Managing our Streamside Management Zones

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It seems that the most common practice for managing our Streamside Management Zones (SMZs) is to paint a blue line around them and, where possible, completely exclude these stands from active management. Occasionally, some *selective* removal (i.e. highgrading) is allowed, but rarely are silvicultural treatments prescribed. Does this approach make sense? As is the case with most management decisions, it depends . . . on the site, any operational constraints (legal, social, economic, or biological), and most importantly, it depends on the landowner's objectives.

The three most common benefits that are typically derived from our SMZs include: 1) water quality, 2) wildlife habitat, and sometimes 3) timber production. Each of these is provided to some degree, regardless of management intensity. In this article, I'd like to address the incremental benefit provided with increased silvicultural effort as it affects each of these objectives, and conclude with a recommendation for those situations where active management is deemed most appropriate.

Water Quality

The vegetation present in an SMZ reduces the potential for erosion and also acts as a filter strip to reduce the amount of sediment flowing into the stream from adjacent land uses. One of the most important traits associated with this filtration capacity is a measure called roughness. This is basically a measure of the number and density of stems on the ground. With increasing roughness, the energy and flow of surface water is reduced, thereby reducing erosion potential as well. An undisturbed mature hardwood stand has relatively few trees, but still casts a dense shade. Because most of the sunlight is intercepted by the forest canopy, very little understory vegetation is able to survive and thus, the roughness coefficient is quite low. Conversely, a stand that is actively managed with regular partial cutting does not have a densely closed canopy, so the light levels on the forest floor are sufficient to sustain a dense array of herbaceous and woody plants that are much more efficient at filtering sediment than fewer, larger trees.

Wildlife Habitat

The information needed to manage an SMZ for quality wildlife habitat could easily fill an encyclopedia. However, some generalities may be suggested. First, management (or lack thereof) must be specific to the habitat needs of the target species. What is optimal for one species or group may make the area completely unsuitable for another. Second, the vegetation deemed most desirable must be given sufficient growing space to thrive. As mentioned previously, if lush herbaceous growth is required, then the forest canopy must be maintained in an open condition so that light is available on the forest floor. Conversely, snags are more likely to be produced in older closed canopy

stands where competition is intense. Such conditions will also tend to produce an open midstory and understory which may be desirable for some birds and bats. Hard mast producing species (oaks and hickories) tend to produce larger and more regular crops when they have been released from competition by thinning. However, not all trees within a species will produce equally well and some may never produce at all. If acorn production is of interest, then good mast producers must be identified in advance of thinning operations.

Timber Production

Although many forest landowners produce timber, only in rare cases is timber production an objective of ownership. Timber harvests are typically conducted to fulfill the objective of producing income. I make this point because many of the decisions regarding management of an SMZ can markedly affect present and future revenue. If we simply exclude SMZs from management, we may be completely removing 10-15 percent of the land base from production. Highgrading the SMZ may generate some immediate income, but the long-term effect is to reduce or eliminate high-value species and to concentrate growth on low-value species or non-merchantable stems. Succeeding harvests are unlikely to generate significant revenue following highgrading. If, however, the SMZ is managed with a selection system designed to distribute adequate growing space among potential crop trees and recruit enough reproduction to sustain growth and harvest, there may be less income generated with the initial entry, but future harvests will continue to generate income while maintaining a healthy, vigorous stand.

As is probably obvious by now, in many cases I believe that active management of our SMZs is often in the landowner's best interests. Managing density of the overstory can improve the filtration capacity of SMZs by stimulating growth of understory vegetation. However, this must be balanced by exerting tight control during harvesting operations, because excessive disturbance of the forest floor and exposure of bare mineral soil may increase erosion beyond the added benefit of increased roughness. An increase in the herbaceous and understory woody material also means improved browse production for wildlife. Marking rules may further be used to influence the species composition of a stand to improve hard and soft mast production or designed to ensure the retention of certain structural characteristics such as cavity trees. Although there are other revenue streams, if one focuses on timber, then excluding all harvesting will cost the landowner in terms of lost opportunity and annual taxes. Highgrading may generate some immediate return, but is unlikely to be sustainable in the long run. Alternately, a selection system will continue to generate periodic income in perpetuity.

Selection

Selection silviculture seems to be a lot like the weather…everyone talks about it, but no one ever does anything about it. Selection is mentioned in the Alabama BMP guidelines as the appropriate method of harvesting/managing SMZs. However, even an extensive search of the scientific literature will generate very little information in terms of the system's application, particularly in riparian hardwoods. I have been working on a method of applying the system that seems (based on preliminary research) to be applicable in southeastern SMZs. All of these guidelines are subject to modification based on local conditions, but in general, I have been recommending a residual basal area of approximately 60 feet^2/acre. Stocking is allocated among broad diameter classes in a fixed ratio with stands harvested so that 30 feet^2/acre is left in trees 12 inches DBH (diameter at breast height) and larger; 20 feet^2/acre in trees 6-12 inches DBH; and 10 feet^2/acre is allocated to trees less than 6 inches DBH. As in any selection system, it is necessary to distribute growing space within the stand among the overstory, midstory, and the reproduction layers. As was mentioned earlier, a densely stocked stand does not allow enough light through the canopy for grass to grow; that same process affects trees as well.

Selection silviculture is a useful tool, but it is not a silver bullet. Harvest entries must be planned carefully and operators must be well trained and closely supervised. Excessive residual stand damage will destroy future value. Finally, because selection requires periodic recruitment of desirable species into the stand, the system is unlikely to be successful where a dense understory of undesirable shade-tolerant species cannot be controlled.