GEORGIA FORESTRY COMMISSION

2017 Carbon Sequestration of Georgia Timberland

Over 1.5 billion metric tons of carbon is sequestered on Georgia timberland according to 2017 Forest Inventory & Analysis (FIA) data, provided by the U.S. Forest Service. This includes 23.6 million acres on federal, state/local, and private property. It accounts for carbon in aboveground and belowground live and dead biomass, aboveground and belowground understory vegetation, coarse woody debris, soil, and leaf litter. This estimate excludes timberland primarily consisting of exotic species and non-stocked stands (previously forested land that has yet to be replanted or produce substantial natural vegetation).

Table 1 shows how much carbon is sequestered by carbon pool and major species group. Total carbon sequestration is over 734 and 810 million metric tons from softwood and hardwood stands, respectively. Roughly 50% of carbon is found in the soil and 30% in aboveground live biomass.

Table 1: Metric tons of carbon sequestered on GA timberland by pool.

	Softwood		Hardwood	
Carbon Pool	**Metric Tons**	**% of Total**	**Metric Tons**	**% of Total**
Soil	376,909,005	51.3%	391,663,924	48.3%
Aboveground Live	213,261,645	29.1%	274,405,709	33.9%
Belowground Live	48,111,785	6.6%	54,862,645	6.8%
Leaf Litter	43,917,898	6.0%	34,112,302	4.2%
Coarse Woody Debris	29,058,109	4.0%	26,573,827	3.3%
Aboveground Seedlings/Shrubs	14,310,103	1.9%	12,350,799	1.5%
Aboveground/Belowground Dead	6,955,264	0.9%	14,933,156	1.8%
Belowground Seedlings/Shrubs	1,590,012	0.2%	1,372,312	0.2%
Total	**734,113,820**		**810,274,674**	

Table 2 and Figure 1 show the total carbon sequestration by 20-year age classes and species groups. Approximately 78% of softwood carbon sequestration is found in stands under the age of 40, and 90% under 60. Hardwood stands increased sequestration for each age class from 0-80 years. These trends show that the majority of softwood timber is managed within a 40-year rotation while many hardwood stands have a rotation close to 80 years.

Table 2: Total metric tons of carbon sequestered by age class.

	Softwood	Hardwood	Total
0-20 years	250,329,435	140,640,424	390,969,860
21-40 years	321,720,203	158,127,502	479,847,705
41-60 years	89,932,675	175,076,782	265,009,458
61-80 years	59,185,888	229,766,387	288,952,275
81-100 years	12,945,618	106,663,579	119,609,197
Total	**734,113,820**	**810,274,674**	**1,544,388,494**

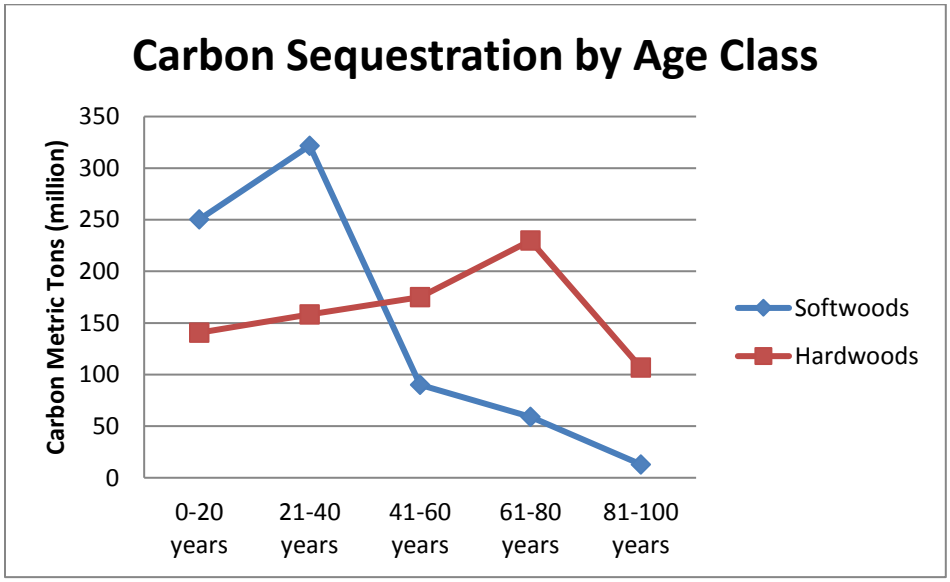

Figure 1: Total metric tons sequestered of carbon by age class.

