MAKE IT WILD

**Notes on Reference Source from the University of Leeds 2019 paper:**
**'Enhancing the Benefits of the Trees on Campus'**

There are various sources of information on the absorption rates of carbon dioxide by trees and the figures do vary very considerably. Some relate to tropical forests and others relating to trees in temperature regions, some for species of trees that have a relatively short life measured in a handful of decades or conversely ones that may take centuries to fully mature. Some sources even confuse elemental carbon with where that carbon came from, namely in the form of carbon dioxide in the atmosphere – that error alone can account for a factor of 3.67. There are so many factors that affect tree growth, and therefore, absorption rates such as latitude, actual location on the land, hours of sunlight received in a typical year, density of planting, competition from other trees and vegetation, soil types, rainwater etc. Growth is not in a 'straight line' either, it starts very modestly and then accelerates exponentially before slowing in the latter stages of the tree's life.

You will see below there is a link, with some explanatory notes, to a highly respected paper from the University of Leeds on native trees growing in the British climate and you will see that the figures of Tonnes per tree are very significantly higher than some quoted in the public domain. The figure we use, 1 Tonne of elemental Carbon (C), that is 3.67 Tonnes of Carbon Dioxide ($CO_2$), is an average figure based on the range of species we plant (please see the attachment entitled, *"An 'Average' Tree and How We Calculate the Number Needed for Carbon Offsetting"*). This compares to the 1.85 Tonnes of elemental C (6.8 Tonnes of $CO_2$) shown for the mature trees in the paper.

Our lower figure is based on the absorption at 40 years (a lot of work has been done on trees of this age, as the timber industry will typically fell trees at that time, allowing for accurate measurement of the masses involved). Although we will not fell our trees for timber or anything else for that matter (they have been planted for wildlife in perpetuity), we do not include any additional absorption beyond this age. Nor do we take the very significant amounts of carbon that is accruing in undisturbed, deciduous woodland soils over time. They can be considered extra amounts that more than allow for any natural losses from the woodland.

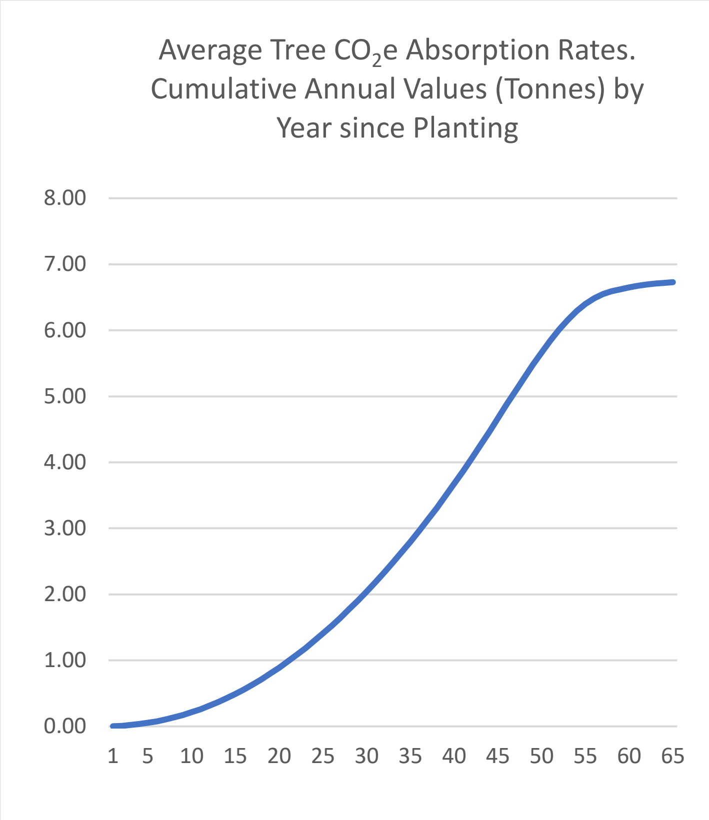
A good source for the carbon dioxide absorption rates of trees can be found at the link **here**: It is from the United Bank of Carbon (UBoC) at the University of Leeds and I have attached a 2019 paper where they have analysed the carbon content of 1,450 trees growing on the campus.

The paper opens with a forward by the highly respected Piers Forster, Professor of Physical Climate Change at the University of Leeds and who is also on the UK Government's Committee for Climate Change.

We work based on an average tree containing 1 Tonne of Carbon (C) by the age of 40 years. By the principle that this C has all been sequestered in the form of carbon dioxide ($CO_2$) from the atmosphere (via photosynthesis) as this is the only source of C available to a growing tree. For each Tonne of C locked up in a tree's timbers then we know that 3.67 Tonnes of $CO_2$ must have been removed from the atmosphere. This is simply by virtue of the atomic weights of Carbon and Oxygen. Please see our attachment on 'Average Trees'.

You will see in the article (page 13) that the 100 largest trees on the campus are computed to contain an average of 1.85 Tonnes of C each (i.e., they have sequestered 6.80 Tonnes of $CO_2$ each – i.e., 1.85 * 3.67). These are clearly the most mature trees, but it does demonstrate that the potential of UK trees to hold very significant amounts of C. The 1.85 Tonnes is nearly double the average figure we use (1 Tonne) but our cut off is at 40 years, but it has to be assumed that many of these campus mature trees are significantly older than 40 years and trees do continue to be net absorbers of C well beyond this age.

In the same table on page 13, it records that these 100 trees account for 34% of the total amount of C in all 1,450 trees. This is because the remaining 1,350 trees are younger, and many are species that do not grow as massive. As they grow the rate of absorption increases (see the S-shaped curve below) and they will begin to 'catch-up' with the mature trees.




Another interesting and relevant statistic is given on page 15 is that these 100 largest trees are absorbing (on average) 50kg of C each per annum (100 trees and 5 Tonnes of C per annum = 0.05 Tonnes each, i.e., 50 kg). Therefore, once a tree reaches a certain size, they are absorbing at the rate of 0.5 Tonnes every 10 years.

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It's not our aim to protect nature, it's our purpose