (1902)	140 (322)	16 (59)	30 (152)	45 (83)	180 (7)
Tanoak / laurel								
Western larch	15 (35)	75 (44)	95 (161)	177 (12)	8 (16)	28 (13)		
Western oak		90 (36)	90 (17)					
Western white pine								

Pacific Northwest West

Forest type group	Natural				Planted			
	Small (< 5")	Medium (5"–10")	Large (10"–20")	Very large (> 20")	Small (< 5")	Medium (5"–10")	Large (10"–20")	Very large (> 20")
Alder / maple	12 (27)	33 (143)	60 (398)	76 (79)	7 (47)	23 (55)	35 (73)	
Aspen / birch								
Douglas-fir	14 (46)	40 (135)	80 (1131)	155 (1567)	6 (461)	21 (598)	37 (1493)	66 (122)
Elm / ash / cottonwood		43 (11)	60 (25)	85 (8)			37 (5)	
Fir / spruce / mountain hemlock	23 (30)	42 (112)	110 (324)	230 (238)	22 (22)	32 (58)	43 (43)	
Hemlock / Sitka spruce	17 (36)	37 (80)	65 (373)	210 (424)	6 (90)	22 (55)	40 (82)	
Lodgepole pine	6 (5)	52 (29)	82 (20)					
Other hardwoods	7 (8)	71 (29)	77 (35)	117 (5)	7 (13)	28 (11)		
Other western softwoods								
Ponderosa pine		75 (10)	87 (58)	160 (24)	14 (5)	30 (16)	43 (20)	
Tanoak / laurel	10 (56)	61 (31)	75 (51)	109 (21)	8 (20)	29 (18)	41 (6)	
Western larch								
Western oak	17 (16)	77 (70)	90 (42)	101 (12)				
Western white pine								

Pacific Southwest

Forest type group	Natural				Planted			
	Small (< 5")	Medium (5"–10")	Large (10"–20")	Very large (> 20")	Small (< 5")	Medium (5"–10")	Large (10"–20")	Very large (> 20")
Alder / maple	9 (7)	42 (8)	50 (17)					
Aspen / birch	53 (7)							
California mixed conifer	19 (14)	70 (97)	91 (634)	140 (421)	7 (27)	20 (35)	45 (24)	
Douglas-fir	7 (5)	38 (22)	50 (85)	105 (72)		23 (5)	40 (11)	
Elm / ash / cottonwood								
Exotic softwoods								
Fir / spruce / mountain hemlock	13 (5)	56 (12)	90 (136)	144 (108)				
Hemlock / Sitka spruce			41 (5)					
Lodgepole pine		73 (10)	121 (42)	177 (5)				
Other hardwoods	20 (17)	53 (10)	79 (23)	111 (6)				
Other western softwoods	18 (11)	78 (74)	95 (185)	190 (17)				
Pinyon / juniper		115 (12)	150 (57)					
Ponderosa pine	15 (5)	57 (31)	90 (231)	110 (71)	10 (13)	25 (50)	40 (54)	
Redwood	11 (6)	25 (12)	51 (36)	95 (70)				
Tanoak / laurel	5 (16)	50 (49)	65 (103)	95 (30)	16 (6)	25 (6)		
Western oak	18 (89)	75 (273)	92 (261)	122 (44)		33 (6)	52 (6)	
Western white pine			186 (6)					
Woodland hardwoods			131 (5)					

Rocky Mountain North

Forest type group	Natural				Planted			
	Small (< 5")	Medium (5"–10")	Large (10"–20")	Very large (> 20")	Small (< 5")	Medium (5"–10")	Large (10"–20")	Very large (> 20")
Alder / maple								
Aspen / birch	16 (73)	54 (76)	67 (73)					
Douglas-fir	17 (118)	72 (435)	105 (1596)	115 (83)	11 (5)	16 (6)	71 (6)	
Elm / ash / cottonwood	12 (7)	74 (19)	95 (36)	114 (10)				
Exotic softwoods								
Fir / spruce / mountain hemlock	16 (113)	72 (370)	108 (992)	119 (59)	8 (8)	29 (5)		
Hemlock / Sitka spruce	22 (20)	60 (23)	96 (136)	145 (28)				
Lodgepole pine	13 (180)	84 (463)	94 (239)		13 (5)			
Oak / hickory								
Other hardwoods	17 (5)							
Other western softwoods	30 (22)	89 (61)	149 (100)					
Pinyon / juniper	23 (12)	66 (110)	91 (173)					
Ponderosa pine	12 (42)	71 (157)	98 (458)	113 (45)	11 (5)	29 (12)	52 (10)	
Western larch	14 (35)	42 (53)	102 (111)	150 (10)	11 (13)	26 (6)		
Western white pine								
Woodland hardwoods	42 (9)	95 (38)	102 (24)					

