COMMERCIAL FOREST LAND AS A POSTMINING LAND-USE: A WIN-WIN-WIN OPPORTUNITY FOR COAL OPERATORS, LANDOWNERS, AND SOCIETY IN THE CENTRAL APPALACHIANS[1]

by

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Abstract: Commercial forest land is a postmining land-use option that may represent the best collective interests of landowners, coal operators, and society in the central Appalachian coal fields. A distinguishing attribute of "commercial" forest land is the expressed intention of the landowner to use the reclaimed property for timber production. Consequently, land should be reclaimed in a fashion that not only protects the environment, but maximizes the growth potential of trees. Land reclaimed as commercial forest land may look different than land reclaimed as "hayland/pasture" or other land-uses. In many cases, for example, coal operators can improve tree growth by reducing the amount of grading; this will also reduce their costs. Landowners and the public will benefit from healthier and more productive forests.

Introduction

The Surface Mining Control and Reclamation Act of 1977 (SMCRA) drastically altered surface mining and reclamation practices throughout the United States. This law was primarily brought about for the purpose of protecting the people and environment of the coal mining regions from the abuses that occurred prior to the law's enactment. The legislation is also somewhat forward-looking, since it requires consideration of future land use. At the time of permit application, the coal operator and the landowner must agree on a post-mining land use, after which the coal operator must reclaim the land in a fashion to achieve that land use.

Reclamation is a complex process involving landowners, coal operators, and regulators. These groups may have different long-term goals and ideas about what constitutes desirable reclamation. Coal operators and landowners are usually two separate entities. Coal operators generally have no long-term interest in the land. It is in the best interest of the coal company to mine, reclaim, and achieve bond release as cost-effectively as possible. After bond release, the landowner continues to be responsible for property taxes and future environmental liabilities.

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Consequently, it is in the best interest of the landowner to have a postmining land use which generates income and enhances environmental stability. Regulators have the responsibility of enforcing the regulations which were written to benefit the public. Aside from the protection that SMCRA provides to the public during the mining and reclamation period, it is in the best interest of society to have a post-mining land use which provides long-term environmental benefits and contributes to the economic and social well-being of the region.

Most of the reclaimed surface-mined land in the central Appalachian Mountains cannot realistically be used for anything other than growing trees. Some will be used for cattle production, and some will be used for residential or commercial development, but most of the land will ultimately become forested. The value of these forests to landowners and society will depend on whether or not reclamation is designed to enhance forest benefits. Reclamation provides the opportunity for coal companies to replace moderate- to low-quality forest land with some of the most productive forest land in the country and stock it with whatever species of trees the landowner chooses.

"Commercial" forest land is a potentially valuable, but rarely used, post-mining land use option available to coal operators. From our point of view (as university researchers), commercial forest land seems to be the most logical post-mining land use for much of the central Appalachian region. Reclamation to achieve a productive forestry land use would be in the best collective interest of all parties involved.

The objective of this paper is to present the advantages that commercial forest land reclamation offers landowners, coal operators, and society in the central Appalachian coal fields, and to suggest how reclamation to commercial forest land should differ from reclamation to other land uses.

What is commercial forest land?

From a regulatory perspective, there is little distinction between "commercial" ("managed" forest land) and "unmanaged" forest land. Unmanaged forest land is already a common post-mining land use in the central Appalachians, particularly in Virginia. The bond release requirements for unmanaged forest vary somewhat from state to state, but generally the coal operator must achieve a 90% ground cover and establish a specified number of tree or shrub seedlings (usually 400-600 per acre depending on slope steepness). White pine (*Pinus strobus*) is usually planted in conjunction with some non-commercial species such as black locust (*Robinia psuedoacacia*), black alder (*Alnus glutinosa*), autumn olive (*Elaeagnus umbellata*), and several other shrub species. For commercial forest land, the number of trees required for bond release and the species composition may vary depending on the timber management objectives of the landowner. In most cases, it is possible to achieve the same final result with either post-mining land use specification. Nonetheless, there are certain advantages to selecting commercial forest land as opposed to unmanaged forest land.

