UT Extension

FWF Update Newsletter

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NEW WOOD RESIDUES INFORMATION AVAILABLE FOR TENNESSEE

Adam Taylor, Assistant Professor, Forest Products

There is a new map available showing producers of wood processing residues in Tennessee for 2008. The map is available for free download at http://web.utk.edu/~mtaylo29/pages/Google%20Maps.htm and can be viewed using the GoogleEarth software, which can also be downloaded for free. With more interest in biomass more and more people want to know where you can buy chips, sawdust and bark. This map can help.

WOOD IS GOOD – FOR YOUR BLOOD PRESSURE?

Adam Taylor, Assistant Professor, Forest Products

Wood has many advantages as a raw material for building things, including that it is local, renewable and sustainable. But now there is evidence that is can be good for your blood pressure also.

Researchers in Japan measured the blood pressure of people when they touched various materials such as wood, metal and plastic. While touching aluminum and cold plastics led to increases in blood pressure, these same people had stable blood pressure readings when they touched wood. Wood is a natural material whose grain patterns and other variations feels pleasant to the touch. By contrast, plastics and metals are unnaturally smooth and regular.

Wood also has a very low *thermal diffusivity*, which is a measure of how fast a material adjusts its temperature to its surroundings. This is why you can touch a very hot piece of wood with your bare hands and not get burned. This is another reason why wood feels good to the touch and is the reason that pots and frying pans often have wooden handles.

We are fortunate to have an abundant, growing and varied wood resource in Tennessee. There are many good reasons to use wood instead of other materials – and now you can add ‘it feels good’ to the list.

BIOMASS STUDY SHOWS FOREST CAN HANDLE HARVEST, COSTS - EXCESSIVE

Wayne Clatterbuck, Professor, Forest Management and Silviculture

Biomass Study Shows Forest Can Handle Harvest, but Economic Costs are Excessive. Forest researchers have been scrambling to implement studies to determine the environmental effects and economics associated with cutting woody biomass. The results of one study initiated in 2005 on the Superior National Forest in Minnesota by the USDA Forest Service, University of Minnesota, University of Wisconsin – Steven's Point, and the Institute for Agriculture and Trade Policy are now available.

Researchers evaluated nine harvests before and after loggers cut the wood for commercial uses. The brush and small trees that were not commercially cut were then harvested for biomass. Even though the study called for taking all the biomass off a site that was possible, loggers only managed to retrieve about 2/3 of the total, leaving plenty of cover behind. One of the concerns with biomass harvesting is that all the biomass would be taken from a site, impacting nutrient cycling and other soil functions. However, about 1/3 of the biomass was left on the site even when loggers were trying to get it all.

The study was less encouraging on economics. The cost of equipment, fuel and labor associated with harvesting and transportation was more than the price paid for the wood chips sold for energy. Even with increased interest in local, renewable, and carbon-neutral biomass leading to slightly higher wood chip prices for energy, the cost of getting the chips to market was excessive. Since the study was conducted in 2005-2006, diesel prices have doubled, rendering an even more negative economic cost. Thus, in this study, the value of biomass energy alone does not pay to get the biomass out of the woods.

However, if biomass harvesting can be implemented (and perhaps subsidized) for fuels reduction (fire prevention) or to create conditions favorable for wildlife, harvesting for biomass needs could reduce costs. In this study, on six of the nine sites, using wood for biomass energy reduced the cost the Forest Service otherwise would have paid for forest thinning for fire protection alone. Combining forest thinning for fire prevention efforts and wildlife management projects with biomass harvesting could help cut the cost of forest operations, create some jobs and provide an energy source.

Harvesting small trees and brush for energy can be done without having detrimental effects on forest soils. However, the cost to do the work exceeds income received in this Minnesota study. Until higher prices are realized for wood chips, large-scale woody biomass projects for energy will be slow to come on-line. Although there is a tremendous forest resource for biomass available, especially branches and crowns of harvested trees that remain in the woods, the cost of extraction does not justify the biomass operations yet.

Source:Duluth News Tribune
John Myers
June 26, 2008

THERE IS MUCH VARIATION IN SHAPE OF TREE CROWN

David Mercker, Extension Specialist, Forest Management and
Jennifer Franklin, Assistant Professor, Tree Biology

The *crown* of a tree or woody plant is that portion that contains live branches and foliage. The *live crown ratio* expresses the relationship of live branches (or crown length) to the total tree height. For example, a tree with a total height of 100 feet, having live branches in the upper 40 feet, would have a live crown ratio of 40% (calculated by 40/100). When trees are young and/or open-grown, they will have high live crown ratios because live branches often exist nearer the ground level. As they experience competition for sunlight from adjacent trees or structures, shaded branches located lower on the crown will use more photosynthate (energy) than they produce. These branches will eventually die and are shed, thus shrinking live crown ratio. Crown shape will vary according to tree species, and in forested settings, according to a tree's position within the canopy. Crown shape is of interest to foresters because it influences the amount of growing space (or stocking) that is needed to maximize lumber production. Crown shape is important around buildings and in urban settings because it influences: contrast, view, shading and screening. Nearby, competitive trees strongly influence crown shape. Trees that are open-grown will exhibit considerably different crown shape than those having neighboring trees. Crowns are typically categorized into six distinct shapes: oblong, round, oval, vase, pyramidal and weeping.

