

Biological and Economic Hurdles to Private Forest Ownership of Reclaimed Strip Mines¹

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Abstract. Most mine lands after reclaimed just “hold the world together”. While a cover crop of mostly exotic plants provides some wildlife habitat, little of value can be grown to produce wood products. Most ownerships do not seek reclaimed mine lands but purchase or hold them for the value in adjacent lands. Besides hunting leases, these lands do not generally pay their way in acceptable economic returns. If commercial forestry, especially high value timber species, can be grown on these lands, they become more valuable. Mined lands can become important sources of fiber during wet times of the year because of existing all weather access and the characteristics of the soil that allow harvesting during these times. Carbon credits may make these lands very valuable. To create economically viable land, soils; sites; silviculture; regulations; and finances must all must be understood to create a management system.

Additional Key Words: financial return, economic analysis, commercial forestry

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Introduction

The key to restoration of forests to strip mines is not regulation but providing economic incentives for landowners to keep and manage this property. In fact, regulations have played a negative role in the restoration of forests. The Surface Mining Control and Reclamation Act of 1977 (SMCRA) stated that site productivity must be at least equal with the pre-mining levels. The use of over aggressive herbaceous vegetation, compaction, and calcareous shale makes regeneration of forests difficult (Burger, 1999). Rodrigue and Burger (2000) found that pre-SMCRA lands were as productive as the unmined condition in the Midwest but was less in the east. Torbert et al. (2000) reported that white, Virginia, and loblolly pines grew significantly better on pre-SMCRA sites than post-SMCRA sites. The result of the post-SMCRA is a forest that either is not established or grows at a rate that is economically feasible.

There is some value to the land but the land is not valued. For most industrial landowners, it holds the world together and not much else. The purpose of this paper is to explore the possibilities of increasing value of mine lands to industrial landowners. By taking this perspective, other landowners may see the potential and limitations for owning mined land. The biological potential drives the economic potential. If the biological hurdles can be overcome, economic ones may follow suite.

There are not a lot of effective techniques to easily reestablish trees after the reclamation is accomplished that uses the traditional methods that compact the soils and leave basic to alkali shale at the surface. Ground cover is established quickly and the site is stabilized. These methods insure that the bond is released quickly and it is understandable. The time to effectively reclaim the land to forest is at time of reclamation and the proper time to consider post-reclamation land use is before the overburden is removed. However, the reality of the situation is that there are probably millions of acres that could support tree growth if the compaction was alleviated and tree species are chosen to thrive in the soil chemical environment. The problem is very little thought is given to further production of value from the land beyond the extracted value or future extracted value. Laws and regulations designed to insure that the land is reclaimed often results in making the task more difficult. Well-meaning groups often advocate techniques that become regulations that are designed to make the mining more difficult in hopes of stopping it. The result is that a viable and valuable forest is not established. A good example is the reclamation

required for mountain-top removal in West Virginia if forest is the required land use. The regulation that one acre block of native trees is used in manner that no more than one acre of a single species is continuous. This would be humorous if it was not so tragic. No regard is given to soil and site characteristics and little attention is given to ecological principals that would quickly restore a working forest that would have value to the owner and the community at large. Lip service to diversity without regard to long term health and restoration seems to be the prevailing thought behind this advocacy. A single nurse crop can be planted and harvested with supplemental underplanting would approximate a more ideal that a few surviving patches of trees.

Any student that has had a course in natural resource economics can write a paper on value. The purpose of this paper is not to teach a course on value. The most important concept is that even non-tangible values have an economic cost. Book values are still carried and can decrease returns per capital employed. The book value represents the base worth of the property. Property taxes and possibly other taxes must be paid on an annual basis. Other costs involve liability risks for owning the land which include both personal and environmental liability. The most common cost of liability is insurance to cover damages. The annual costs (C) of owning land can be summarized as:

$$C = (BV * I) + T + M \quad (1)$$

Where BV is book value, I is an alternative interest rate, T is taxes, and M is management costs and liability. To own the land, this is the true annual cost. Any philanthropic use of the land such as wildlife habitat will cost the landowner this much annually. This fact seems to be lost on some interest groups and regulators. After the coal is gone, the landowner still has these costs. The question is can the landowner recoup these costs. To do so, revenue (R) must counter the costs and show a profit (P):

$$P = R - C \quad (2)$$

Assume that the book value is \$500 per acre, the alternative interest rate is 5%, taxes are \$3.00 per acre, and management costs are \$5.00 per acre. The annual cost of holding mine land is \$36 per acre. If we apply the following to determine annual rate of return (RR):

$$RR = R / BV \quad (3)$$

The result is -6.4 percent annually the landowner is losing. To breakeven based on the costs of holding the land the landowner must generate \$36 per acre.

Biomass and Fiber in Short Rotations.

