

REFORESTATION/WARM SEASON GRASS COMMITTEE RECOMMENDATIONS*

The Bureau of Mines and the Land Reclamation Committee (LRC) should implement permitting guidelines for the use of Warm Season Grasses (WSG). The guidelines should be used by the permit applicant to develop a reclamation plan to be part of the mining application. The guidelines should be based on the attached “Guidelines for Warm Season Grass Reclamation on Maryland Coal Mines.”

The Bureau of Mines and the Land Reclamation Committee (LRC) should implement permitting guidelines for the Forestry Reclamation Approach (FRA). The guidelines should be used by the permit applicant to develop a reclamation plan to be part of the mining application. The guidelines should be based on the attached: “Guidelines for using the Forestry Reclamation Approach on Maryland Coal Mines.”

The Bureau of Mines and the Land Reclamation Committee (LRC) should jointly provide to the Maryland coal operators and consultants the information provided in “Guidelines for Warm Season Grass Reclamation on Maryland Coal Mines” and “Guidelines for using the Forestry Reclamation Approach on Maryland Coal Mines.”

The Bureau of Mines should add a revegetation success standard for warm season grasses in COMAR 26.20.29.07 B. The standard should be consistent with “Guidelines for Warm Season Grass Reclamation on Maryland Coal Mines.” The standard should include a percent ground cover requirement and a definition of ground cover.

Current Maryland coal mine revegetation success standards for forestland require that the herbaceous ground cover be sufficient to control erosion and have a ground cover of 70%. The Bureau of Mines should change COMAR 26.20.29.07 B3d to exclude areas planted to the Forestry Reclamation Approach from the 70% ground cover requirement. The revised standard for these areas would require sufficient ground cover to control erosion.

For reclamation plans that include the Forestry Reclamation Approach or Warm Season Grasses the LRC should consider recommending to the Bureau of Mines that the Bureau contribute up to 50% of the cost of fertilizer, lime, and seed needed to reclaim the permit site as per Title 15-512 of the Annotated Code of Maryland as funds are available.

*Recommendations as modified and adopted by the LRC on Nov 2, 2005. Modifications made by the LRC to original recommendations are underlined.

GUIDELINES FOR WARM SEASON GRASS RECLAMATION ON MARYLAND COAL MINES

Areas to be planted in Warm Season Grasses must have a post mining land use of “Fish and Wildlife Habitat”. See COMAR 26.20.02.13T.(1) for requirements for identifying the post mining land use. The post mining land use must be identified in the permit application.

The permit application must include a revegetation plan for the area to be planted in warm season grasses. The plan must be developed in accordance with COMAR 26.20.29.04(G). The plan must be developed in consultation with the Maryland Wildlife and Heritage Division of the Maryland Department of Natural Resources.

Revegetation success standards are used to determine if the area is eligible for bond release. For warm season grasses the standard should require the site have sufficient herbaceous ground cover to control erosion. It should also require the site have 70 percent ground cover. For warm season grass the percent ground cover is determined by calculating the percentage of land surface that is overlain by aerial parts of the plant or covered with naturally produced litter (dead leaves and stems).

Warm season grasses shall not be planted on areas with an average slope greater than 8% or a maximum allowable slope of 15%.

Recommended Seed Mixture:

<u>Species</u>	<u>Cultivar</u>	<u>lbs/ac.</u>
Switchgrass	Blackwall, Carthage, Cave-in-Rock or Shelter	3 PLS (Pure Live Seed)
Indiangrass	Ramsey	3 PLS
Big Bluestem	Niagera or Rountree	3 PLS
Little Bluestem	Aldous or Blaze	3 PLS
Partridge Pea	Common	4
<u>PLUS</u>		
Optional for visual quality:		
Blackeyed Susan	Common	0.5
Lance-leaved Coreopsis	Common	0.5
Purple Coneflower	Common	0.5
<u>PLUS</u>		
Nurse Crop:		
Creeping Red Fescue	Dawson, Pennlawn Flyer,	
or	Fortess, Ruby or Salem	15
Oats	-----	64

Soil Amendments: The soil in the area to be planted in warm season grasses shall be sampled and analyzed by a certified lab.

Lime: Apply sufficient lime to bring soil pH to a level between 5.0 and 7.0

Fertilizer: Apply 50#/ac. each of P and K or 500#/ac. 0-10-10, assuming P and K soil test levels converted to Maryland's FIV (Fertility Index Values) are in "Low" or "Very Low" range. Otherwise, no P and K are needed. Apply 30#/ac. Nitrogen to the soil for warm season grass plantings with cool season nurse crops of oats and Red Fescue.

