

Main Stem Green and Dry Weights of Red Oak, White Oak, and Maple In the Appalachian Region of Virginia



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by

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INTRODUCTION

New emphasis has been placed on the weight of whole trees and portions of trees. Weight inventories and purchase of wood by weight are becoming increasingly common for saw logs as well as pulpwood. More information needs to be gathered on the weight of portions of tree stems, however, before weight can be a standard measurement unit. This information must also be flexible enough to be used with varying utilization standards so that new inventories will not be required when a standard changes.

The objective of this study was to develop main stem green and dry weights with and without bark to various top diameters inside and outside bark for red oak, white oak, and maple in the Appalachian region of Virginia.

DATA COLLECTION AND PREPARATION

Sample Tree Selection and Measurement

Sample plots were located in the Appalachian hardwood region in the vicinity of Blacksburg, Virginia. The plots were subjectively located with the aim of sampling across site and topography. Plots were located only in areas that were naturally regenerated, had not been recently cut, and had an average stand age of 15 years or older. All sampling was done in late fall and winter to assure visibility of the tree boles and to keep all weights on a foliage-free, dormant basis.

Both standing sample and felled sample plots were taken. A standing sample tree plot consisted of all trees two or more inches in DBH of the species of interest included in a BAF 10 prism plot.

A total of 81 standing sample trees were measured. The standing tree sample consisted of 37 white oaks (Quercus alba), 33 red oaks (15 Q. rubra, 12 Q. velutina, and seven Q. coccinea), and 11 maples (Acer rubrum). Although there was no specific DBH range desired for the standing sample trees, the point sampling selection method insured that the larger trees predominated in the sample.

The characteristics listed below were recorded for each standing sample tree.

1. Species
2. DBH
3. Total height
4. Diameters and heights at points of change in tree taper up to a three inch top outside bark or end of the main stem
5. Diameter at stump height (0.5 feet)

DBH and stump diameter were measured with a diameter tape. Total height and upper stem diameters and heights were measured with a Barr and Stroud dendrometer.

All diameters and heights were measured to the nearest .1 inch and nearest foot, respectively. The diameter and height ranges and averages for the standing sample trees are shown in Table 1.

Felled sample trees were selected with the goal of including trees representing the range of diameter classes encountered for each species. The felled tree sample included four white oaks (Q. alba), seven red oaks (five Q. rubra and two Q. velutina), and four maples (A. rubrum).

The characteristics listed below were recorded for each felled sample tree.

Table 1. Diameter and height ranges and averages for felled and standing sample trees.

<u>Species</u>	<u>Minimum Diameter (inches)</u>	<u>Maximum Diameter (inches)</u>	<u>Average Diameter (inches)</u>	<u>Minimum Height (feet)</u>	<u>Maximum Height (feet)</u>	<u>Average Height (feet)</u>
Felled Sample Trees						
Red Oak	4.7	16.9	10.1	45.0	76.0	62.8
White Oak	5.0	11.0	8.1	41.5	66.0	57.5
Maple	6.6	14.0	9.8	58.5	60.0	59.4
Standing Sample Trees						
Red Oak	3.0	23.2	18.3	23.5	97.3	63.1
White Oak	3.6	25.8	10.8	31.2	89.6	62.6
Maple	5.1	17.2	8.9	38.4	86.6	60.6

1. Species
2. DBH
3. Total height
4. Length of the main stem to a three inch top outside bark or end of the main stem
5. Diameters (inside and outside bark) at four foot intervals to the end of the main stem or three inch top outside bark
6. Diameter (inside and outside bark) at stump (0.5 feet) and at the end of the main stem
7. Green weight without bark of a one inch disk cut from the bole at each of the above diameter points
8. Specific gravity of the bole disks
9. Moisture content for the bole disks

DBH was measured with a diameter tape. The trees were then felled and total height was measured with a steel tape. Inside and outside bark diameter on each bole disk was measured with a ruler. Disks cut from the felled trees were transported in plastic bags to insure minimum moisture loss. Specific gravity and moisture content determinations of the disks were on an oven dry (103°C), ~~dry~~ green volume basis. All diameters and heights were measured to the nearest .1 inches and nearest foot, respectively. The diameter and height ranges and averages for the felled sample trees are shown in Table 1.