The most important reason to use commercial forest land versus unmanaged forest land is that it emphasizes the **intent** of the landowner, which in turn should require that the land be reclaimed in a fashion to facilitate that intention. For commercial forest land, it is not sufficient to merely plant trees, but the land must be reclaimed so that trees grow well. In forestry jargon, the reclaimed area must

have a high site quality or site index (SI). Site index is the height of dominant trees at age 50. Harvestable tree volume increases exponentially with site index. In the central Appalachian region, where white pine is the primary commercial tree species planted on minesoils, we believe the goal of reclamation should be to create land with a SI of 100 feet.

How is commercial forest land created?

The central Appalachian coal fields of Virginia, West Virginia, Kentucky, and Tennessee have an abundance of rainfall (compared to western states), and toxic, acid-producing spoils occur less frequently than in the northern Appalachian region of West Virginia and Pennsylvania. Thus, compared to many parts of the country, it is relatively easy to reclaim land in the central Appalachians in ways that prevent environmental damage. Under such circumstances, it is reasonable to pursue a higher and better level of reclamation: one that focuses on long-term land use as well as immediate environmental protection. We are convinced that it is relatively easy to create productive minesoils throughout the central Appalachian region with a SI of 100 feet or more for white pine.

Restoration of productive forest land requires the construction of a deep, non-compacted, non-toxic minesoil, and the absence of a competitive ground cover. This can be accomplished by (1) selecting appropriate overburden materials for placement at the surface, (2) eliminating compaction on level or gently sloping surfaces, and (3) using a tree-compatible ground cover to enhance tree seedling survival and early growth. It is not the intent of this paper to detail our guidelines; this has been done elsewhere (Burger and Torbert, 1992; Torbert et al., 1991a). Rather, we want to report that these procedures have resulted in site indices of more than 100 feet for white pine. By comparison, the average SI for white pine on natural soils in this region is 80 feet (Dolittle, 1958). Thus, it is possible to achieve a level of forest productivity for minesoils that exceeds the average for native soil.

In Illinois, these same procedures resulted in a 30-year-old white oak (*Quercus alba*) SI of 94, which was the best-growing white oak stand ever recorded in that state (Ashby, 1984). Similar growth was reported for yellow-poplar (*Liriodendron tulipifera*) and black walnut (*Juglans nigra*). Despite the potential to create such productive forest land, most of the surface-mined land in the Appalachians is reclaimed to a level of productivity far below SI 100 as a result of compaction caused by placement and grading of the final surface. The compaction problem is especially severe on level and gently sloping areas, where SI is often reduced to about 60 feet or less.

Cause of compaction

Excessive compaction arises when the final layer of overburden and/or topsoil is placed on the surface and graded. Frequently the final lift of overburden or topsoil substitute on level areas is dumped by haulers and leveled with bulldozers. When the next truck arrives with another load, it will drive over the area that was just leveled to dump the new load which will subsequently be spread and leveled by the bulldozer. Thus, dumping and grading occur simultaneously and the surface layer of minesoil becomes extremely compacted from the traffic. Additional compaction may occur when (1) bulldozers grade the site one more time to remove any large rocks or boulders that protrude from the surface, and (2) when bulldozers "track" the final surface before seeding.

Revegetation is usually accomplished with a mixture of Kentucky-31 tall fescue (*Festuca arundinacea* Sel. Ky-31) and other species that generally produce a dense ground cover during the first year. This reclamation scenario has become standard operating practice for most coal operators in the region, and regulators have come to expect (demand) smoothly finished surfaces with dense vegetation. Unfortunately, much of the reclamation community now equates these practices with "successful" reclamation. These practices may be desirable for creating a "hayland/pasture" land use, but they are counterproductive with respect to a forestry land use.

