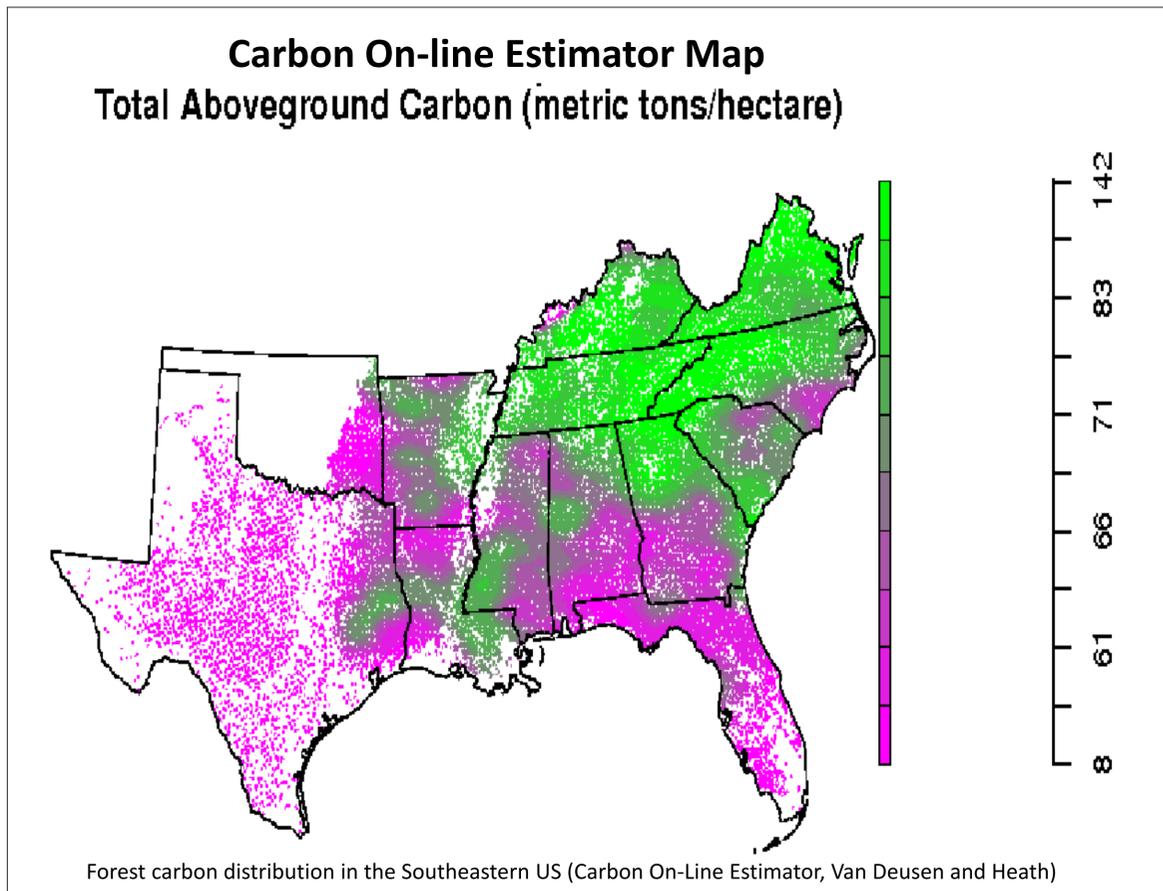


Carbon Stocks

Carbon sequestration is the process by which atmospheric CO₂ is taken up by trees, grasses, and other plants through photosynthesis and stored as carbon in biomass (trunks, branches, foliage, and roots) and soils. Forests help to mitigate the climate effects of increasing atmospheric CO₂ concentrations by removing carbon from the atmosphere through the process of vegetative growth and storing carbon as biomass. Worldwide, forests offset up to 60% of global CO₂ emissions from fossil fuel combustion (Pan et al. 2011). However, loss of forest land cover is responsible for about 20 percent of global human caused carbon emissions (IPCC 2007). In the U.S., forests and carbon stored in wood products are a net carbon sink and offset about 13% of total U.S GHG emissions (EPA 2011). Forest management activities will play a critical role in ensuring that forests remain a net carbon sink.



Climate Change Mitigation

“The Intergovernmental Panel on Climate Change (IPCC) defines mitigation as an intervention to reduce the emissions or enhance the storage of greenhouse gases (<http://www.ipcc.ch/>).

Forests and other ecosystems as carbon sinks provide for mitigation by their very existence as they absorb CO₂, removing it from the atmosphere. Forest management activities will play a critical role in ensuring that forests remain net carbon sinks (National Roadmap for Responding to Climate Change).

Current Carbon Stocks of the Nantahala and Pisgah National Forests

Existing carbon stocks and changes over time are estimated using Forest Inventory and Analysis (FIA) data, which provides estimates for five pools of carbon within the forest ecosystem. The 2011 estimates for the Nantahala and Pisgah National Forests total 72.0 teragrams (Tg or million metric tonnes) +/- 5.0 Tg of carbon. This represents about 0.16% of the total of approximately 42,654 Tg of carbon in forests of the coterminous United States (EPA 2008). The average density of forest carbon is about 68.9 metric tonnes per acre (Mt/ac).