Sample Tree Volume

Volumes of the main stem inside and outside bark for the felled sample trees were determined using the following procedure. The shape of each tree section between points of measurement was assumed to be truncated cone. The cubic foot volume for each section was calculated by Smalian's formula

$$V = (A_b + A_t)(h/2)$$

where:

V = section volume in cubic feet,

h = length of the section in feet,

A_b = cross-sectional area at the base of the section in square feet,

A_t = cross-sectional area at the top of the section in square feet.

Diameters outside bark (d.o.b.) at the points of measurement and the distance between the measurements were used to calculate volume outside bark for each section. The volumes of each section were then summed to produce the total outside bark volume of the stem to the end of the main stem or a three inch top outside bark. Volume inside bark for each felled tree was calculated as above using diameter inside bark (d.i.b.) in the place of d.o.b. to determine cross-sectional area.

The volume outside bark for the standing sample trees was determined using the same method as for the felled sample trees. Before volume inside bark for the standing sample trees could be determined, the d.i.b. at each measurement point had to be established. A regression relating d.i.b. to d.o.b. was constructed using data from the felled sample trees. The equation was

$$\text{d.i.b.} = a(\text{d.o.b.})$$

An equation having an intercept other than zero was initially used, but the intercept was dropped because it was not significantly different from zero for any of the tree species. The value of the slope coefficient "a" for each species is shown in Table 2. The d.i.b. at each measurement point was predicted from d.o.b., and these diameters were used to calculate volume inside bark for the standing sample trees.

Sample Tree Specific Gravity and Moisture Content

Specific gravity and moisture content of wood only were determined for each disk cut from the felled sample trees. Main stem bark specific gravity and moisture content values were

Table 2. Values of the slope coefficient "a" for predicting d.i.b. from d.o.b. for red oak, white oak, and maple.*

Species	a
Red Oak	.90356
White Oak	.92017
Maple	.94306

*d.i.b. = a(d.o.b.)

obtained from Koch (1970) and Manwiller (1975), respectively. Koch does not present specific gravity values for white oak so the red oak specific gravity values were used for white oak. Even though Koch does not present white oak bark specific gravity, this source was used because it is the most applicable of the available information, and other possible sources reported very little variation between white oak and red oak bark specific gravity.

All attempts to link specific gravity and moisture content of stem wood for each species to position within the tree, DBH, or total height were unsuccessful. Therefore, the averages of these measurements taken from the trees in each species were used. These averages and the stem bark values are shown in Table 3.

VOLUME AND WEIGHT PREDICTION

Main Stem Volume

A volume prediction system was developed for each species by first fitting a taper equation to the sample data, and then integrating the taper equation to produce volume.

Omerod's taper equation (Omerod 1973) was used as the taper model for each species. This nonlinear equation relates diameter at specified heights to DBH and total height. The equation is

$$d = D \left[\frac{H-h}{H-4.5} \right]^b \quad (1)$$

where:

d = stem diameter in inches,

D = diameter at breast height in inches,

H = total height in feet,

h = height in feet at which diameter d occurs,

b = constant estimated by nonlinear regression.

Table 3. Main stem wood and bark specific gravity and moisture content for red oak, white oak, and maple.

Species	Specific Gravity	Moisture Content
Red Oak		
Stem Wood	.593	.648
Stem Bark	.600 ^{1/}	.551 ^{2/}
White Oak		
Stem Wood	.607	.567
Stem Bark	.600 ^{1/}	.581 ^{2/}
Maple		
Stem Wood	.473	.721
Stem Bark	.547 ^{1/}	.744 ^{2/}

^{1/} From Koch (1970).

^{2/} From Manwiller (1975).

Equation 1 can be rearranged to predict the height at which diameter d occurs as

$$h = H - (H-4.5)(d/D)^{1/b} \quad (2)$$

where all variables are as previously defined.

