GEORGIA FORESTRY COMMISSION

2015 Carbon Sequestration of Georgia Timberland

Over 1.5 billion metric tons of CO_2 is sequestered on Georgia timberland according to 2015 Forest Inventory & Analysis (FIA) data, provided by the U.S. Forest Service. This includes 23.7 million acres on federal, state/local, and private property. It accounts for carbon in above and belowground live and dead biomass, above and belowground understory vegetation, coarse woody debris, soil, and leaf litter. This estimate excludes timberland primarily composed 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.

Table 1: Metric tons of CO_2 sequestered on GA timberland by carbon pool.

	Softwood		Hardwood	
Carbon Pool	CO_2 Tonnes	% of Total	CO_2 Tonnes	% of Total
Soil	377,422,504	52.0%	406,093,470	48.8%
Above Ground Live	206,541,176	28.5%	278,821,467	33.5%
Below Ground Live	46,637,479	6.4%	55,760,519	6.7%
Leaf Litter	43,489,100	6.0%	34,981,591	4.2%
Coarse Woody Debris	28,833,864	4.0%	27,446,436	3.3%
Above Ground Seedlings/Shrubs	14,278,267	2.0%	12,761,206	1.5%
Above & Below Ground Dead	6,875,620	0.9%	15,262,660	1.8%
Below Ground Seedlings/Shrubs	1,586,474	0.2%	1,417,910	0.2%
Total	**725,664,483**		**832,545,260**	

Total carbon sequestration is over 726 and 832 million metric tons from softwood and hardwood stands, respectively. Roughly 50% of carbon is found in the soil and 30% in above ground live biomass.

Table 2 and Figure 1 below 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 over 90% under 60. Hardwood stands show continued increases 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 CO_2 sequestered by age class.

Age Class	Softwoods	Hardwoods	Total
0-20 years	263,590,066	152,668,967	416,259,032
21-40 years	301,837,461	153,482,009	455,319,470
41-60 years	91,982,976	188,983,749	280,966,725
61-80 years	58,020,356	226,997,911	285,018,267
81-100 years	8,464,000	85,952,708	94,416,709
100+ years	1,769,623	24,459,917	26,229,540
Total	725,664,483	832,545,260	1,558,209,743

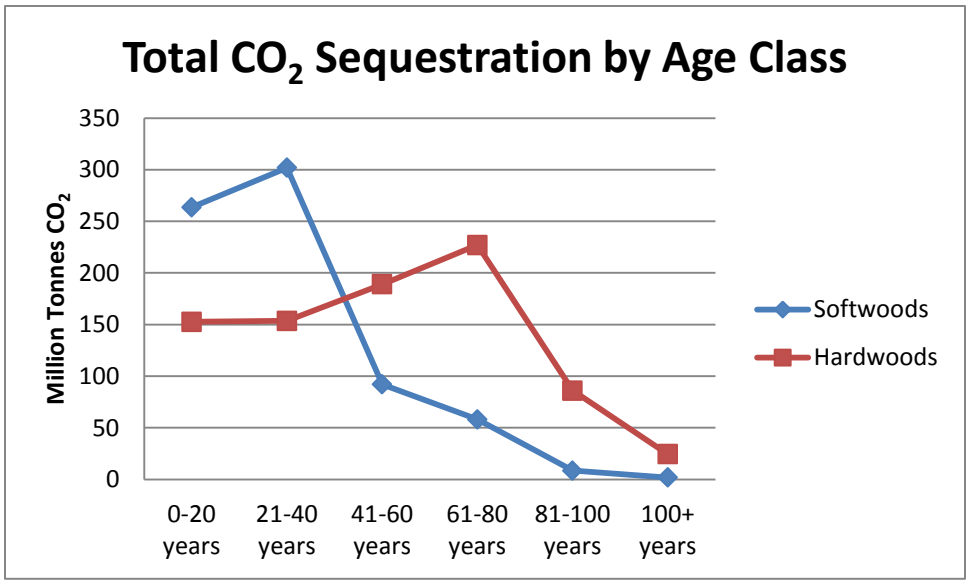

Figure 1: Total metric tons sequestered of CO_2 by age class.