2011 Nantahala and Pisgah National Forest Carbon Stocks (Metric tonnes or Mt)

Total Carbon	By Carbon Pool				
	Above Ground Live Carbon	Below Ground Live Carbon	Dead Wood Carbon	Litter Carbon	Soil Carbon
72,010,405	35,637,818	6,904,064	4,778,916	3,496,699	21,192,908

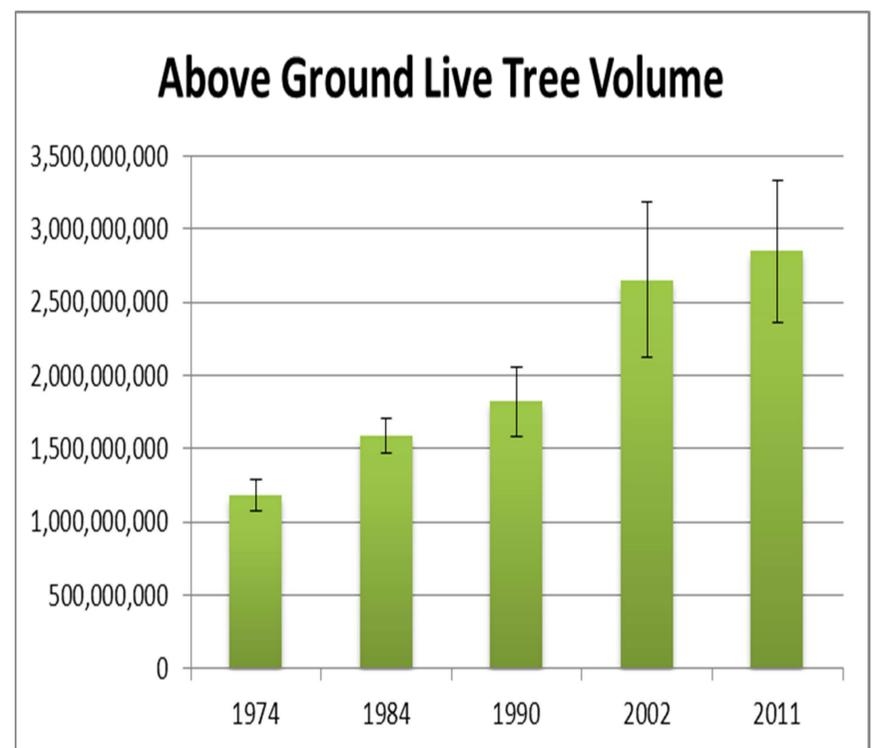
Proportions of Nantahala and Pisgah 2011 Carbon Stocks by Forest Type and Dominant Tree Size Class

Forest type field call	Dominant Tree Size Class			
	Total	Large diameter(sfw wd 9 to 19.9;hdwd 11 to 19.9 inches)	Medium diameter(sfw d 5 to 8.9;hdwd 5 to 10.9 inches)	Small diameter(0.1 to 4.9 inches)
Total	72,010,405	55,866,699	14,919,782	1,223,924
Eastern white pine	1,153,498	768,998	384,500	-
Eastern white pine / eastern hemlock	544,009	544,009	-	-
Red spruce / balsam fir	685,075	685,075	-	-
Table Mountain pine	128,233	128,233	-	-
Eastern white pine / northern red oak / white ash	752,972	752,972	-	-
Shortleaf pine / oak	439,480	439,480	-	-
Virginia pine / southern red oak	326,774	99,732	227,042	-
Other pine / hardwood	2,966,790	1,458,405	1,508,385	-
Post oak / blackjack oak	312,667	312,667	-	-
Chestnut oak	12,507,572	10,742,086	1,398,159	367,327
White oak / red oak / hickory	8,906,424	6,362,810	2,352,346	191,268
Northern red oak	3,488,013	2,473,643	517,926	496,445
Yellow-poplar / white oak / northern red oak	13,889,880	12,749,678	1,140,202	-
Scarlet oak	1,795,803	679,210	1,116,593	-
Yellow-poplar	5,044,214	4,401,474	642,740	-
Chestnut oak / black oak / scarlet oak	3,231,630	2,635,043	596,587	-
Cherry / white ash / yellow-poplar	427,689	-	427,689	-
Red maple / oak	101,336	-	101,336	-
Mixed upland hardwoods	7,302,535	5,258,311	2,044,224	-
Sugar maple / beech / yellow birch	5,310,633	3,157,876	2,152,757	-
Black cherry	168,884	-	-	168,884
Hard maple / basswood	2,526,295	2,216,998	309,298	-

Harvested Wood Products

Trees harvested from the Nantahala and Pisgah National Forests are converted to a variety of primary wood products. Sawtimber may be converted partially into lumber that remains in structures for many years. Bark, chips and sawdust may be used for other products or uses, such as paper or to generate electricity, which given off as emissions over different periods. Landfilled residues and waste are often sequestered for extended periods of time. Forest Service Research has developed methods to estimate the uses of harvested wood and the rates at which the carbon in various products are sequestered or emitted to the atmosphere. (Smith, et al 2006).

Annual harvests from the Nantahala and Pisgah National Forests average 65,940 ccf (Forest Service Cut and Sold Reports). On average 0.06% of the standing total stocks of carbon are harvested each year. Of this annual harvest it is estimated that more than 30% will remain in a sequestered state (wood products in use or in landfills) after 50 years.



Based on trends in tree volume estimates from FIA, the Nantahala and Pisgah National Forest have been a steady carbon sink for a number of decades. The most recent inventories indicate that the Nantahala and Pisgah National Forests are a carbon sink, with most recent 9-year accumulations at the rate of about 7.3%. Although this increase is well within the sampling error for the inventory, the trends reflect that a continued increase over time without interruption. These estimates include the growth, mortality and harvests. Even considering the current harvest and burning levels the forest maintains large carbon stocks that continue to grow, although the growth rates may be slowing and close to reaching their upper limits.

Coming Soon: Information on Carbon Emissions in Smoke