The volume to a particular top diameter, d , can be obtained by integrating equation 1 between stump height (.5 feet) and the height, h , at which that top diameter occurs:

$$V = \int_{0.5}^h k D \left[\frac{(H-h)^b}{(H-4.5)^b} \right]^2 dh \quad (3)$$

$$= \frac{k D^2}{(H-4.5)^{2b}(2b+1)} ((H-0.5)^{2b+1} - (H-h)^{2b+1})$$

where:

$$V = \text{cubic foot volume and } k = \pi/(2 \cdot 12)^2.$$

By substituting h from equation 2 into equation 3 the volume to a top diameter d as a function of DBH, total height, and d is

$$V = kD^2 \left[\frac{(H-0.5)^{2b+1} - [(H-4.5)(d/D)^{1/b}]^{2b+1}}{(2b+1)(H-4.5)^{2b}} \right] \quad (4)$$

where all variables are as previously defined.

The coefficient b for outside bark volume for each species was estimated using the outside bark diameters from the standing and felled sample trees for each species. The value of b for each species is shown in Table 4. Volume outside bark to a particular top diameter was calculated by using the appropriate species coefficient b , and substituting the desired top diameter outside bark for d , DBH for D , and total height for H in equation 4.

Table 4. Value of "b" for Omerod's taper equation for outside bark taper of red oak, white oak, and maple.*

Species	b
Red Oak	.72735
White Oak	.72858
Maple	.73045

* d.o.b. = $DBH \left(\frac{H-h}{H-4.5} \right)^b$

No inside bark coefficient b was estimated since d.i.b. was a constant proportion of d.o.b. for the sampled trees of all three species. Instead, inside bark volume was calculated using the appropriate species coefficient b in equation 4, and substituting the desired top diameter inside bark for d , total height for H , and diameter inside bark at breast height (DBHIB) for D , where DBHIB is the product of DBH and the appropriate species d.i.b.-d.o.b. conversion factor from Table 2.

Main Stem Weight

Since specific gravity and moisture content could not be successfully tied to tree characteristics, other than species, green and dry weights of the main stem were obtained as the product of volume, specific gravity, and moisture content. For each species inside bark dry weight is volume inside bark to the selected top diameter multiplied by specific gravity and the weight of water per cubic foot. Inside bark green weight is dry weight multiplied by one plus the moisture content. Outside bark dry and green weights are calculated in a similar fashion from volume inside and outside bark and the bark specific gravity and moisture content.

RESULTS

The equations and coefficients previously described can be used to predict main stem volumes and weights to any given top diameter inside and outside bark of red oak, white oak, and maple in the Appalachian region in Virginia. Green and dry weights for particular top diameters inside and outside bark are included with this report.

Predicted main stem green and dry weights outside bark to 4, 6, 8, and 10 inch top diameters outside bark for red oak and white oak are shown in Appendix Tables 1 through 4 and 5 through 8, respectively, and to 4 and 6 inch top diameters outside bark for maple in Appendix Tables 9 and 10. Inside bark main stem green and dry weight predictions to 4, 6, 8, and 10 inch top diameters inside bark for red oak and white oak are shown in

Appendix Tables 11 through 14 and 15 through 18, respectively, and to 4 and 6 inch top diameters inside bark for maple in Appendix Tables 19 and 20. These predicted weights apply only to trees for which the main stem reaches the stated top diameters.

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- Koch, C. B. 1970. Variation in bark specific gravity of selected Appalachian hardwoods. *Wood Science* 3:43-47.
- Manwiller, F. G. 1975. Wood and bark moisture contents of small diameter hardwoods growing on southern pine sites. *Wood Science* 8:384-388.
- Omerod, D. W. 1973. A simple bole model. *Forestry Chronicle* 49:136-138.

APPENDIX

Table 1. Red oak main stem weight outside bark to 4 inch top diameter outside bark.

DBH (inches)	Total Height (feet)				
	40	50	60	70	80
	Dry Weight (pounds)				
6	110	132	153		
7	165	198	232		
8	225	272	319	366	
9	293	354	416	478	
10	367	444	522	600	678
11		543	639	734	830
12		651	765	880	995
13		768	903	1038	1174
14		693	1051	1209	1367
15			1209	1391	1573
16			1379	1586	1794
17			1559	1793	2028
18			1749	2013	2276
19			1951	2244	2539
20			2163	2489	2815
	Green Weight (pounds)				
6	179	215	250		
7	268	323	378		
8	367	443	520	597	
9	477	577	677	778	
10	598	724	851	978	1105
11		885	1041	1197	1353
12		1061	1248	1435	1622
13		1251	1471	1692	1914
14		1456	1713	1970	2228
15			1971	2267	2564
16			2247	2585	2924
17			2540	2922	3306
18			2851	3280	3710
19			3179	3658	4138
20			3525	4056	4588

CAUTION: The main stem of trees with larger DBH's may end before the top diameter is reached.