Figure 2 and 3 provide further details of total carbon sequestration by age class, broken down by carbon pool. Prior to above ground biomass development, the vast majority of carbon is sequestered in soils from 0-20 years. Combined, carbon in the soil and above ground live biomass remain close to 80% of the total for each age class and species group; however, the flux between the two continues to shifts to a greater proportion in biomass over the majority of 100 years.

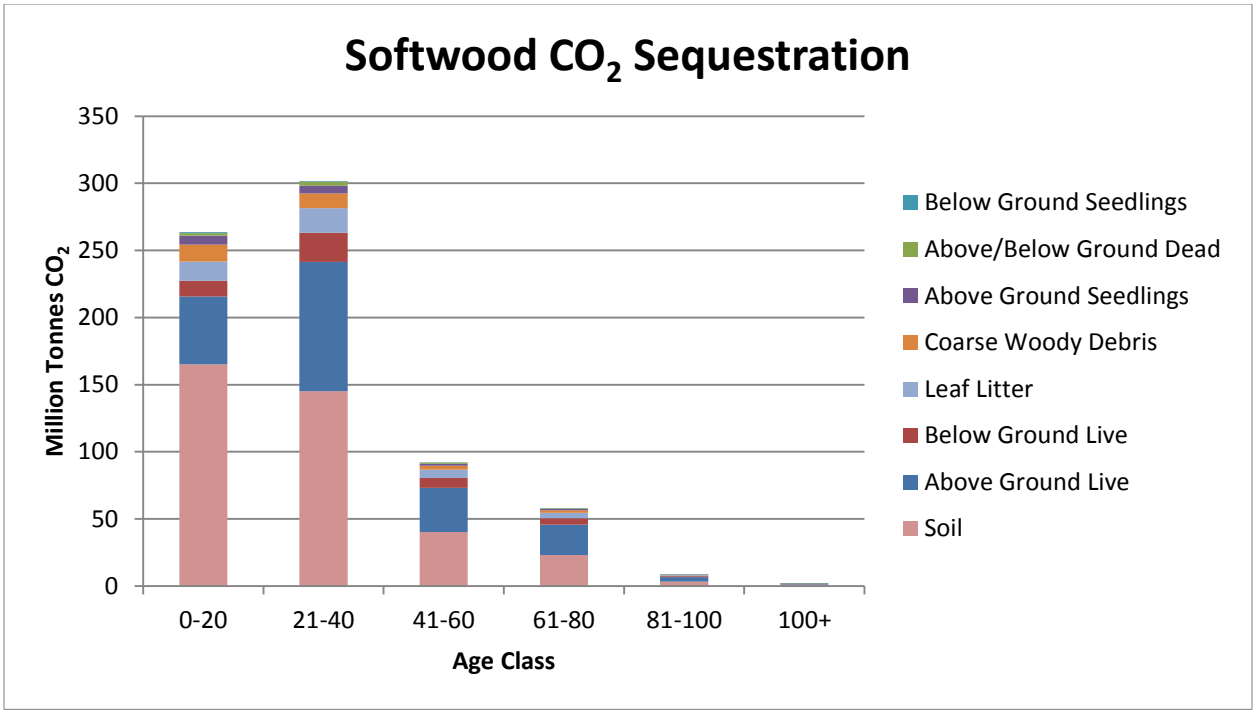

Figure 2: Softwood metric tons sequestered of CO_2 by carbon pool and age class.

