

night. Eighty cubic yards of concrete was placed over the rock and rubble to consolidate the fill material. This was covered with material trucked in from a nearby site. After mounding and compacting, the site was covered with topsoil which was leveled and grass seed planted over the disturbed area. The problem was remediated at a cost of \$64,464.00 in approximately five working days.

Sometime after the hole had stabilized, it was learned that an unknown person entered the structure and rescued Romeo the lovebird along with a few of the resident's more valuable possessions.

Mr. Morang has learned that both structures will have to be razed and that his insurance will not cover any of the loss of his home or his business. No subsidence insurance program is in effect for the state of Kansas. The one hundred and fourteen year old building has become another casualty of the lead and zinc mining problem that affects the entire Tri-State Mining District.

Available maps indicate that most of the city is undermined, including the Galena School complex. The clock is ticking.

By Larry Spahn, Kansas Emergency Program Coordinator

Maryland Bureau of Mines Performs Reforestation Demonstration Project

The Maryland Department of the Environment, Mining Program, Bureau of Mines has completed a reforestation demonstration plot on a reclaimed surface mine. The demonstration plot was completed in the spring of 2006 in conjunction with the reclamation of the TD Mining Bond Forfeiture Reclamation Project, located just southwest of Frostburg, Garrett County, Maryland.

Most surface mined lands in the Appalachian coal fields were forested prior to mining. Surface coal mining completely removes the vegetation and soil from the surface in order to extract the underlying coal reserves. In 1977, the newly enacted federal surface mining laws dictated national standards for coal mining and coal mine reclamation. To meet these standards, coal mine operators began using heavy grading, soil compaction, and thick herbaceous ground cover to provide both quick and long-term soil stabilization. This type of reclamation is well suited for areas where the post-mining land-use is pasture or grazing, but in areas where the post-mining land-use is designated as forestry or undeveloped land, this traditional and long accepted practice severely inhibits tree growth. The heavily compacted soil slows tree growth by impeding root penetration and decreasing water infiltration into the soil. The thick mat of cool-season grasses out-competes small seedlings for moisture and sunlight, delays natural succession by decades and severely limits the survival rate of planted tree seedlings.

In 2004, the Maryland Bureau of Mines, the federal Office of Surface Mining, and coal mining agencies from Ohio, Kentucky, Virginia, Pennsylvania, West Virginia and Tennessee began to promote the Appalachian Regional Reforestation Initiative (ARRI). The Goals of ARRI are to promote planting hardwood trees on reclaimed coal mines in Appalachia and to use methods that increase survival rates and growth rates of the trees, thus reestablishing the high-value hardwood forests that existed prior to mining. To achieve these goals, ARRI members promote to the coal mining industry, landowners and state abandoned mine reclamation programs the use of the Forestry Reclamation Approach (FRA). The five steps

of the FRA are: 1) Create a suitable rooting medium for good tree growth that is no less than 4 feet deep and comprised of topsoil, weathered sandstone, and/or the best available material. 2) Loosely grade the rooting topsoil (or topsoil substitutes) to create a non-compacted growth medium. 3) Use native and non-competitive herbaceous ground covers that are compatible with growing trees. 4) Plant two types of trees, early succession species for wildlife and soil stability, and commercially valuable crop trees, and 5) Use proper tree planting techniques.

Three demonstration plots were developed on the TD Mine Project Site using the FRA techniques. Soil encountered during backfilling that was suitable for tree growth was left in place until the demonstration plots were rough backfilled and ready for topsoil placement. The soil was then pushed from the stockpile area using D-9 bulldozers and deposited on the surface of the demonstration plots. The bulldozers pushed a blade full of soil to the back of the demonstration plots, with each consecutive blade full butted against the previous. In this manner, the topsoil was never compacted by



bulldozer traffic and left very rough. The abutting soil piles were then backbladed with a single pass of the bulldozer resulting in a uniform, uncompacted topsoil layer of 4 to 6 feet thick. A composite soil sample was taken and reported a pH of 6.4. No nutrient analysis was completed and no soil amendments were applied.

The plots are on the east slope of Big Savage Mountain, elevation 2650, and slope toward the southeast at a 6% grade. On Plot #1, trees were planted by hand using the Bureau of Mine's in-house tree planting crew. The trees were planted during the first week in April, 2005. Plot #2 was planted by hand on April 6, 2006 by High School students, Government personnel, Watershed Groups and other volunteers during the Bureau of Mines 2006 Arbor Day event.

Plot #1 (2 acres)

Trees
 750 Black Cherry
 250 Chestnut Oak
 400 Green Ash

Herbaceous
 Orchard Grass 10 lbs/ac
 Perennial Rye Grass 10 lbs/ac
 Weeping Lovegrass 10 lbs/ac
 Timothy 10 lbs/ac

The remainder of the mine site (Plot #3) was backfilled, graded and stabilized using the traditional reclamation methods of compaction and thick herbaceous ground covers. Trees were planted on this area during the last week in April, 2006 by a tree planting contractor using a mechanized tree planter. A mixture of Green Ash, Pin Oak, Black Cherry, Northern Red Oak, Chestnut Oak, and White Oak were planted at a rate of 500 trees to the acre. This area was also treated with 5 tons/acre of agricultural grade lime and 400 lbs/acre of 10-20-20 fertilizer. These rates are an industry standard and are generally accepted as appropriate application rates for new revegetation on mine sites.

The goal of the demonstration project is not to provide scientific data but rather provide a site that will visually demonstrate



Arbor Day Tree Planting, April 2006

Plot #2 (5.2 acres)

Trees
 500 Red Maple
 1000 Northern Red Oak
 1250 Black Locust
 100 American Plum

Herbaceous (60 lbs/acre)
 Orchard Grass 10 lbs/ac
 Perennial Rye Grass 10 lbs/ac
 Weeping Lovegrass 10 lbs/ac
 Timothy 10 lbs/ac
 Birdsfoot Trefoil 10 lbs/ac
 Redtop 10 lbs/ac
 Red Clover 2 lbs/ac

the benefits of the FRA to Maryland's Coal Mining Industry and landowners that have property leased to mining companies. It will be used to promote forestry as a viable post-mining land-use and to encourage coal mine operators and landowners to forego the visually pleasing, smooth, compacted grades, and sterile grass fields for the environmental and economic benefits of a well-managed hardwood forest.

The initial results appear to show greater tree growth and survival rates on the FRA sites, although a late summer drought in 2005 has effected the results on Plot #1. It will require at least one or two more growing season before the benefits can be visually observed. To learn more about the ARRI, visit the web site at <http://arri.osmre.gov/>

NEWSLETTER ARTICLE SPECIFICATIONS

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