Table 2. Red oak main stem weight outside bark to 6 inch top diameter outside bark.

DBH (inches)	Total Height (feet)				
	40	50	60	70	80

Dry Weight (pounds)					
9	248	296	345	395	
10	328	394	461	528	595
11		499	585	671	757
12		612	718	824	931
13		733	860	988	1117
14		862	1012	1163	1315
15			1174	1350	1526
16			1347	1548	1750
17			1529	1758	1988
18			1722	1981	2240
19			1926	2215	2505
20			2140	2461	2783

Green Weight (pounds)					
9	404	483	563	643	
10	535	643	752	861	971
11		814	954	1094	1235
12		998	1170	1344	1517
13		1195	1402	1611	1820
14		1405	1650	1896	2143
15			1914	2200	2487
16			2195	2524	2853
17			2492	2866	3241
18			2807	3228	3650
19			3138	3610	4082
20			3487	4011	4536

CAUTION: The main stem of trees with larger DBH's may end before the top diameter is reached.

Table 3. Red oak main stem weight outside bark to 8 inch top diameter outside bark.

DBH (inches)	Total Height (feet)			
	50	60	70	80

	Dry Weight (pounds)			
12	527	614	701	789
13	656	767	878	990
14	793	928	1064	1200
15		1098	1260	1422
16		1277	1466	1655
17		1465	1682	1900
18		1663	1910	2158
19		1870	2149	2429
20		2088	2400	2713

	Green Weight (pounds)			
12	859	1001	1143	1286
13	1070	1250	1431	1613
14	1292	1513	1734	1956
15		1789	2053	2317
16		2081	2389	2697
17		2387	2742	3097
18		2710	3113	3518
19		3048	3503	3959
20		3403	3912	4422

CAUTION: The main stem of trees with larger DBH's may end before the top diameter is reached.

Table 4. Red oak main stem weight outside bark to 10 inch top diameter outside bark.

DBH (inches)	Total Height (feet)			
	50	60	70	80
	Dry Weight (pounds)			
12	372	425	479	533
13	518	598	679	760
14	668	776	884	993
15		959	1096	1233
16		1150	1316	1482
17		1348	1545	1742
18		1555	1783	2012
19		1770	2031	2295
20		1995	2290	2586
	Green Weight (pounds)			
12	607	639	781	869
13	844	975	1107	1239
14	1089	1264	1441	1618
15		1563	1786	2010
16		1874	2145	2416
17		2197	2517	2839
18		2534	2906	3279
19		2885	3311	3737
20		3251	3732	4215

CAUTION: The main stem of trees with larger DBH's may end before the top diameter is reached.

Table 5. White oak main stem weight outside bark to 4 inch top diameter outside bark.

DBH (inches)	Total Height (feet)				
	40	50	60	70	80

	Dry Weight (pounds)				
6	112	134	156		
7	168	202	236		
8	230	277	325	373	
9	298	360	423	486	
10	374	452	532	611	691
11		553	650	748	845
12		663	780	897	1014
13		782	919	1058	1196
14		910	1070	1231	1392
15			1232	1417	1602
16			1404	1615	1827
17			1587	1826	2066
18			1782	2050	2318
19			1987	2286	2586
20			2203	2535	2867

	Green Weight (pounds)				
6	176	210	245		
7	263	317	371		
8	360	435	510	586	
9	468	566	664	763	
10	587	710	834	959	1084
11		868	1021	1173	1327
12		1041	1223	1407	1591
13		1227	1443	1660	1877
14		1428	1679	1932	2185
15			1933	2224	2515
16			2204	2535	2867
17			2491	2866	3242
18			2796	3217	3639
19			3118	3587	4058
20			3457	3978	4499

CAUTION: The main stem of trees with larger DBH's may end before the top diameter is reached.