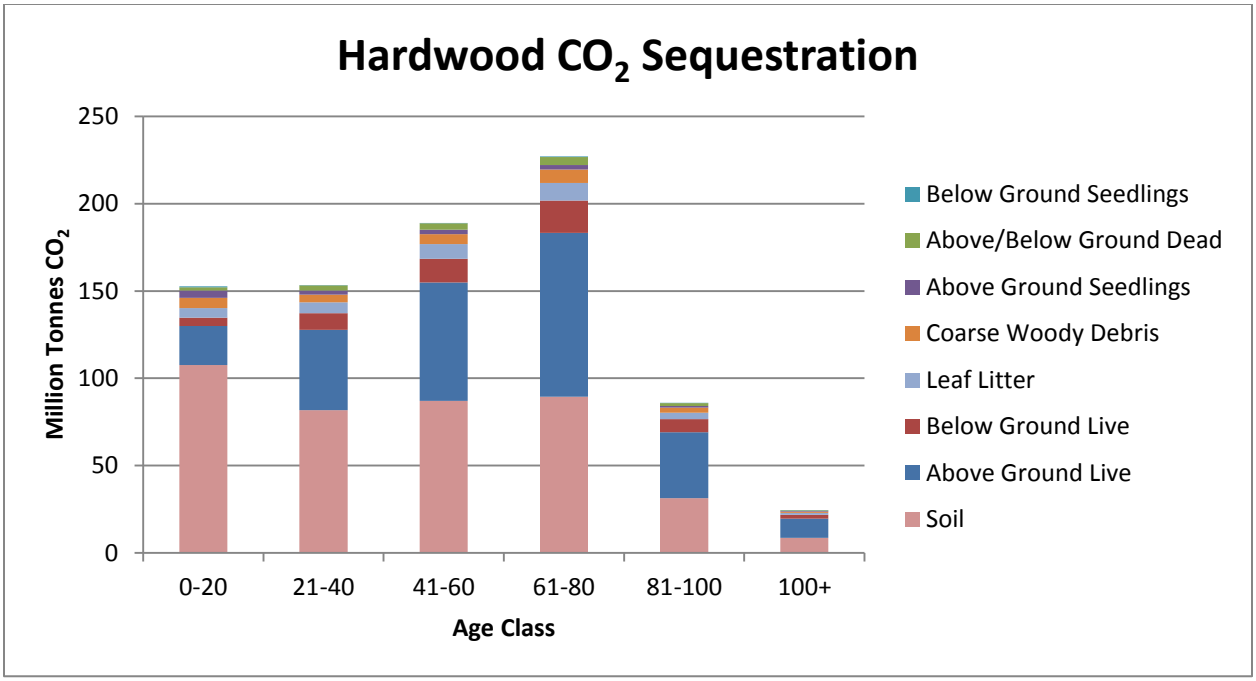

Figure 3: Hardwood metric tons sequestered of CO_2 by carbon pool and age class.

Figure 4 shows timberland acreage by age class. The 0-20 and 21-40 year age classes have 8.2 and 6.8 million acres, respectively, accounting for 63.6% of the total acreage. Softwood stands account for 4.7 and 4.3 million acres from 0-20 and 21-40 years, respectively, which is 82.4% 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 27.7%, and age classes from 21-80 years old each range from 19.5% - 22.4% of the hardwood acreage.

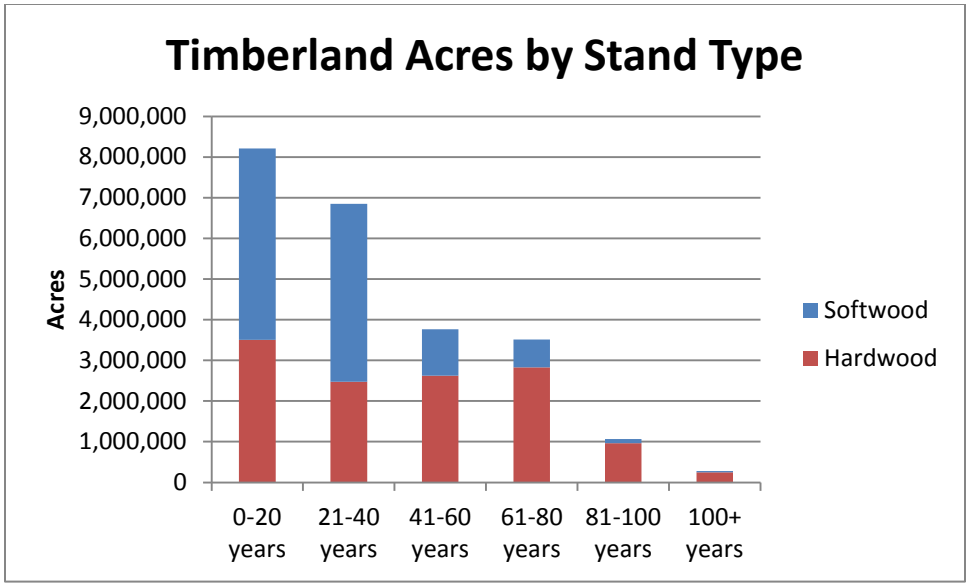

Figure 4. Timberland acres by age class and stand type.

