

# Trees

No. 15

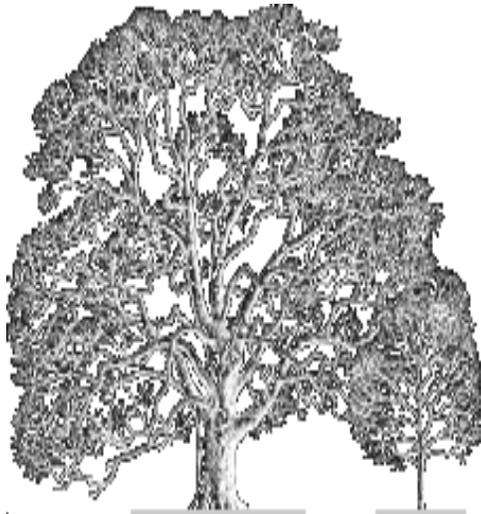
Obed Watershed Community Association

January 2007

## **Trees Serve as Carbon Sinks and Reduce the Greenhouse Effect**

- One acre of new forest turns 2.5 tons of carbon dioxide into biomass annually. Trees can absorb CO<sub>2</sub> at the rate of 13 pounds / tree / year. Trees reach their most productive stage of carbon storage at about 10 years. For every ton of new wood that grows, about 1.5 tons of CO<sub>2</sub> are removed from the air and 1 ton of oxygen are produced.
- Planting 100 million trees could reduce the amount of carbon by an estimated 18 million tons per year.
- Planting 30 trees each year offsets carbon emissions from the car and home of one American.
- Rapidly growing trees can absorb carbon dioxide at the rate of 26 pounds per year.

- In Chicago, trees annually sequestered the equivalent amount of carbon weekly emitted from all forms of transportation.



## **Trees Clean the Air**

- Trees clean the air by removing dust and particulate, and by absorbing ozone, sulfur dioxide, carbon monoxide, and other chemicals. Researchers estimate that the trees in Chicago annually remove 15 tons of carbon monoxide, 84 tons of sulfur dioxide, 89 tons of nitrogen dioxide, 191 tons of ozone, and 212 tons of small particulate. The estimated value of this pollution removal was \$1 million for the trees in the city itself and \$9.2 million for the metro areas.
  - During a 50-year life span, one tree will generate \$30,000 in oxygen, recycle \$35,000 worth of water, and cleanup \$60,000 worth of air pollution. That is a total of \$125,000 without including any other value.
- One acre of trees produces enough oxygen for 18 people to breathe each day and eliminates as much carbon dioxide from the air as is produced from driving a car 26,000 miles.

## **Trees Provide Clean Drinking Water**

- Trees reduce runoff pollutants by increasing ground water infiltration. This helps to purify the water and recharge aquifers which results in a more consistent stream flow and quantity of potable water.
- Tree root networks filter contaminants in soils, producing clean water.
- Trees and their symbionts can breakdown pesticides and carcinogenic groundwater contaminants, such as atrazine and trichloroethylene, into harmless compounds. Trees are planted on landfill caps to help reduce pollutants while improving the environment.

### **Trees Reduce Soil Erosion**

- While groundcover holds the topsoil in place, the roots of trees secure large blocks of soil, especially important on steep slopes.
- Field windbreaks can significantly increase crop yields compared to fields without windbreaks by reducing wind and heat stress on crops, preventing topsoil loss, and reducing soil moisture losses. Windbreaks trap and accumulate winter precipitation that makes more water available to crops later in the year.

### **Trees Along Streams (Riparian Areas) Serve Many Purposes**

- Reduce water temperature by their shade.
- Prevent or reduce bank erosion and silt. Silt destroys aquatic life and makes streams shallower, causing more frequent and severe flooding.
- Provide hiding places for aquatic animals.
- Slow floodwaters.
- Filter runoff and sediments from slopes next to the stream.

