AMERICAN FORESTS
- SINCE 1875 -

Carbon Sequestration Potential of Reforestation under Senator Booker's Climate Stewardship Act
Calculation Methodology and Notes

The Climate Stewardship Act provides sustained resources to support the planting of 16 billion trees by 2050. By the end of the century, these trees will have sequestered more than 13 billion metric tons of carbon dioxide equivalent – more than two years of total current US greenhouse gas emissions.

American Forests used a national per-acre average for carbon sequestration to estimate the total potential carbon benefit of planting 16 billion trees. To develop this national average, we relied on two data sources: GTR NE-343[i] and forest inventory data from the US Forest Service[ii]. GTR NE-343 is a general technical report produced by the US Forest Service in 2006, providing standard estimates for forest ecosystem carbon in the US, customized by region and forest type. A comprehensive set of forest carbon pools is included in the GTR NE-343 estimates: aboveground and belowground parts of both live and dead trees, understory vegetation, downed dead wood and other material on the forest floor, and soil organic carbon.

To derive a national average using GTR NE-343, we took the following steps. First, we used forest inventory data from the US Forest Service to calculate the acreage of each forest type within each of the GTR NE-343 regions. Using these acreages, we created a weighted average of carbon sequestration for reforestation in each region based on the relative proportions of the forest types there – an important step that acknowledges the different growth rates (and therefore different carbon sequestration rates) of the various forest types across the US. We then aggregated these regional averages into a national average rate of annual carbon sequestration from reforestation.

Next, we converted the national per-acre average carbon sequestration rate to a per-tree value. To do this, we assumed an average of 250 trees would be planted per acre in these reforestation projects. American Forests developed this planting density in consultation with the US Forest Service.

With our carbon sequestration rate converted to the appropriate units (metric tons of carbon dioxide equivalent per tree per year, or $mtCO_2e$/tree/year), we estimated the annual carbon sequestered from the reforestation efforts outlined in the Climate Stewardship Act. We modeled various scenarios for the schedule and scale of tree planting, calculating the total amount of carbon sequestered each year from 2021-2121.

For further information on this methodology, please contact:

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Resources:

[i] Smith, J.E., Heath, L.S., Skog, K.E., Birdsey, R.A. (2006). Methods for Calculating Forest Ecosystem and Harvested Carbon with Standard Estimates for Forest Types of the United States. General Technical Report NE-343. Newtown Square, PA: US Department of Agriculture, Forest Service, Northeastern Research Station. Available from https://www.nrs.fs.fed.us/pubs/8192.

[ii] USDA Forest Service, Forest Inventory and Analysis Program, Tue Jul 30 18:37:28 GMT 2019. Forest Inventory EVALIDator web-application Version 1.8.0.00. St. Paul, MN: US Department of Agriculture, Forest Service, Northern Research Station. Available from http://apps.fs.usda.gov/Evalidator/evalidator.jsp.