Post-Mountaintop Removal Reclamation of Mountain Summits for Economic Development in Appalachia

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INTRODUCTION

Mountaintop Removal (MTR) is a highly intensive form of coal surface mining in Appalachia in which vast amounts of bedrock, called “overburden”, are removed from the sides and tops of mountains to access the underlying coal seams. Up to 600 feet of bedrock can be removed from thousands of acres at a single mine. (EIA, 2006) The overburden is typically deposited into adjacent valleys in a formation called a “valley fill” (VF). After mining is completed, the mined area is usually re-contoured. The end result is often extensive areas of deforested land with level topography relative to pre-mining conditions.

Geredien (2009) estimated that somewhere between 1.05 and 1.21 million acres of land had been extensively surface mined in the Appalachian region, much of which has consisted of MTR/VF mining. At least 500 mountain ridges in the region have been partially or completely leveled by MTR/VF (Geredien 2006).

This study examined a sample dataset of several hundred sites in the western Appalachian Mountains, where MTR mining has occurred, in order to determine how much of the post-mining landscape has been converted to new land uses such as industrial, commercial or residential development. More specifically, this study identified the number of MTR-mined mountaintops that have been converted to such economic uses.

METHODS

The study examined reclaimed MTR sites in the coal surface mining region of Kentucky, West Virginia, Virginia, and Tennessee. These sites were derived from an existing GIS database of 500 known mountain peaks and ridges where the bedrock of the uppermost elevation has been reduced by at least 50 vertical feet due to mining (Appalachian Voices 2006-2009, Geredien 2009). It should be noted here that the surface mines at these locations make up the majority of MTR mining in the region, however more than 50% of all Appalachian surface mining occurs away from the summit ridgeline, though significant overburden is still often removed (Geredien, 2009). 90 of these 500 mountain locations were excluded from this study due to active, ongoing mining activity as of 2007-2008, and therefore an assessment of post-mining activities on these sites is premature. The 410 remaining mountain locations comprised the study sample.

Each reclaimed MTR location was treated as a single point, and a circular buffer with a radius of 500 meters, based on the typical minimum separation distance between data points of 1 km, was generated around each point to approximate the area of the mountaintop or ridge where the mining activity and any subsequent economic development occurred. Each mountain point and its corresponding circular buffer were analyzed using photo interpretation based on USDA National Aerial Imagery Program (NAIP) high-resolution, true-color aerial photography from 2007-2008. Using this high-

resolution imagery, land cover types and associated land uses were identified within the 500-meter circular buffer.

Specific land uses that could be classified as “post-mining economic development” were identified. These land uses generally included “industrial, commercial, residential, or public” uses (30 U.S.C. §§ 1201-1328). , Unlike pasture and forestry, land use for oil and gas drilling was classified as post-mining economic development because the latter activities are considered an industrial post-mining land uses with significant economic value. However, pasture and forestry were not classified as post-mining economic development, since the post-mining landscape does not facilitate these uses any more so than the natural landscape would. For example, the author has observed pasture and hay on many un-mined Appalachian ridges, including areas with steep slopes. Moreover, it was rarely possible to differentiate pastured grasslands from other post-mining grasslands using aerial imagery.

Listings of known reclaimed MTR sites in each of the four states in the study area published by The National Mining Association and the internet were used to identitfy specific development sites by name and location (Dula 2009).

SUMMARY OF FINDINGS

Of the 410 reclaimed MTR sites surveyed, 366 (89.3%) had no form of verifiable post-mining economic reclamation excluding forestry and pasture.

Only twenty-six locations (6.3% of the total) host some form of verifiable post-mining economic development. These development projects included one federal prison, three oil/gas fields, two airports, one hospital, which was located within an industrial park, one ATV training center, three golf courses, four industrial/business parks, two county/municipal parks, and one county fairground. Commercial agriculture or farming was identified on nine sites, sometimes in conjunction with other land uses such as residential development.

Virginia had the highest proportion of economic development on its reclaimed MTR sites at 20.0%, whereas only 4.0% and 4.2% of mountains in Kentucky and West Virginia respectively had any post-mining economic development. Tennessee, which has relatively little MTR mining compared to the other three states, had no economic development on the six MTR locations examined in that state. **Table 1** shows a complete breakdown by state of all 410 mountains in the study sample.

State	No. Mountains	No. Reclaimed	Econ Develop	Possible/Maybe	% Econ
Kentucky	293	248	10	8	4.0%
Virginia	66	60	12	4	20.0%
West Virginia	135	96	4	6	4.2%
Tennessee	6	6	0	0	0.0%
Total	500	410	26	18	6.3%

Table 1 Summary of results, showing total number of MTR sites in each state followed by the number reclaimed, the number with economic development, and the number with possible economic development. "% Econ" shows the percentage of sites with economic development.

The post-mining land use status of all but 18 mountain locations was identified with a high level of confidence. These 18 locations were identified as having "possible" post-mining economic land uses. Frequently some evidence of potential economic reclamation existing on these sites, such as mowed fields or improved structures, but specific land use was not clear. In some cases, it was not clear whether structures were abandoned or directly connected to former or existing mining activity on site or nearby.

CONCLUSION

Most mountain locations impacted by MTR have not had post-mining economic development and are in various stages of successional vegetation such as grassland, shrubland, tree plantings, or forest.

Because only mountain ridgelines were documented in this study, over half of all surface mining activity in Appalachia was excluded from this analysis. Consequently many reclaimed sites with known economic development such as federal correctional facilities did not appear in these results. A broader study that examines the post-mining land uses of all Appalachian surface-mined areas would capture these developments. However, the relative proportion of reclaimed land used for economic development could be lower than presented here because much more total acreage would be included in such analysis..

The results of this assessment are consistent with reports that 5% or less of mined lands has been reclaimed for economic development (Estep and Johnson, 2009). With the vast majority of the 410 mined mountains in this study still undeveloped, it is clear that MTR has not yet led to much economic development on reclaimed mine lands in

Appalachia, nor is there a shortage of landscapes with flattened topography available for industrial, commercial, or residential post-mining economic development.

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