Timber Harvesting & Forest Sustainability

Note: The following article is excerpted and adapted from remarks originally titled "Observations of Forest Sustainability" and made by State Forester James R. Grace, Director of the Pennsylvania Bureau of Forestry. His remarks expand upon one of the major themes of the PA Forest Stewardship Program: sound harvesting practices focus on the residual forest stand – what remains to become the future forest; poor practices focus on what is being removed and how much money it's worth.

Silviculture is the theory and practice of controlling forest establishment, composition and growth. From the silvicultural perspective, cutting trees is the primary method of establishing and tending forest stands to meet a woodland owner's objectives. Depending on the landowner, these objectives might include water, wildlife, recreation, or timber and other forest products. In most cases there are multiple objectives.

A silvicultural harvest is designed to either improve the residual stand (intermediate treatments) or to harvest with the intent of establishing a growing new forest (reproduction or regeneration cut). The key to either type of treatment is there is as much or more concern given the residual stand than there is about the trees being removed. In non-silvicultural harvests, the emphasis is primarily on the economic value of the trees being harvested. There is less or no concern for the residual stand.

The Persistence of Diameter-Limit Cutting

Unfortunately, the predominant type of harvest operation carried out on private land in Pennsylvania is diameter-limit cutting. This harvesting technique has the characteristic of removing individual trees larger than a specified diameter. The minimum diameter-at-breast-height usually ranges from 12 to 16 inches. In most cases, this system of harvest is not silvicultural. It is popular because it is simple and easily understood, and its application results in a one-time economic return to both the operator and the landowner. Furthermore, because it is a partial ("selective") harvest, it usually leaves a residual stand (although one of poor quality), and the site remains green.

Proponents of diameter-limit cutting, also know as high-grading or selective cutting, frequently rationalize that they are removing the old trees and leaving behind the younger trees to grow for future harvests. In reality, diameter-limit cutting is commonly applied to even-aged stands, where the smaller trees are about the same age as those being removed. Usually the smaller trees are slower growing, damaged, genetically inferior, and less vigorous species and individuals. Most of the trees left standing were growing underneath the biggest and best trees in the original stand and, much to the landowner's dismay, will not respond to their release with substantial additional growth.

The Long-Term Effects of High-Grading

Repeated diameter-limit cutting will eventually remove all the high-value species of good form, and leave behind a stand of poor genetic character occupied by poorly formed, low-value species. At first the effects of this type of harvest are subtle, but over time they are devastating. Depending on the site and species composition, a given stand may be able to support two or three diameter-limit harvests over a course of 20 to 50 years. By that time, there are no management options left other than to clearcut the residual stand for

pulpwood or firewood and hope that a new stand of seedlings will regenerate and grow. In most cases, though, these degraded stands are left to occupy the site indefinitely. The economic value of such stands increases little or not at all over time.

Diameter-limit cutting is frequently being applied in situations where loggers or procurement staff from various lumber mills buy timber without the supervision of a professional consulting forester. The common rationale might be: "this is the type of harvest the landowner wanted," or "this is the only way to practice economic forestry." Overall, the assumption exists that high-grading is the only way to harvest trees for high economic return.

In reality, the practice is destroying the biological integrity of our forested stands, and in any time frame of more than a year, high-grading makes poor economic sense. Over a period of 20 to 60 years it will prove to be economically devastating to future landowners and the forest products industry, which is so dependent on high-quality sawlogs and veneer.

Who is Responsible?

Very few of the people in the forestry community are intentionally practicing bad forestry. Most are genuinely trying to do a good job and are conscientious about the way they do their work. Nevertheless, over time we have developed a large class of individuals who are harvesting forest stands in a way that will lead to their economic ruin.

In the long run, good silviculture will produce better economic returns than diameter-limit cutting, high-grading or "selective" cutting.

The irony is that the practice of diameter-limit cutting (or known by its associated monikers) is not an issue with the environmental community. In fact, many environmentalists are proponents of this type of harvesting. "Let's just harvest the big mature trees and let the 'young' trees grow." The stands stay green and "we certainly don't want to clearcut!" Many have the misguided idea that diameter-limit cutting is uneven-aged management, which is a whole other subject.

If we are concerned about forest sustainability, then we should work towards stopping the practice of diameter-limit cutting in Pennsylvania. If we don't, the end result will be forests of poor quality, low economic value, and few viable management options. While we may not have all the answers to practice perfect silviculture, we should certainly realize that good management is more complicated than merely counting to 12 or 16 and then cutting everything larger!!

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