Figure 2 and 3 provide further details of total carbon sequestration by age class, broken down by carbon pool. Prior to aboveground biomass development, the vast majority of carbon is sequestered in soils from 0-20 years. Combined, carbon in the soil and aboveground live biomass remain close to 80% of the total for each age class and species group; however, a greater proportion shifts to biomass as the timber grows.

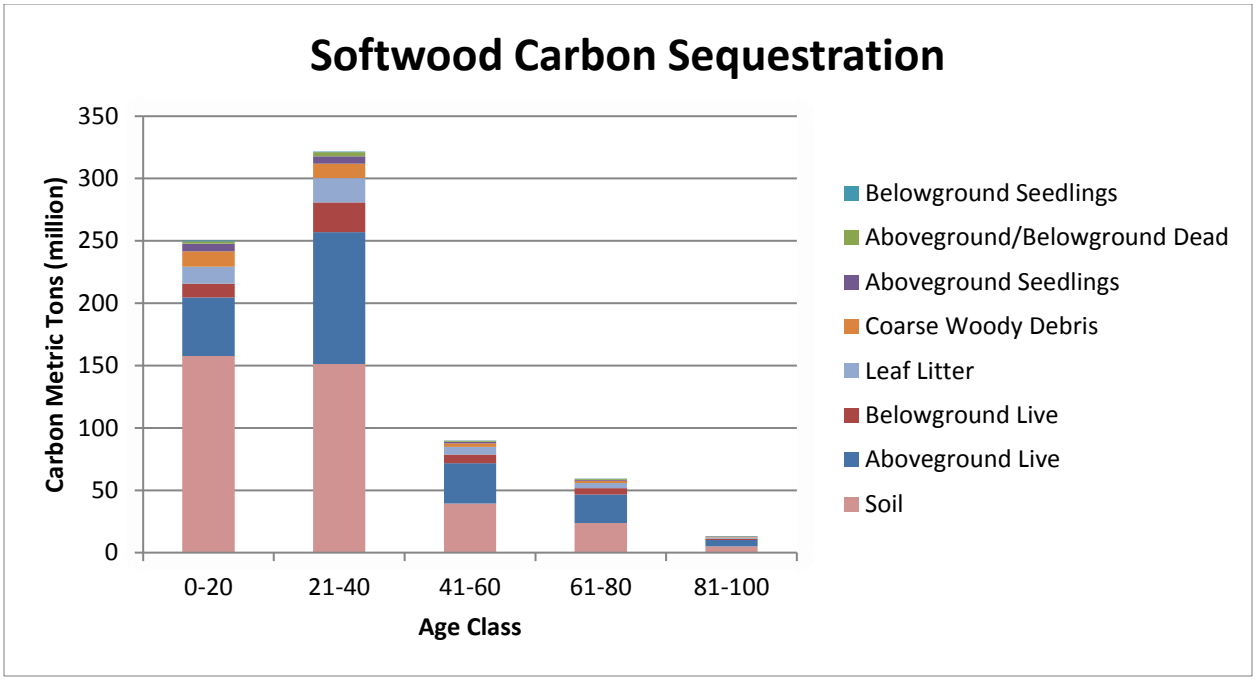

Figure 2: Softwood metric tons sequestered of carbon by carbon pool and age class.