Rocky Mountain South

Forest type group	Natural				Planted			
	Small (< 5")	Medium (5"–10")	Large (10"–20")	Very large (> 20")	Small (< 5")	Medium (5"–10")	Large (10"–20")	Very large (> 20")
Aspen / birch	15 (241)	76 (524)	98 (377)	21 (6)				
Douglas-fir	25 (15)	96 (137)	116 (502)	121 (6)				
Elm / ash / cottonwood	12 (7)	58 (17)	84 (34)	109 (15)				
Exotic hardwoods								
Fir / spruce / mountain hemlock	24 (65)	96 (301)	126 (926)	134 (11)				
Lodgepole pine	17 (61)	98 (267)	122 (146)					
Oak / hickory		84 (6)	34 (10)					
Other hardwoods			86 (5)					
Other western softwoods	27 (12)	106 (52)	151 (74)					
Pinyon / juniper	87 (97)	103 (1387)	143 (6278)	192 (107)				
Ponderosa pine	25 (25)	93 (135)	104 (1118)	124 (27)				
Woodland hardwoods	18 (1050)	77 (596)	119 (522)	95 (9)				

South Central

Forest type group	Natural				Planted			
	Small (< 5")	Medium (5"–10")	Large (10"–20")	Very large (> 20")	Small (< 5")	Medium (5"–10")	Large (10"–20")	Very large (> 20")
Elm / ash / cottonwood	12 (203)	35 (546)	62 (812)	84 (16)	8 (21)	22 (16)	31 (5)	
Exotic hardwoods	10 (68)	25 (79)	53 (26)		3 (10)			
Loblolly / shortleaf pine	8 (301)	24 (953)	48 (2540)	71 (93)	5 (931)	15 (1821)	27 (2197)	
Longleaf / slash pine	11 (15)	30 (108)	62 (363)		5 (63)	19 (119)	31 (84)	
Maple / beech / birch	14 (13)	46 (76)	68 (278)	78 (5)				
Oak / gum / cypress	15 (197)	36 (794)	67 (1651)	80 (45)	9 (50)	19 (101)	28 (10)	
Oak / hickory	10 (985)	44 (2875)	71 (6359)	83 (58)	4 (116)	18 (26)	29 (21)	
Oak / pine	10 (237)	35 (805)	62 (1309)	70 (20)	4 (182)	13 (58)	30 (51)	
Other eastern softwoods	23 (29)	44 (171)	58 (73)					
Other hardwoods	15 (9)	34 (23)	59 (13)					
Pinyon / juniper		75 (5)						
Tropical hardwoods								
White / red / jack pine			73 (40)					
Woodland hardwoods								

Southeast

Forest type group	Natural				Planted			
	Small (< 5")	Medium (5"–10")	Large (10"–20")	Very large (> 20")	Small (< 5")	Medium (5"–10")	Large (10"–20")	Very large (> 20")
Aspen / birch								
Elm / ash / cottonwood	10 (113)	26 (190)	69 (248)	85 (6)	6 (5)			
Exotic hardwoods	10 (19)	27 (28)	57 (7)					
Exotic softwoods								
Loblolly / shortleaf pine	7 (345)	23 (816)	43 (1897)	74 (32)	4 (700)	15 (837)	30 (1383)	
Longleaf / slash pine	15 (90)	35 (274)	63 (680)	94 (5)	5 (322)	17 (542)	31 (338)	
Maple / beech / birch		54 (19)	86 (67)					
Oak / gum / cypress	14 (351)	43 (813)	75 (1320)	98 (35)	4 (6)	15 (10)		
Oak / hickory	8 (886)	36 (1464)	77 (4593)	99 (109)	4 (104)	22 (21)	38 (28)	
Oak / pine	8 (291)	32 (644)	63 (1167)	85 (17)	4 (145)	18 (64)	32 (68)	
Other eastern softwoods	15 (11)	47 (23)	56 (13)					
Other hardwoods	7 (36)	38 (36)	67 (56)		4 (11)			
Spruce / fir								
Tropical hardwoods	20 (23)	48 (29)	54 (77)					
White / red / jack pine		39 (21)	57 (94)	87 (10)			37 (15)	