Forest land should be less intensively graded on level and gentle slopes (where erosion hazard is slight), and less aggressive ground covers should be used to facilitate tree seedling survival. It should be acceptable to leave rocks and debris (logs, stumps, etc.) on the surface, since they do not affect forestry land use opportunities, and because they can actually enhance wildlife habitat and biodiversity.

Advantage to landowners

The commercial forest-land option is especially appropriate for large corporate landowners who may own hundreds or thousands of acres of reclaimed mined land. Even though the coal will be gone, these landowners will still be responsible for taxes and any environmental liabilities that may occur after the coal operators have left. These corporations may use some of the land for commercial development and they may lease some of it for cattle production or other uses, but the majority of the land will not be intensively used for any purpose. These corporations have the ability to undertake a long-term land management program such as timber production which may be unrealistic for individual private landowners due to tract size and the length of time required to grow a harvestable crop.

Owners of surface-mined land have certain forest management opportunities available to them that don't realistically exist for anyone else. Reclamation with a commercial forest land use option represents a once-in-a-lifetime opportunity to replace native woodlands, which often consist of a large proportion of non-marketable trees on marginally productive soils. Forest soils can be replaced with deeper, more productive minesoils with fully stocked stands consisting of species of the landowner's own choosing. This can occur at no cost to the landowner, since the coal company pays the cost of reclamation. On natural soils, landowners would not only have to pay the costs of site preparation and planting, but they would have to capitalize those costs until the time of harvest.

To obtain good timber returns, landowners need to let coal operators know they intend to manage the land for timber, and that the land needs to be reclaimed to a SI-100 level of productivity. Probert et al. (1992) estimated that the 30-year value of white pine on a SI 100 minesoil would be worth ninefold the value of white pine on a SI 65 minesoil.

Advantage to coal operators

Whereas landowners will reap the economic rewards of timber production, coal operators must pay the cost to reclaim the land and plant trees. Fortunately, the commercial forest land option provides the opportunity for coal operators to reduce their reclamation costs through reduced grading. It is fortunate that the most important steps coal operators can take to improve the

productivity of minesoils involves a reduction of cost. From observations of grading operations and personal communication with coal operators in the region, we estimated that coal operators can save approximately $400/acre when the costs of tree planting and the savings from reduced grading are calculated.

Advantage to society

The benefits of commercial forest to society are less tangible but still important. It seems logical to assume that many of the non-commodity forest amenities will increase with forest health and productivity. The roots and forest floor associated with a vigorous forest will stabilize steep slopes, prevent surface erosion, and protect the watershed. Healthy forests support wildlife and improve aesthetics. Eventually, if enough land is reclaimed to commercial forest, timber-related jobs will develop.

Ideally, large landowners utilizing the commercial forest option on their surface-mined land will also begin to appreciate the forest management opportunities that exist on their non-coal-bearing properties. The Appalachian Mountains have a vast supply of renewable forest resources which historically have been exploited, but never effectively managed. With proper forest management, the region could develop its timber-related enterprises, and the economy of the region could become less dependent on the coal industry.

Conclusion

By selecting commercial forest land as the post-mining land use, landowners and coal operators have the opportunity to set a new precedent for the way that land is reclaimed when the long-term goal is to grow trees. Coal operators, landowners, and regulators should expect land reclaimed as commercial forest land to look different than land reclaimed as "hayland/pasture". In order to construct minesoils with a SI of 100, and successfully establish trees, coal operators may have to modify their traditional overburden placement and grading techniques on level land and use a different mixture of ground cover species.

Research and demonstrations (Torbert et al., 1991b) have shown that appropriate reclamation modifications can be made to accommodate productive forest land while meeting regulatory requirements. Furthermore, landowners (Probert et al., 1992) have shown that commercial forest on reclaimed mined land meets their long-term management objectives and is consistent with the health and well-being of the region at large.

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