### **Trees Reduce Noise**

- Properly placed screens of trees and shrubs act as sound buffers, significantly decreasing noise pollution along busy thoroughfares and intersections by dulling the sound waves that attempt to pass through them and dampening these sounds by adding noises of their own, a phenomenon called masking.
- Trees planted in contiguous rows in widths of 16 feet or more provide the most noise reduction. A row of trees can cut the ambient noise level approximately in half.

### **Trees Reduce the Need to Consume Energy**

- Shade from trees cools hot streets and parking lots. Cities are “heat islands” that are 5-9 degrees hotter than surrounding areas. Three trees located strategically around your house can cut air-conditioning bills in half.
- Shade from trees can reduce utility bills for air conditioning by 15-50 percent. In Chicago, increasing tree cover by 10% (equivalent to adding three trees in optimal locations per building) can reduce total energy use for heating and cooling by 5-10%.
- Windbreaks around homes can shield against wind and snow, reducing heating costs by as much as 30%.
- Tree shelters for livestock effectively reduce weight losses during cold winter months and provide shade for moderating summer heat.

### **Trees Provide People Food and Pharmaceuticals**

- Nutmeats - walnuts, pecans, hickory
- Fruits - plum, peaches, apples, cherries, pears, persimmons
- Berries - chokecherry, mulberry
- Maple syrup.
- Pharmaceuticals - active ingredients for asthma medication and cough remedies. Aspirin comes from the



bark of willow trees.

### **Trees Contribute to the Increase and Conservation of Biodiversity**

- Trees provide homes for birds and other animals. Almost all woodpeckers only make their nests in standing dead trees. Many other wildlife species depend on dead wood for shelter.
- Dead and decaying trees on the ground replenish soils by returning important nutrients and provide food resources for many types of wildlife.

### **Trees Provide Wood Products**

- Properly managed forests can on a sustained yield basis provide lumber for plywood and other wood products.
- Energy plantations of hybrid poplars and other fast-growing species can be managed on a sustained yield basis for a continuous supply of firewood.

### **Trees Increase Property Value and Community Pride**

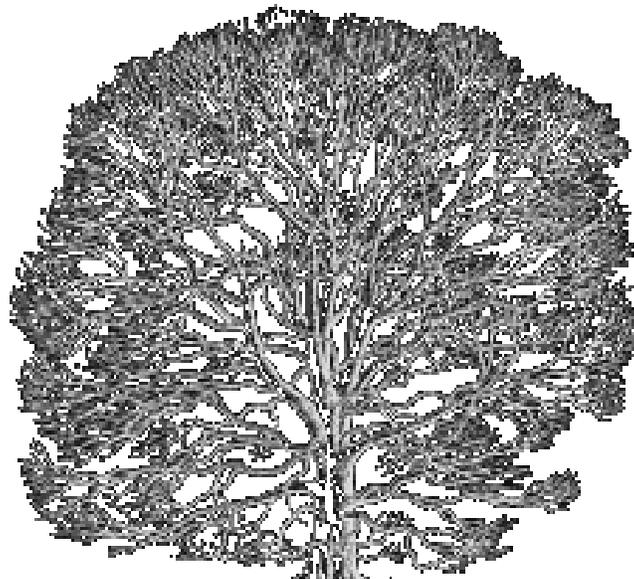
- Proper placed and maintained landscaping increases residential and commercial property values. Homes on lots with many trees have 6% to 12% higher appraised values.
- Trees help instill community pride.

### **Trees Provide a Healthy Environment**

- The presence of trees reduces stress in the workplace and speed recovery of hospital patients.
- Trees give us a sense of privacy in an urban environment.
- The presence of trees in urban neighborhoods has been linked to less crime.

