



Trees and Air Quality

This page last reviewed April 5, 2012

The right tree can improve air quality as well as provide other benefits such as shade and beauty. However, some trees can have adverse effects on air quality and, because of their pollens, can even affect people's ability to breathe. This site provides an introduction to the effects of trees on air quality and identifies some websites that provide additional information.

BENEFITS OF TREES ON AIR QUALITY

Trees deliver air quality benefits by the cooling effect of their shade and by removing certain pollutants.

COOLING

By cooling, trees reduce evaporative emissions from vehicles and other fuel storage. By cooling homes and offices, trees reduce power generation emissions. General cooling also reduces the speed of chemical reactions that lead to the formation of ozone and particulate matter. By using models at ARB or at the Federal EPA, we can predict how well cooling by trees helps improve air quality.

Sacramento Shade provides an excellent website to learn about the savings in energy and air quality, as well as the real estate enhancements that trees can provide. The site is located at: <https://www.smud.org/en/residential/environment/shade-trees/>.

POLLUTANT REMOVAL OR DEPOSITION

Leaves and needles have surface area that can allow for removal (deposition) of ozone, nitrogen dioxide, and to a lesser extent particulate matter. Several different factors affect pollutant removal. These factors include how long a parcel of air is in contact with the leaf, the amount of leaf area, as well as the specific pollutant of interest. Because deposition has an affect on air quality, the Air Resources Board (ARB) is interested in this phenomenon. For example, the ARB support a study to evaluate how well agricultural crops remove ozone. For more on the California Ozone Deposition Experiment (CODE) please refer to: <http://blg.oce.orst.edu/code91/twinotter/description/synopsis.html> In addition, an excellent discussion of the impact of trees on ozone removal can be found for **Blodgett Forest** at: <http://www.cnr.berkeley.edu/forestry/>

ADVERSE EFFECTS OF TREES ON AIR QUALITY

Trees can also have adverse effects on air quality by their release of compounds, which can react to form ozone and particulate, and by the release of allergens such as pollen.

BIOGENIC EMISSIONS

Trees emit hydrocarbons (biogenic emissions) which can react with nitrogen oxides that are emitted by sources such as cars and power plants to form ozone and particulate matter. These biogenic hydrocarbons are sometimes even more efficient in forming ozone than those hydrocarbons emitted from cars and power plants. A description of these emissions at a California site can be found at: <http://www.cnr.berkeley.edu/forestry/>.

*Further the **national biogenic modeling effort** is described at: <http://www.ladco.org>.*

BIOGENIC ALLERGENS

Pollen from grasses, weeds, shrubs, and trees causes allergic reactions in sensitive people. Some molds that grow on trees can also cause allergic reactions. Allergic responses have a wide spectrum of effects but can be as severe as an acute asthma attack.

*More information can be found at the **National Allergy Bureau's** website at: <http://aaaai.org/nab/>*

TREE SELECTION

Tree advocacy groups are an excellent source for information to assist with tree selection for planting. One such group, SelecTree for California, maintains a database that allows homeowners and businesses to select a tree that meets their needs based on a variety of factors. The website is located at: <http://selectree.calpoly.edu/>.

For further information, please contact: [Ash Lashgari](#) at (916) 323-1506.