Table 6. White oak main stem weight outside bark to 6 inch top diameter outside bark.

DBH (inches)	Total Height (feet)				
	40	50	60	70	80
	Dry Weight (pounds)				
9	252	302	352	402	
10	334	402	470	538	606
11		509	596	684	771
12		623	731	840	948
13		746	876	1007	1137
14		878	1031	1185	1339
15			1196	1375	1554
16			1372	1577	1783
17			1557	1791	2025
18			1754	2017	2281
19			1961	2256	2551
20			2179	2506	2835
	Green Weight (pounds)				
9	396	474	552	631	
10	524	630	737	844	952
11		798	935	1073	1211
12		978	1148	1318	1488
13		1171	1375	1580	1785
14		1378	1618	1859	2101
15			1877	2158	2439
16			2152	2475	2798
17			2444	2811	3178
18			2753	3166	3579
19			3078	3540	4003
20			4420	3934	4448

CAUTION: The main stem of trees with larger DBH's may end before the top diameter is reached.

Table 7. White oak main stem weight outside bark to 8 inch top diameter outside bark.

DBH (inches)	Total Height (feet)			
	50	60	70	80

	Dry Weight (pounds)			
12	536	625	714	804
13	668	781	894	1008
14	807	945	1083	1222
15		1118	1283	1448
16		1300	1492	1685
17		1492	1713	1935
18		1693	1945	2198
19		1905	2189	2474
20		2126	2444	2763

	Green Weight (pounds)			
12	842	981	1121	1261
13	1049	1226	1403	1581
14	1267	1483	1700	1918
15		1755	2013	2272
16		2040	2342	2645
17		2341	2689	3037
18		2657	3053	3450
19		2989	3435	3882
20		3337	3836	4336

CAUTION: The main stem of trees with larger DBH's may end before the top diameter is reached.

Table 8. White oak main stem weight outside bark to 10 inch top diameter outside bark.

DBH (inches)	Total Height (feet)			
	50	60	70	80

	Dry Weight (pounds)			
12	379	433	488	543
13	528	609	691	774
14	680	790	900	1011
15		977	1116	1256
16		1171	1340	1510
17		1373	1573	1774
18		1583	1816	2048
19		1803	2068	2335
20		2031	2332	2633

	Green Weight (pounds)			
12	595	680	766	852
13	828	956	1085	1215
14	1067	1240	1413	1587
15		1533	1751	1971
16		1837	2103	2369
17		2154	2468	2783
18		2485	2849	3215
19		2829	3246	3664
20		3188	3660	4133

CAUTION: The main stem of trees with larger DBH's may end before the top diameter is reached.

Table 9. Maple main stem weight outside bark to a 4 inch top diameter outside bark.

DBH (inches)	Total Height (feet)			
	40	50	60	70
	Dry Weight (pounds)			
6	89	106	124	
7	133	160	187	
8		220	258	296
9		286	336	386
10		359	422	485
11		439	516	593
12			618	711
13			729	839
14			849	976
15			977	1124
16			1114	1281
	Green Weight (pounds)			
6	153	183	214	
7	229	276	323	
8		379	444	510
9		493	579	665
10		619	727	836
11		757	889	1022
12			1066	1226
13			1257	1446
14			1463	1683
15			1684	1938
16			1920	2209

CAUTION: The main stem of trees with larger DBH's may end before the top diameter is reached.

Table 10. Maple main stem weight outside bark to 6 inch top diameter outside bark.

DBH (inches)	Total Height (feet)		
	50	60	70

	Dry Weight (pounds)		
9	239	279	319
10	319	372	427
11	403	473	542
12		580	666
13		695	798
14		818	940
15		949	1091
16		1088	1251

	Green Weight (pounds)		
9	413	481	549
10	549	642	735
11	696	815	935
12		1000	1148
13		1198	1376
14		1410	1620
15		1636	1880
16		1876	2156

CAUTION: The main stem of trees with larger DBH's may end before the top diameter is reached.

Table 11. Red oak main stem weight inside bark to 4 inch top diameter inside bark.