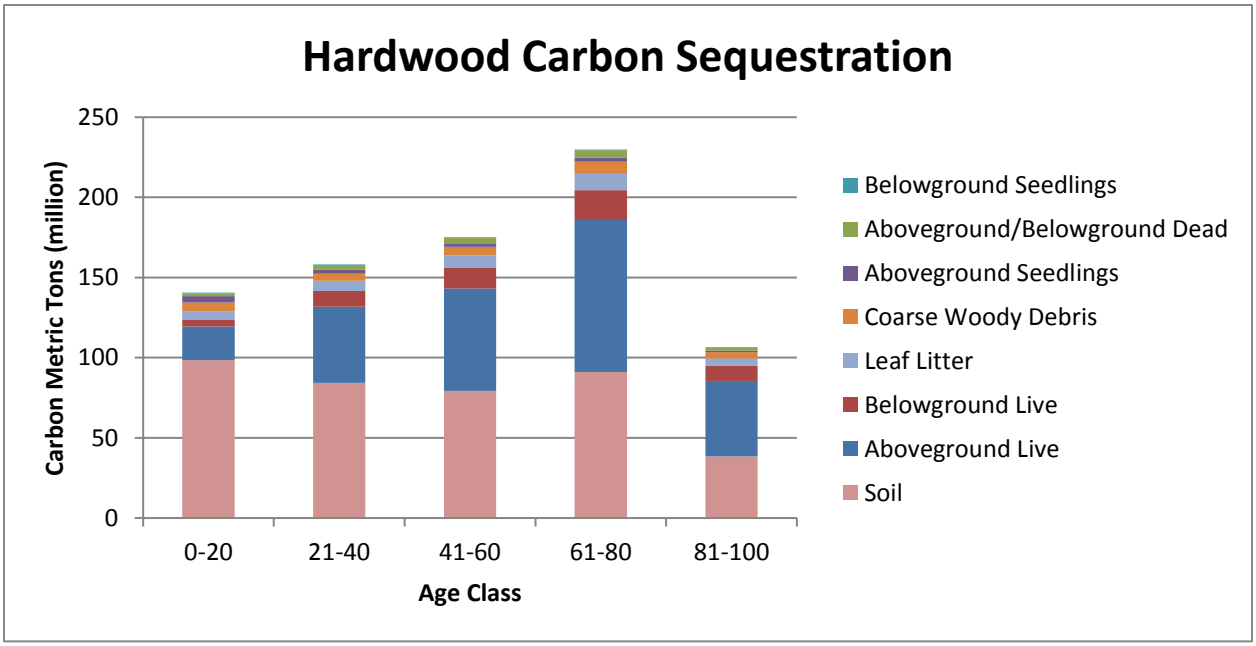

Figure 3: Hardwood metric tons sequestered of carbon by carbon pool and age class.

Figure 4 shows timberland acreage by age class. The 0-20 and 21-40 year age classes have 7.8 and 7.1 million acres, respectively, accounting for 63.8% of the total acreage. Softwood stands account for 4.5 and 4.6 million acres from 0-20 and 21-40 years, respectively, which is 82.3% of total softwood acreage.

Hardwood stand acreage is more evenly distributed between 0-80 years. The 0-20 year age class is the highest percentage at 26.6%, and age classes from 21-80 years old each range from 19.8% - 23.2% of the hardwood acreage.

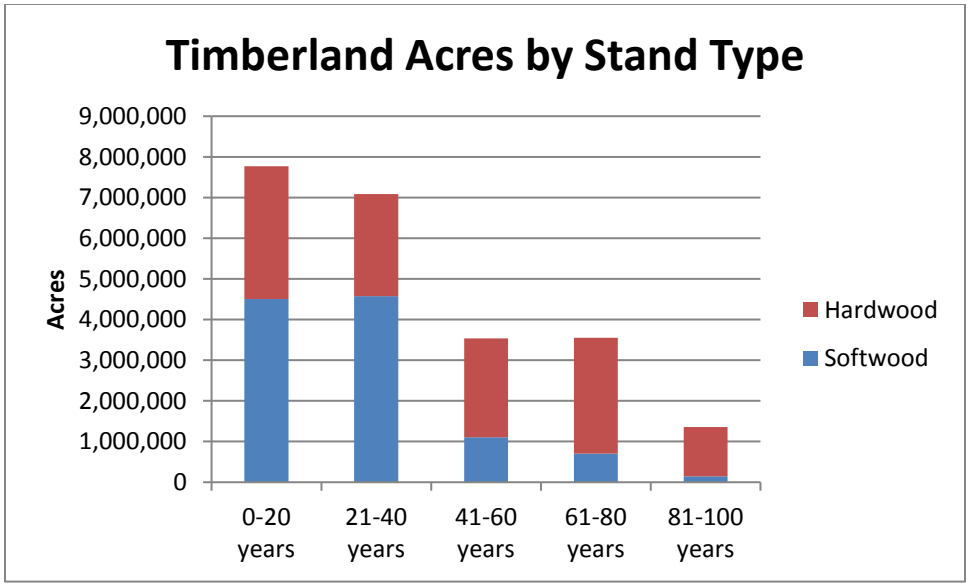

Figure 4. Timberland acres by age class and stand type.