Mined lands offer opportunities to produce fiber if site conditions can be made to be conducive to tree growth. Limiting factors to most forest industries is the ability to procure fiber during inclement weather and adverse soil conditions. Mine land generally has all weather access and soil characteristics that will not be adversely impacted by wet weather logging. An area that has these characteristics would quickly become a core supply area for forest industries. Markets for the short rotation fiber would be pulpwood, oriented strand board, and fuel markets. Target rotations would be 20 years with yields of about 100 green tons of fiber based on site quality. These yields are based on unpublished research data on actual mine sites. Cost of site preparation and planting is projected to be about \$300 per acre. Weed control at ages 1 and 2 is about \$40 per acre each and fertilization at age 1, 5, and 10 is \$10, \$15, and \$20. Present costs (FC) and revenue (FR) must be evaluated based on compound interest. The following formulas can be use to calculate these values:

$$PC = \sum (C / (1 + I)^t) \quad (4)$$

$$PR = \sum (R / (1 + I)^t) \quad (5)$$

Where t is the time of investment in years. Net present value (NPV) can be expressed as:

$$NPV = PR - PC \quad (6)$$

For this example, the present cost per acre of growing the fiber is \$541 the present value of growing the fiber at \$10/ton is \$377. This operation would be a net loss unless productivity could be increased, price increased, or costs decreased. That is the simple matter of these results. Improper mine reclamation at the beginning increases the establishment costs and decreases productivity. On a properly reclaimed mine, establishment costs should be about \$100. This would decrease the present growing costs to \$462. Yields should be about 130 tons per acre with a resultant present value of \$490 and a net present value of \$38. If the total cost of establishment is borne by the mining operation, the present value of growing costs is \$312 which yields a

positive net present value of \$65 at 100 tons per acre yield and \$10/ton income. The net present value at 120 tons per acre is \$150.

Sawtimber

Sawtimber yields and costs are a little more difficult to calculate. This management strategy has not been completed or successful on post-SMRA sites. Varying strategies must be employed to make this effort successful and at best it would be very costly to establish. The best scenario would be a short rotation nurse crop to cover the cost and an understory of valuable hardwoods. More research is needed before this strategy is recommended or costs and benefits evaluated

Wildlife.

In West Virginia, hunting leases are becoming common among private lands. This allows the landowner opportunity to recover some of the costs of the land. When leased as part of a larger parcel, mine land will bring between \$1 and \$4 per acre depending on several factors. The value of strip mine land alone for hunting is unknown. The current practices of reclaiming with exotic, invasive species of which most have marginal wildlife value does not add to the habitat of the site. In Kentucky, elk have been released to restore viable populations in the east and strip mine habitat has been deemed critical for elk due to the forbs and grasses. Similar projects have been suggested for West Virginia. If the landowner could be compensated for the supplying of elk habitat, this may provide a further incentive to leave the habitat as reclaimed. However, forestry and wildlife habitat are not mutually exclusive. A nurse crop of herbaceous cover can still provide favorable habitat if the correct species are chosen. Tree cover can provide a completely different habitat after crown closure that the open field does not. No matter the land use, wildlife value is there and can be recaptured by hunting leases. If we take the \$4 per acre for wildlife leases and recalculate profit and annual rate of return at \$28 and -5.6 percent respectively.

Water Quality.

Water is a social value that cannot be recaptured by the free-market process. In fact, the considerable effort to reclaim the land is to insure that water quality is not impacted. To date, no fishing rights have been leased on the open market. This does not preclude fishing rights to be sold in the future but currently there is no market. Although water quality does not have a direct

value to the landowner, degrading water quality will prevent the landowner from generating revenue from the property.

Carbon Sequestration

The area of carbon sequestration is another that needs more research. The Chicago Carbon Exchange that publicly trades carbon values are extremely interested if mine lands can sequester carbon and what reclamation techniques sequester the most. Selling of carbon credits could counter balance the management costs like hunting leases and would make holding mine lands more attractive.

Conclusions

Improper mine reclamation is expensive for the future holding of mine land. Basic calculations show that expensive cultural practices, management costs, land value, and taxes make forests operations on mine land too expensive if the site is not properly prepared for forests. Production of sawtimber especially hardwood sawtimber is a large unknown management strategy. Wildlife leases and carbon credits could offset management costs. Preferential taxes would also help. To encourage investment in these lands, these costs must be minimized. The real costs for holding these lands must be realized by government organizations hoping to capture social values from the property. The question of industrial ownership is still to be determined. Currently more productive land is taking up the slack for mine land. If large tracts are owned of only mine land, continued ownership would be doubtful in this current climate. Future investments in these lands depend on making the capital used to make them productive return at an acceptable rate. Until this can happen, no future investments in mine land will be made.

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