DBH (inches)	Total Height (feet)				
	40	50	60	70	80

Dry Weight (pounds)					
6	81	96	111		
7	127	152	178		
8	178	214	251	287	
9	233	282	331	380	
10	295	356	418	481	543
11		438	514	591	668
12		526	618	711	804
13		622	731	840	950
14		724	852	980	1108
15			981	1129	1277
16			1120	1288	1457
17			1267	1457	1648
18			1422	1636	1851
19			1587	1825	2065
20			1760	2025	2290

Green Weight (pounds)					
6	133	158	183		
7	209	251	293		
8	293	353	413	474	
9	385	464	545	626	
10	486	587	689	792	895
11		721	847	974	1101
12		867	1019	1171	1324
13		1024	1204	1385	1566
14		1194	1403	1614	1825
15			1617	1860	2104
16			1845	2122	2400
17			2087	2401	2715
18			2343	2696	3049
19			2614	3008	3402
20			2900	3336	3773

CAUTION: The main stem of trees with larger DBH's may end before the top diameter is reached.

Table 12. Red oak main stem weight inside bark to 6 inch top diameter inside bark.

DBH (inches)	Total Height (feet)				
	40	50	60	70	80

	Dry Weight (pounds)				
9	182	216	250	284	
10	250	299	349	398	448
11		387	453	519	585
12		481	564	647	730
13		582	682	783	884
14		688	808	928	1048
15			941	1082	1222
16			1083	1245	1407
17			1233	1417	1602
18			1391	1599	1808
19			1558	1791	2025
20			1733	1993	2253

	Green Weight (pounds)				
9	300	355	412	496	
10	412	493	574	656	739
11		638	746	855	964
12		793	929	1066	1202
13		958	1124	1290	1457
14		1134	1331	1529	1727
15			1551	1782	2014
16			1785	2051	2318
17			2032	2335	2640
18			2292	2635	2980
19			2567	2952	3337
20			2855	3284	3713

CAUTION: The main stem of trees with larger DBH's may end before the top diameter is reached.

Table 13. Red oak main stem weight inside bark to 8 inch top diameter inside bark.

DBH (inches)	Total Height (feet)			
	50	60	70	80

	Dry Weight (pounds)			
12	383	444	506	567
13	494	575	657	738
14	609	711	814	916
15		853	978	1103
16		1003	1150	1297
17		1159	1330	1501
18		1323	1519	1715
19		1494	1716	1939
20		1674	1923	2173

	Green Weight (pounds)			
12	632	732	833	935
13	814	947	1082	1217
14	1004	1172	1341	1510
15		1406	1611	1817
16		1652	1895	2138
17		1910	2191	2474
18		2179	2502	2826
19		2462	2828	3195
20		2758	3169	3580

CAUTION: The main stem of trees with larger DBH's may end before the top diameter is reached.

Table 14. Red oak main stem weight inside bark to 10 inch top diameter inside bark.

DBH (inches)	Total Height (feet)			
	50	60	70	80
	Dry Weight (pounds)			
12	206	228	251	273
13	335	381	428	475
14	466	536	607	679
15		694	790	886
16		857	978	1099
17		1025	1172	1319
18		1199	1373	1547
19		1379	1581	1783
20		1566	1797	2027
	Green Weight (pounds)			
12	340	376	413	450
13	552	628	705	783
14	767	884	1001	1118
15		1144	1302	1460
16		1412	1612	1812
17		1689	1931	2174
18		1975	2262	2549
19		2273	2604	2937
20		2581	2960	3340

CAUTION: The main stem of trees with larger DBH's may end before the top diameter is reached.

Table 15. White oak main stem weight inside bark to 4 inch top diameter inside bark.

DBH (inches)	Total Height (feet)				
	40	50	60	70	80

	Dry Weight (pounds)				
6	88	104	121		
7	136	163	191		
8	190	229	268	307	
9	249	300	352	405	
10	313	379	445	511	578
11		465	547	628	710
12		559	657	755	854
13		660	776	892	1009
14		769	904	1040	1176
15			1041	1198	1355
16			1188	1367	1546
17			1344	1546	1748
18			1509	1736	1963
19			1683	1936	2190
20			1867	2147	2429

	Green Weight (pounds)				
6	137	163	189		
7	213	256	299		
8	297	358	420	481	
9	390	471	552	634	
10	491	594	698	802	906
11		729	857	985	1113
12		876	1029	1183	1338
13		1034	1216	1398	1581
14		1205	1417	1630	1843
15			1632	1878	2123
16			1862	2142	2422
17			2106	2423	2740
18			2365	2720	3077
19			2638	3035	3432
20			2925	3366	3807

CAUTION: The main stem of trees with larger DBH's may end before the top diameter is reached.