On a per acre basis, softwood stands sequester more carbon from age 0-80 than hardwood stands in each respective age class (Table 3 & Figure 5). However, softwoods show little change from age 41 – 100, ranging from 81.0 – 86.8 metric tons per acre, and decrease significantly over 100 years old. Hardwoods continue increasing the sequestration rates through 100 years, going from 43.5 to 97.6 metric tons per acre.

Table 3: Metric tons of CO_2 sequestered per acre.

Age Class	Softwood	Hardwood	Average
0-20 years	56.1	43.5	50.7
21-40 years	69.0	62.1	66.5
41-60 years	81.0	71.9	74.7
61-80 years	85.3	80.2	81.2
81-100 years	86.8	88.9	88.7
100+ years	64.4	97.6	94.3
Average	**65.9**	**65.8**	**65.8**

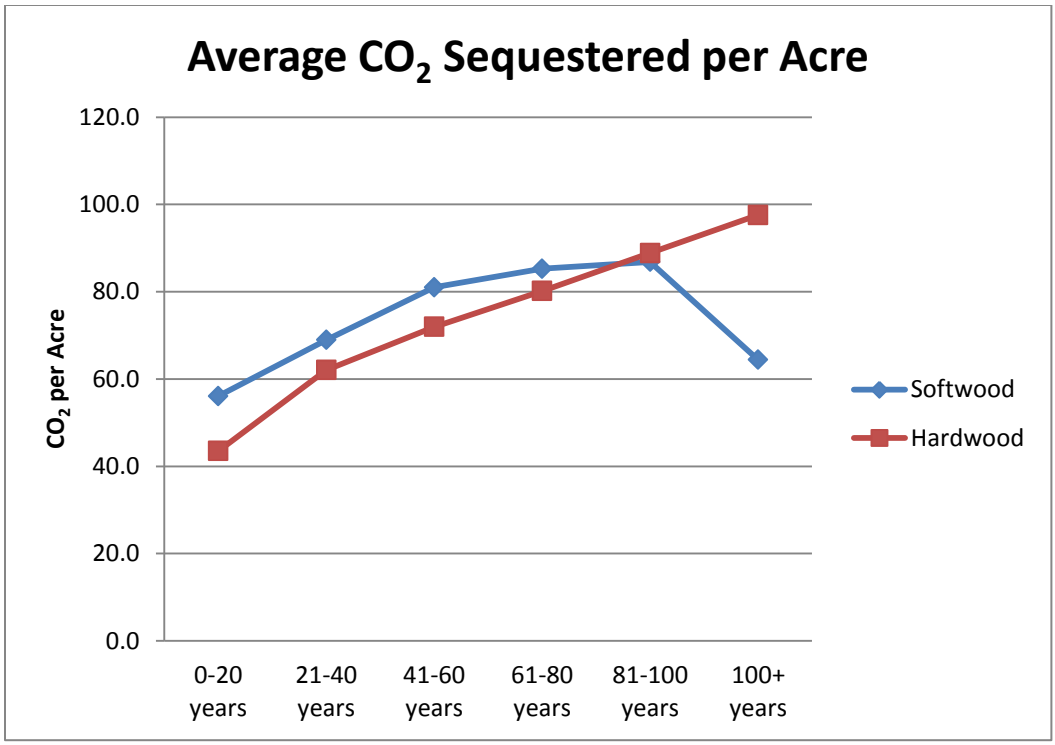

Figure 5: Average CO_2 sequestered per acre by age class and stand type.

This data provides a good indication of timber management's impact on carbon sequestration. Softwoods are managed on short rotations, and even with the youngest age classes sequestering the least amount of 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. 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 quantity and quality of sawtimber 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 timberland remains the best land use for much of the state.

Sources:

U.S. Forest Service EVALIDator Version 1.6.0.03a - http://apps.fs.fed.us/Evalidator/evalidator.jsp

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