

"Nature's Tree Marking Paint"

An Overview of a Common Sense Natural Tree Selection Method
Jason Rutledge, Environmentally Sensitive Logging and Lumber Company

We write this material for the purpose of describing the methods we use in selecting which tree to harvest when simultaneously managing a forest with the goal of restoration, while also extracting for human needs. This is not intended to be a scientific paper, but a common sense approach for workers in the forest (Biological Woodsmen), landowners and other interested stakeholders. This is also a work in progress. As information and experience is gained, selection is subject to be changed for the betterment of the forest.

This is general information that should include thoughtful considerations of two facts. First, that human intervention and former presence seems to be the greatest single feature influencing the condition of most Appalachian forests. Second, that each piece, boundary, woodlot or forest has it's own history and individual characteristics specific to that site.

The scientific silvicultural considerations of forestry are important, particularly, aspect and exposure, soil type, slope, moisture level, and forest type (species present). One should have a general understanding of this information to aid in making the decisions of which individual trees to cut and which to leave. Individual selection made on commercial value is a decision made for future value. This we will discuss as "residual dividend". We believe that what you leave is more important than what you take. Any analysis of this method must consider the "residual dividend" in the equation as a wealth-creating management method.

This approach is one answer for a forest landowner that has the goal of leaving a legacy of an improving investment, environment, ecology and a naturally beautiful, aesthetically pleasing forest. Since the majority of land is owned by non-industrial private landowners and many of these folks are very concerned about the appearance of their forest, they are recalcitrant about choosing conventional harvesting practices and methods. Worst first single tree selection provides a harvesting option that is an alternative to clearcutting, increased roadbuilding, environmental damage generated by a greater harvest, and the resulting even aged forest. Even aged management style has a place in plantations, but not in the mixed meso-phytic forests of the Appalachian region, particularly when it is always in someone's backyard.

Can a Human Being be a Benevolent, Beneficial Predator?

We attempt to imitate nature by harvesting the worst specimens first. Just as wild predators always prey on the old, diseased or weaker victims, so should the harvesters of trees. This method will insure that the strongest of specimens will survive and reproduce. This will insure better regeneration of quality standing residual growing timber and genetic reproduction in superior seedlings descending from the best elder specimens.

"Nature's Tree Marking Paint" Indicators

Which Trees To Leave

Given an understanding of site specific factors and site index concepts, the following are factors we consider in selecting which trees to leave. Simply the best specimens should remain that are suited to nature's choices of what grows best on each site. Since most forests have been previously high graded and/or clear-cut, there are some often occurring similarities in most forest conditions.

Spatial arrangements are usually very bad conditions common to most Appalachian forest. There is usually around 200+ basal feet per acre. The trees are simply too close together to grow well. What we are looking to create is a stand that has good specimens that are 12 to 20 feet apart or 5 to 7 paces/steps. The crown to stem ratio should be 2/3 stem or bole to 1/3 limb or crown, (2/3 stem to 1/3 limb). If the trees are taller than two thirds of the overall height being stem, then they are too close together and should be thinned. If you have a wolf tree that has limbs more than 1/3 of the way down the overall height, then the trees are too far apart (a thin stand). This is often the condition of a forest regenerated from a previously cleared field, or a partial clear-cut that left some big trees for various reasons. Those "wolf" trees are usually subject to harvest because they displace the opportunity for better specimens to grow in the disproportionate space they take up with their large crowns.

Often we are in a position of restoring a forest from a previously cleared piece of ground. This is not the best situation but you have to work with what you have and address the landowner's objectives. If you can find a similar (soil type, history) laying piece of ground that is forested and has always been forested, you can get an idea of what should be growing in that particular setting. Given time the forest will heal itself. The forest does not necessarily need us, but we need the forest and have a responsibility to restore it to the most natural condition capable within human knowledge. This also presents the opportunity for the highest economic value as well as ecological integrity. The highest economic value is from the production of clear lumber from clear, limb and defect free stems or boles. This is one way for man to age the forest toward a restored condition.

Which Trees To Harvest - Obvious Exterior Visible Defects

There are several problems that develop in individual trees that lessen their productive capacity to grow clear lumber. These problems are usually not enough to kill the trees quickly, but can cause a condition of interior degradation or rot that are not obvious, but will be seen when the tree is felled and examined from both ends of the log. Of course these defects will be obvious when lumber is processed from these logs. When you are selecting which individuals to harvest, these subtle flaws are indicators of the "worst first" specimen to harvest.