Table 16. White oak main stem weight inside bark to 6 inch top diameter inside bark.

DBH (inches)	Total Height (feet)				
	40	50	60	70	80

	Dry Weight (pounds)				
9	197	234	272	310	
10	269	322	376	429	483
11		415	485	556	627
12		514	603	691	780
13		620	727	835	943
14		733	860	988	1116
15			1002	1151	1300
16			1151	1323	1496
17			1310	1506	1703
18			1478	1699	1921
19			1654	1902	2151
20			1840	2116	2392

	Green Weight (pounds)				
9	309	367	426	485	
10	421	505	589	673	757
11		650	761	872	983
12		806	944	1083	1222
13		972	1140	1309	1478
14		1149	1348	1549	1749
15			1570	1804	2038
16			1805	2074	2344
17			2033	2361	2668
18			2316	2663	3011
19			2592	2981	3371
20			2883	3316	3750

CAUTION: The main stem of trees with larger DBH's may end before the top diameter is reached.

Table 17. White oak main stem weight inside bark to 8 inch top diameter inside bark.

DBH (inches)	Total Height (feet)			
	50	60	70	80

	Dry Weight (pounds)			
12	417	483	550	618
13	533	621	709	798
14	654	764	874	985
15		914	1047	1181
16		1071	1229	1387
17		1236	1419	1602
18		1409	1618	1828
19		1591	1827	2064
20		1781	2046	2312

	Green Weight (pounds)			
12	653	757	863	968
13	835	973	1111	1250
14	1025	1197	1370	1544
15		1432	1641	1851
16		1679	1926	2173
17		1938	2224	2511
18		2209	2536	2865
19		2493	2864	3236
20		2791	3207	3623

CAUTION: The main stem of trees with larger DBH's may end before the top diameter is reached.

Table 18. White oak main stem weight inside bark to 10 inch top diameter inside bark.

DBH (inches)	Total Height (feet)			
	50	60	70	80

	Dry Weight (pounds)			
12	240	268	296	325
13	374	427	481	535
14	511	589	668	748
15		755	860	965
16		926	1057	1189
17		1103	1261	1420
18		1286	1473	1660
19		1476	1692	1908
20		1674	1920	2167

	Green Weight (pounds)			
12	376	420	464	509
13	587	670	754	838
14	801	924	1048	1172
15		1184	1348	1513
16		1451	1657	1864
17		1728	1977	2226
18		2015	2308	2602
19		2313	2652	2991
20		2623	3009	3396

CAUTION: The main stem of trees with larger DBH's may end before the top diameter is reached.

Table 19. Maple main stem weight inside bark to 4 inch top diameter inside bark.

DBH (inches)	Total Height (feet)			
	40	50	60	70

	Dry Weight (pounds)			
6	74	88	102	
7	113	136	159	
8		189	221	254
9		247	290	333
10		311	365	420
11		381	448	515
12			538	619
13			635	731
14			740	851
15			852	980
16			972	1118

	Green Weight (pounds)			
6	127	151	175	
7	194	234	273	
8		325	380	436
9		425	499	573
10		536	629	723
11		656	771	887
12			926	1065
13			1094	1258
14			1274	1465
15			1467	1687
16			1673	1925

CAUTION: The main stem of trees with larger DBH's may end before the top diameter is reached.

Table 20. Maple main stem weight inside bark to 6 inch top diameter inside bark.

DBH (inches)	Total Height (feet)		
	50	60	70

	Dry Weight (pounds)		
9	197	229	261
10	268	313	358
11	344	402	461
12		497	571
13		599	688
14		707	812
15		822	945
16		945	1086

	Green Weight (pounds)		
9	340	395	450
10	462	539	616
11	591	692	793
12		856	982
13		1031	1183
14		1217	1398
15		1415	1626
16		1626	1869

CAUTION: The main stem of trees with larger DBH's may end before the top diameter is reached.