

FACT SHEET

No. 10

Timber & Timber Harvesting in West Virginia

December, 2001

Regeneration of Hardwood Trees

In forest management, stand regeneration is the initial step in developing forest sustainability. The process entails selecting the right trees for the site and using the correct harvest technique to establish them. The steps that follow establishment are calculated to grow the reproduction to merchantable sizes in as short a time as possible and with minimal harm to other forest values. When well done, professional forest management maximizes landowner income, perpetuates the forest and generates positive public opinion.

The Appalachian deciduous forest has more than 100 tree species, but is broadly characterized by just a few broadleaved deciduous trees – oak, hickory, yellow poplar, American beech, sugar maple and basswood and two needle-leaved trees - white pine and hemlock. In addition to the major species, other trees that may be locally abundant are black cherry, yellow birch, white ash, red maple, cucumber, sycamore, buckeye, black locust, black walnut, black gum and Virginia pine. In West Virginia, red spruce also occurs on the crests of the highest mountains, frequently in pure stands.

The percentage of each species in any particular stand depends wholly on the environmental and topographic characteristics under which the stand developed. Forest management should start before the current crop is sold. Consequently, if you plan to sell or if you plan for your descendants to sell more than one crop of good timber from your land, your professional forester must choose a technique for regenerating the forest before the current forest is harvested. Hardwood forests usually regenerate without the need for planting or reseeding, but the landowner may not like the result unless a forester has guided the succession. As an example, the next crop on an unmanaged forest in the higher elevations may be a nearly pure stand of unmerchantable striped maple when black cherry and red oak were the major species harvested. The striped maple, being shade tolerant, had been increasing its population in the understory for several years and so was ready for release and rapid growth when light was made available through removal of the prior crop. In much the same way, the shade tolerant, low value red maple has become a major tree species throughout the northeastern States. For reasons such as these, tree reproduction within a forest management unit must be carefully considered in order for the forest stand to meet management objectives. Consequently, anyone selling timber without considering how and when a forest is to be cut, how much is to be removed and the overall effect of the chosen silvicultural system on the advance regeneration of quality species could be canceling a large percentage of probable future income. This is another reason why a landowner needs his or her own professional forester as an advisor.

A diagnosis of stand conditions before cutting forms the basis for future decisions. For example, several rainy Springs in succession may keep the nectar washed out of the erect yellow poplar flowers. Thus, insects aren't attracted, pollination is subsequently low and the seed crop is infertile. Yellow poplar seed has a life of about 6-8 years on the forest floor, but without at least two good seed years during this time, the harvest should be postponed until after at least one occurs.

The choice of the silvicultural system to be used is influenced by the biological characteristics and ecological requirements of the tree species, the quality of the site, the initial condition of the stand, the stocking, age classes, stem quality, presence of advance regeneration, and the management goals. Therefore, the key to facilitating the development of natural reproduction is to have a thorough comprehension of the species' biological characteristics. When does it produce flowers, how are they pollinated, when does it produce seed, how is the seed disseminated, what type of seedbed does it prefer, does it sprout readily, do the sprouts recover after browsing by deer or rabbits, is it shade tolerant or intolerant, and what are its requirements for moisture, among others?

The silvicultural system choices for harvesting are single tree selection, group selection, uniform shelterwood, coppice and clearcutting. The first and second are uneven aged systems; the others are even aged. Shade tolerant species such as sugar maple and American beech can be managed under any of the systems. Species less tolerant of shade, such as red oak, yellow poplar and black cherry need to be managed under one or another of the even aged systems including large group selection. A forester is the only professional trained to make these decisions. It's also important that a forester periodically inspect the harvest to ensure that the reproduction is harmed as little as is possible by the logging.

As examples of some of the simpler, but often overlooked forest management manipulations, consider that parent trees, whenever possible, should be cut during the dormant season to encourage sprouting. The sprouts do better and it also allows them to harden off before the Fall freezes. Another consideration is that stumps should be cut as low as possible, because sprouts originating above the root collar break away easily and do not develop an independent root system. It's also important to know in what percentage of full sunlight the seedlings of each species you are attempting to grow does best; so that the canopy gaps or stand openings can be sized accordingly. One reference says the duration of direct sunlight in gaps with a diameter of 60 feet is generally less than 4 hours per day, but this varies with the height of the surrounding canopy. As the gap is widened, the amount of direct sunlight increases until at gap diameters of about 6 tree heights nearly full sunlight reaches the centers. Also, canopy gaps on southern aspects receive substantially more light than the same sized gap on a northerly aspect. To receive one-third of full sunlight, gaps must be greater than two tree heights in diameter on north aspects, one tree height on south aspects and 1.5 tree heights on level ground. In narrow strip cuts, about 20 feet wide, those oriented east-west receive light in the morning and afternoon and are shaded during the middle of the day. In contrast, north-south oriented strips receive direct sun at midday and are more shaded during the morning and afternoon. There are many such considerations that are important and which a trained forester uses to manipulate a stand for best results.

(Prepared by William H. Gillespie)

This publication is distributed free by the Timber Committee, West Virginia Forestry Association, P. O. Box 718, Ripley, WV 25271. Please call 304-372-1955 or write for additional copies, topics or for a list of speakers and their availability.