Table 3 and Figure 5 show average carbon sequestration per acre by age class. This reveals the trend in sequestration rates as stands age. On a per acre basis, carbon sequestration continues rising for both softwood and hardwood through the 81-100 year age class, and sequestration remains higher for softwoods in each respective age class. However, carbon sequestration change slows down for softwoods more than hardwoods from age 41 to 100.

Table 3: Average metric tons of carbon sequestered per acre.

Avg. C/Acre	Softwood	Hardwood	Average
0-20 years	55.5	43.1	50.3
21-40 years	70.3	62.9	67.7
41-60 years	81.1	72.2	75.0
61-80 years	84.4	80.6	81.4
81-100 years	90.8	88.0	88.3
Average	**66.5**	**66.1**	**66.3**

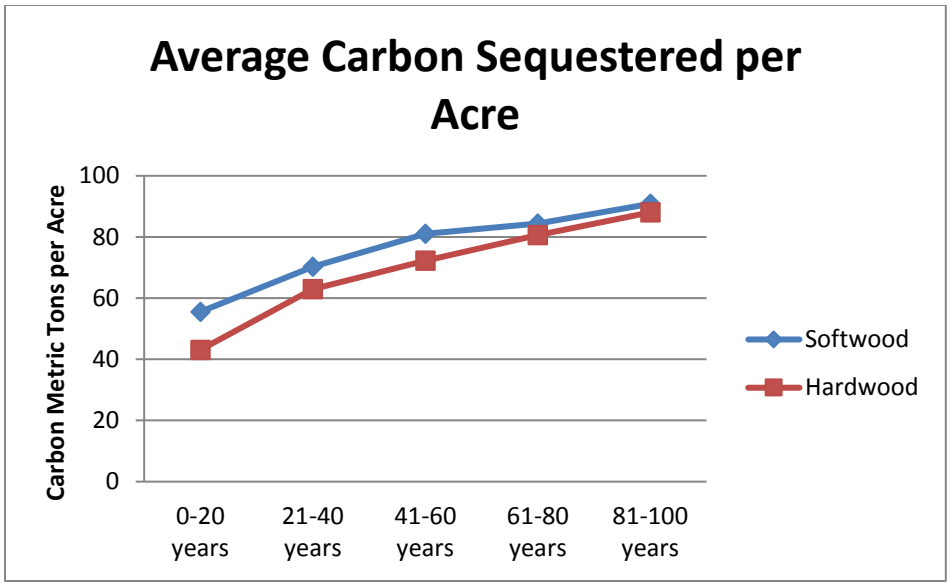

Figure 5: Average carbon sequestered per acre by age class and stand type.

This data reveals timber management's impact on carbon sequestration. Softwoods are managed on short rotations, and although younger age classes sequester less carbon on a per acre basis, the fact that timber rotations can be completed within 30 years and replanted provides great potential for increased carbon sequestration long-term. The same applies to hardwoods closer to an 80-year rotation. Good timber management practices produce a significant amount of sawtimber with each rotation, and sawn lumber continues to sequester carbon offsite while new trees are planted. Furthermore, genetic improvements have increased the growth potential and tree quality leading to increased sawtimber volume and shortened timber rotations.

In conclusion, Georgia's forest resources provide benefits that extend well beyond timberland owners. Sustainable management is the key to maximizing carbon sequestration, and sustainability is achieved through strong timber markets. Markets provide the opportunity for landowners to generate competitive returns on timberland compared to alternative investments, and they encourage landowners to replant, as timber production remains the best land use for much of Georgia.

Sources:

U.S. Forest Service EVALIDator Version 1.8.0.0 - https://apps.fs.usda.gov/Evalidator/evalidator.jsp

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