One such external defect is a "frost crack". These flaws are often evidenced by weeping of sap that creates a dark wet stain down the tree from the blemish. The weeping is not always present; sometimes the frost crack will be dry. They appear as a vertical line that has some puckered bark outlining the crack. They usually occur on the lower part of the tree. Often a frost-cracked tree will have "wind shake" inside that will also degrade the value of the log. The frost crack allows the invasion of natural decomposing agents that rot the tree from the inside. Often windshake is a result of bacterial infection. I have harvested poplar trees that had frost cracks that led to the rotting of the first six feet of the tree. I once cut the rotten part off of such a tree to where the defective portion of the log was minimized (less than a third of the diameter), and an earthworm crawled out of the crack in the center of the log.

Crown damaged trees are often found in the recovering forests of Appalachia. Our rule is if 1/3 of the crown is gone or damaged, then the tree is subject to reduced growth rates and increased susceptibility to decaying agents. A thrifty, good growing tree should have a healthy crown that represents a third of the overall height. Ice storms and strong winds often cause this crown damage in our region. We find that the best specimens survive most of these damaging factors.

Leaning trees are subject to worst first removal. A leaning tree has root damage and produces off-center heart growth patterns. A tree wants to grow straight and a wind thrown specimen is usually growing in thin, poor soil.

An overstocked forest also creates poor growing conditions. A forester can measure the basal footage and determine an accurate estimate of the actual area of the forest ground covered with growing timber. Basal area is a measurement of the number of square feet of surface covered with stump. Since most small loggers that are interested in becoming "Biological Woodsman" do not work with a forester, this is our simple rule of removing individuals to leave the trees to be 5 to

7 paces apart. This process is sometimes called thinning from below, analog forestry and crop tree management.

We again think of it as an “enhanced residual dividend potential”. This factor increases the value of the “Biological Woodsman’s” service to the landowner. It is an integral part of our approach to support the ground level workers of truly sustainable, restorative forestry.

Low value species are subject to inclusion in the NTMP concepts because most sites have been selectively logged and high graded previously. The species population disbursement has been influenced by former human intervention and the low value species have become dominant in frequency of occurrence, not in producing the greatest value available from the site. This will also be included as an indicator for removal for certain species based on their species alone. Examples are soft maple, hickory, black gum, scarlet oaks, post oak, black oak, black birch, beech.

Another service of a “biological woodsman” is to practice what we consider advanced timber stand improvement (TSI). This means selecting individuals that are stump regenerated, meaning producing multiple stems from a stump of a previously harvested specimen. These trees always have off-center hearts, pistol grip butts, and are basically clones of the parent stump. Often we can select one stem from the group and leave the straightest, best specimen for future harvest. This requires skilled chainsaw operation to avoid damaging the residual tree while removing the worst of the grown up sprouts. This is particularly important when the residual is of a high value climax species, like northern red oak. Since our harvesting activities are planned to be more frequent, we can harvest this residual on the next rotation and in the mean time produce some superior seedlings to replace this climax species in the future forest. We also choose to cut down and leave alien invader species in the forest setting. An example is Tree of Paradise. We often find ourselves in a restorative process of removing pioneer species to quicken the development of a more intermediate forest succession; examples could be black locust, yellow pine and low quality black cherry.

Below is a list of the indicators that we use in worst first selection. When three or more such indicators occur on one individual, that tree is identified for harvest. We are working to assign individual numerical values to each indicator to establish a “readiness for harvest” scale.

Low value, shade tolerant species

Leaning trees

Frost Cracks

Frost Cracks weeping

Overstocked (trees too close together, high basal footage)

Coppice (stump sprout) regeneration

Crown to stem ratio (2/3 stem to 1/3 limb is ideal)

Crown damage (more than a third damaged)

Wrong species location for site exposure (softwood on north faces)

Rub damage (from previous extraction activities)

Blister rust (white pine)

Horizontal Cracks interrupting vertical bark fissures in White Pine

Insect damage (flag worm, grease worm in chestnut and swamp oak)

Bird Peck that shows woody material under bark (indicates insect presence)

Hemlock Wooly Adelgid (eradicating Eastern and Red Carolina Hemlock)

Pine bark beetle (in yellow pine)

Over-mature individuals (crown die back, swelled butts indicating interior decay)

Bottom Hanging Fungi (white fungal growth on the bottom edges of white oak bark particularly, but will occur on all species of oak and ash, and indicates some decay internally).

These selection methods are practiced within the guidelines of the DRAFTWOOD standards and are the basis of our “green certification plus” approach (“plus” meaning we exceed other third party certification standards). This approach is a work in progress and is evolving as information and input is gathered from all stakeholders. It is practiced as a part of an overall management method designed to take a long-term view of forest production potential that employs frequent harvest rotations and long-term relationships with the landowners.