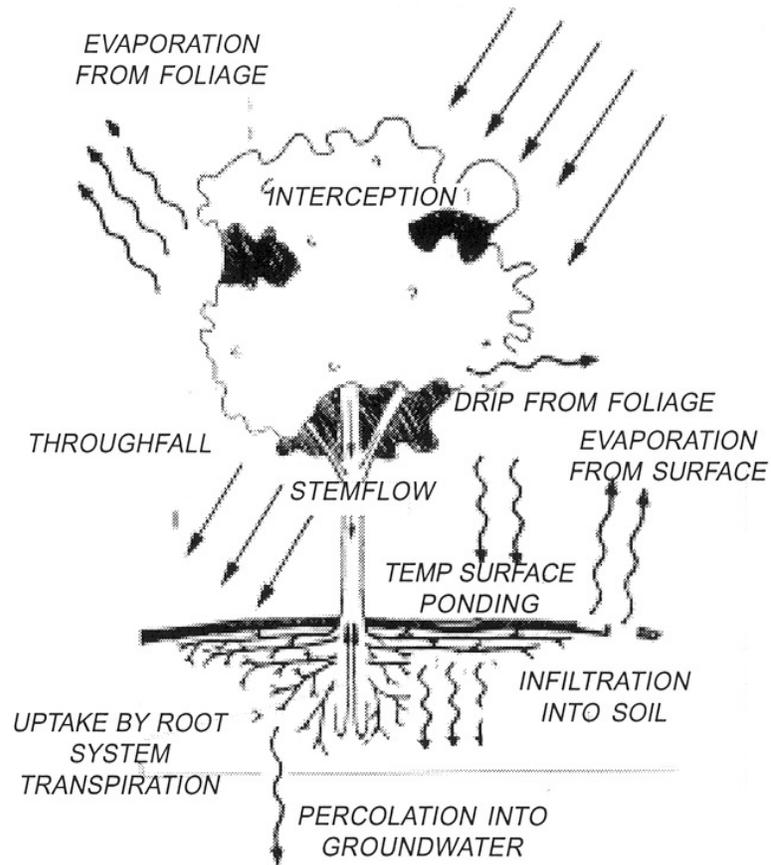
### **Trees Provide Grace and Beauty**

- Trees screen unsightly views and soften harsh outlines of buildings.
- Healthy cities should aim for a 40% tree cover (equivalent to 20 large trees per acre) to ensure their ecological, economic, and social sustainability.
- Trees connect people with their natural heritage and with our most deeply held spiritual and cultural values, linking one generation to the next.
- One cherry tree can perfume the air with 200,000 flowers.



**Urbanization and Rain:** Residential and commercial development changes the ways that the land absorbs rainfall. The ground becomes increasingly impervious as more of it is covered by roofs, paved areas, and lawns. (Most lawns and golf courses have the equivalent imperviousness of asphalt because of their dense short roots.) Rain that falls on such impervious areas runs across the surface, increasing flooding frequency and decreasing the infiltration of water into the ground. Without an adequately forested watershed for sources of city water, large quantities of water flush and disappear downstream when it rains. As a result, little water infiltrates into the soil to provide a consistent supply of water during the dry season.

**More Trees Mean Less Runoff:** For every 5% of tree cover added to a community, storm water is reduced by approximately 2%. At a South Miami residential study site, a 21% existing tree canopy reduced stormwater runoff by 15%. Tree leaves intercept and hold rain drops. The leaf litter on the ground provides a temporary storage area, reducing the amount and peak rates of runoff. Tree roots and the organic matter in the soil increase infiltration of water into the ground and filter the water moving through them. Deep roots increase percolation of water deeper through the soil column. All of the effects on runoff are greatest when urban trees are large and well-established on undisturbed sites.



**Importance of Litter Layer:**

The litter layer - the leaves and other organic debris that collect underneath trees - absorbs several times its own weight in water. Because it breaks the impact of the raindrops, it prevents the agitation and erosion of the underlying soil and slows down the lateral movement of water. Litter layers build better soil structure through increasing the biotic activity within it.

The Obed Community Association has as its purpose community appreciation and volunteer involvement in ongoing research of the natural and cultural heritage of the Obed River watershed within Cumberland County. Louise Gorenflo, OWCA director, produced this fact sheet. Those wanting to join this membership organization or more information may contact OWCA at 484-2633 or at 185 Hood Drive, Crossville, TN 38555.