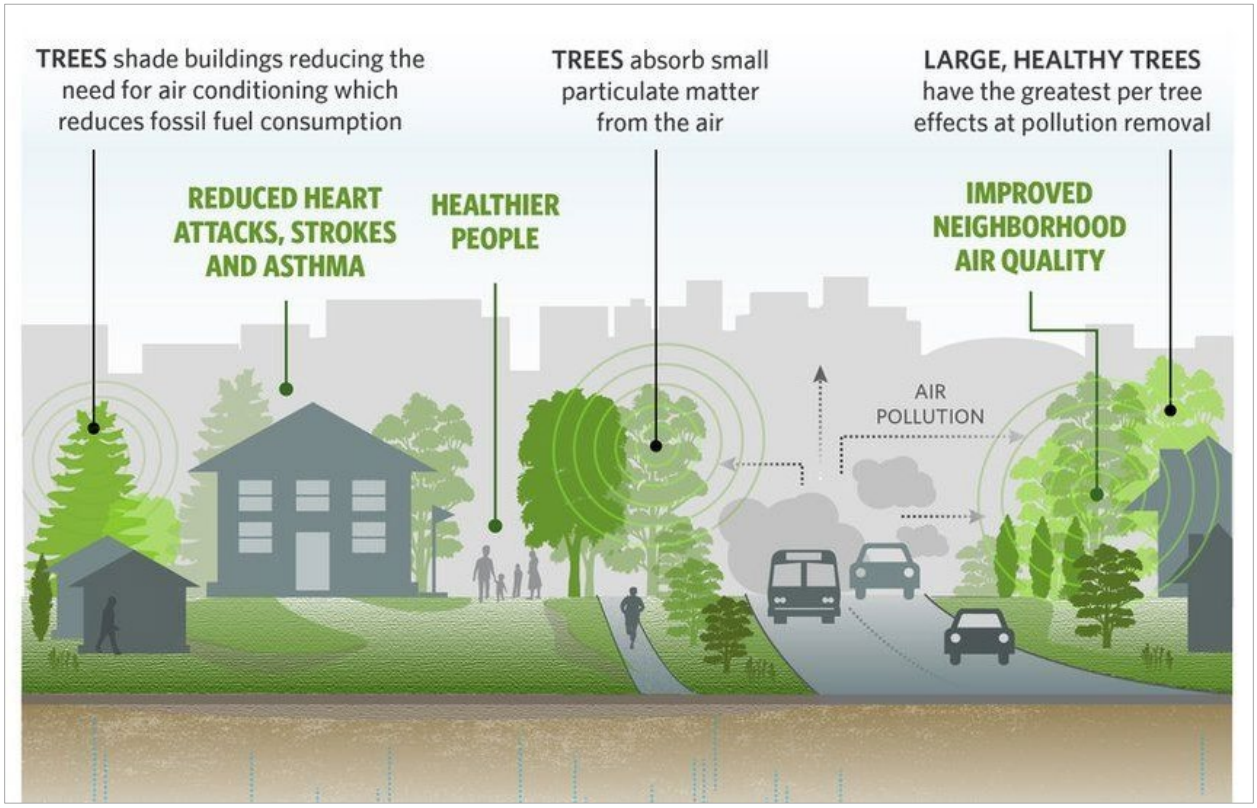
Roadside Trees:

Ecological Value and Impact on Atmospheric Carbon

Highstead

- Roadside trees are typically the fastest growing and largest trees in the landscape because of increased light and reduced competition along the forest edge. Thus, a tree 36 inches in diameter is not unusual along a roadside, but a tree this size represents a tiny 0.03% of trees growing in Connecticut's forest.
- Roadside trees also provide critical human health benefits by filtering pollutants from roadways. Large trees filter far more pollutants than small trees. For instance, a 30-inch diameter tree filters 60-70 times the pollutants as a small tree 3 inches in diameter in the same place.
- Large trees reduce home energy use and carbon emissions by cooling a house in summer and insulating it from cold winds in winter. Large trees (30 inches diameter) provide up to 6-7 times more avoided CO^2 emissions than small trees (3 inches diam.) of the same species.



Source: BBC

- Generally, tree cover in developed settings provides critical cooling services for people, a service that will only become more important with warming temperatures. For instance, within a single urban landscape of the Northeast, areas with 30% less tree cover can be 7 degrees F hotter!
- Large trees are considered 'keystone structures' because of their significant contribution to a broad array of ecological processes and their critical value for biodiversity. They also have large impacts on local microclimate, soil moisture, and soil nutrient levels.
- Regarding biodiversity more specifically, large trees in more developed settings function as biodiversity "hotspots." For instance, a handful of large trees in a developed setting can have up to 2.5 times the diversity of bird species as an equivalent number of smaller trees.
- Large roadside trees are not only rare natural features on the landscape, they absorb carbon much faster and store more carbon than the average tree in the forest. A red oak tree 36 inches in diameter stores about 4.5 metric tons of carbon in its wood, which is equivalent to the annual CO2 emissions of 3.5 passenger cars. That tree stores over 6000 times more carbon than a replacement tree 1 inch in diameter. A 1-inch diameter tree also absorbs 135 times less carbon dioxide each year than a 36-inch tree of the same species.
- When roadside trees are cut and turned into wood chips, most of the stored carbon in the wood is rapidly converted to CO2 and released into the atmosphere, exacerbating the climate problem.
- Large street trees provide unparalleled scenic beauty and natural character in a town. They are town-wide treasures that cannot be replaced for at least a century.

References

https://apps.fs.usda.gov/Evalidator/evalidator.jsp

https://mytree.itreetools.org/#/location

Lindenmayer, D.B., 2017. Conserving large old trees as small natural features. *Biological Conservation*, *211*, pp.51-59.

McDonald, R.I., Biswas, T., Sachar, C., Housman, I., Boucher, T.M., Balk, D., Nowak, D., Spotswood, E., Stanley, C.K. and Leyk, S., 2021. The tree cover and temperature disparity in US urbanized areas: Quantifying the association with income across 5,723 communities. *PloS one*, *16*(4), p.e0249715.

Nowak, D.J. and Greenfield, E.J., 2020. The increase of impervious cover and decrease of tree cover within urban areas globally (2012–2017). *Urban Forestry & Urban Greening*, *49*, p.126638.

Stagoll, K., Lindenmayer, D.B., Knight, E., Fischer, J. and Manning, A.D., 2012. Large trees are keystone structures in urban parks. *Conservation Letters*, *5*(2), pp.115-122.