Perhaps most influential in determining crown shape is differences in the degree of *apical dominance*. Apical dominance is the upward growth of the main *leader* branch, at the expense of lateral branches below them, whose development the leader inhibits by preventing the growth of the lateral buds. The crowns of trees with strong apical dominance grow in height much faster than in width. Typically these species will have a single, distinct and dominating, central trunk and leader. Lateral branches often grow outward, rather than upward. Such trees are said to have an *excurrent* crown that favors oblong or pyramidal shapes. The central trunk rarely forks, usually only when the leader has been damaged or destroyed by weather or wildlife. Sweegtum (*Liquidambar styraciflua L.*) and tulip poplar (*Liriodendron tulipifera L.*) are examples.

In contrast, trees expressing weak apical dominance often grow nearly as fast in width as in height (especially when open-grown). Such species will not express one central leader, but rather multiple ones, each vying to be dominant. The leader with the most access to sunlight normally prevails, which sometimes compromises tree form with a crooked or forked appearance. Such trees are said to have a *decurrent* crown that favors round or oval shapes. Forks in the central trunk are common, even exacerbated when the leader(s) have been damaged by weather or wildlife. Oaks (*Quercus spp*.) and maples (*Acer* spp.) are examples.

Extension employees and natural resource professionals can give better advice to homeowners about tree selection when they are knowledgeable of tree growth forms, including crown shape.

DISSOLVED OXYGEN IN PONDS

Thomas K. Hill, Professor Emeritus - "Retired"

It's that time of year again. Phone calls with concerns about either stressed or dead fish have become plentiful lately. Here is some information to help you understand some of the dynamics of dissolved oxygen (DO) or lack of it in ponds, in order to try and avoid some problems.

How do you recognize DO depletion? First of all, you should observe the pond immediately before daylight. Fish will be seen on the surface gulping for DO. If disturbed by a loud noise, they dive but immediately return to the surface. If the DO content is not low enough to kill fish, fish at the surface in early morning will return to deeper water as it builds up during the day through photosynthesis. In fed ponds, fish often give warning signs of low DOn by not eating. DO levels lower than 3 ppm in the upper 2 feet should cause concern. Many fish will die if DO content is below 0.5 ppm for very long.

DO in ponds comes from two sources – photosynthesis and diffusion from the air. The most important source is photosynthesis, which is the process plants use for manufacturing food. In the presence of sunlight, plants (especially algae) add DO to water as a by-product of photosynthesis. At night, no DO is produced, but respiration of algae, fish, bacteria and other pond dwellers continue to remove DO from the water. Most of the time there is a desirable balance between how much DO is produced and how much is consumed. However, under some conditions the balance can be upset, and the DO concentration becomes low enough to either stress or kill fish.

The most common DO problem occurs when consumption by respiration exceeds the amount of DO produced through photosynthesis and diffusion from the air. Algae grows in large quantities as a result of nutrients from heavy fish feeding. As the quantity of algae increases, it accumulates closer and closer to the surface to gather sunlight and increasingly shades the lower depths. As a result, most of the DO is produced near the surface, leaving a large volume of water below the first 2 to 4 feet deficient in DO production. Eventually, DO produced during the day is less than the demand for DO during the night, resulting in possible death or undesirable stress on fish. This situation may be especially acute after several consecutive cloudy days.

If you have experienced excessive filamentous algae growth in your pond this year, consider fertilizing earlier next year. A good plankton bloom established and maintained can shade the pond bottom and prevent growth of unwanted filamentous algae. Stock 15 Chinese grass carp per acre in your pond as well. They can be a tremendous help in keeping algae and aquatic weeds reduced in ponds.

Another type of DO depletion occurs when algae die suddenly. When algae die, not only does the pond lose a source of DO, but the decaying algae also use considerable amounts of DO. All causes of sudden algae die-offs are not fully understood, but it is known that die-offs can occur after pond treatments with certain chemicals and herbicides.

Predicting natural algae die-offs is difficult. However, they are often associated with surface algae scums and very heavy algal "blooms". When a die-off occurs, the green water often becomes streaked with gray, black or brown. The color of the water may eventually become totally brown, gray, black, milky or clear. A distinct foul smell may also be noticeable.

The third and most serious kind of DO depletion is referred to as a “turn-over”. During hot summer weather, surface water becomes less dense as it absorbs heat and floats over a cooler, more dense layer of water. All the DO is produced in the warmer layer and the two layers may not mix for weeks at a time, especially in deep-water ponds. Eventually, all the DOn is used up in the lower, cooler layer. A cool snap or a thunderstorm with wind and hard rain can cool the warm surface water, making it heavy enough to sink and mix with the oxygen-deficient bottom layer. The net result is a dilution of the DO and an increase in the demand for DO from dissolved minerals and decaying organic matter. To complicate these problems, the algae usually die at the same time. “Turn-overs” cause the most catastrophic fish kills in ponds of any oxygen-related problems.

What should be done if signs of DO depletion are observed? Immediate action must be taken. Stop feeding until good water quality is restored. Flush the pond with fresh aerated water from a well or another pond. If an irrigation pump is available, pump water from the upper 2 feet, aim the water exhaust parallel to the bank and establish a circular motion around the pond. Back a tractor-powered rotary grass cutter into the pond and stir the water with the blades. A boat motor can help in a small pond. Add 6 to 8 pounds each of potassium permanganate and superphosphate per acre. The potassium permanganate helps reduce some of the organic matter with it’s oxygen demands and the superphosphate will stimulate the growth of planktonic algae in the water.

After the emergency has passed, the pond management program should be reviewed and the cause of the DO depletion eliminated. Prevention of such situations through proper management is the only permanent solution.

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