Mulch: No more than 1 Ton/ac. clean straw (no hay).

Seeding Dates:

March 15 to May 31

September 1 to September 30

Recommended planting techniques:

Soil temperature should be 50 degrees or warmer at the time of planting.

Most warm season species (indiangrass, big bluestem, and little bluestem) have fluffy seeds that require the use of a special native grass drill for planting. Ideally, the warm season grasses are drilled and the cool season nurse crops should be broadcast/cultipacked or hydrosseeded. If oats are planted through the drill with warm season grasses, seeding rate should be dropped to 1bu./ac to reduce in-row competition.

Warm season grasses should be planted in strips or small areas to allow for easy burning. After the grass stand has been established, usually the third to fifth year of growth, the grass stand should be burned. Grazing and/or mowing, although less effective, can be used in place of burning.

Most warm season grasses must be planted with a special warm season seed drill. These types of drills are available through the Maryland Wildlife and Heritage Program, 301-777-2136. A 60 day notice is required to reserve the drill. A 40 HP or larger tractor is recommended to pull the drill. A nominal rental fee is required.

Cost Share Programs

WHIP-Wildlife Habitat Incentive Program NRCS 301-777-1494
NRCS contributes up to 75% of cost of seed

EQIP- NRCS 301-777-1494
NRCS contributes up to 50% of seed cost

National Wild Turkey Federation - Western Maryland Chapter
NWTF will provide seed at reduced cost. Website: www.nwtf.org

GUIDELINES FOR USING THE FORESTRY RECLAMATION APPROACH (FRA)
ON MARYLAND COAL MINES

The Forest Reclamation Approach is a reclamation technique that increases the survival rate and growth rate of high value hardwood trees by:

1. Creating a suitable rooting medium for good tree growth that is no less than 4 feet in depth and comprised of topsoil and weathered sandstone and/or the best available material;
2. Loosely grading the topsoil or topsoil substitute to create a non-compacted growth medium;
3. Using native and non-competitive ground covers that are compatible with growing trees;
4. Planting two types of trees, early succession species for wildlife and soil stability, and commercially valuable crop trees; and
5. Using proper tree planting techniques

Areas to be planted using the Forestry Reclamation Approach must have a post mining land use of "Forestry." See COMAR 26.20.02.13T.(1) for requirements to identify the post mining land use. The post mining land use must be identified in the permit application.

The permit application must include a reclamation plan for the area to be planted using the Forestry Reclamation Approach. The plan must address the following:

Procedures for creating a suitable rooting medium for good tree growth that is no less than 4 feet in depth

The best rooting medium for tree growth is made up of topsoil and weathered sandstone. Sandstone is not always available on site therefore the best available material on the permit area should be used with the topsoil to create the rooting medium. The rooting medium should be placed on the surface to a depth of at least four feet, thus accommodating the needs of deeply rooted trees. All topsoil and topsoiling material on the permit area shall be saved and redistributed on the backfill. Growth media with an equilibrium pH of 5.0 to 7.0, low pyritic sulfur content, and a texture conducive to proper drainage are preferred.

Topsoil and subsoil placement techniques that reduce compaction

Minimizing compaction during the application of the rooting medium and the final grading operation is extremely important. The compaction that can occur during establishment of the final surface layer can be minimized by dumping and leveling in separate operations. However, the operator is still responsible for assuring that AOC and backfill stability are achieved. When trucks are used to deliver the final layer of material it should be dumped in tightly placed piles that abut one another across the entire area. After the material is placed a bulldozer can be used to grade the tops off of the piles. The bulldozer should be limited to one or two passes to reduce compaction.

Techniques for creating a backfill surface that is not smooth and uniform

Regardless of whether the mined area is a truck and loader, or dragline operation the final configuration of the backfill surface should be a diverse surface graded so not to create a smooth uniform surface. Natural forest sites and soils have a diverse microtopography of small depressions, hills, gullies, mounds, and rocks. Backfill and grading to imitate nature creates this type of microtopography that is more amenable to recruitment, establishment, and survival of planted trees and native forest species. Therefore, to the extent possible, final grading should be conducted to minimize compaction, create a surface microtopography, leave as much organic debris as possible, and leave occasional rocks, especially when their removal becomes counterproductive due to additional tractor traffic. Woody material, stumps, rocks and organic debris removed with the grubbing operation should be saved with the topsoil and redistributed on the final surface.

Plans to plant two types of trees

Two types of trees should be planted, early succession species for wildlife and soil stability and commercially valuable crop trees to make the land productive. The goal of this reclamation technique is to increase the growth rate of valuable hardwood trees while controlling runoff and soil erosion.

Reduce the amount of seed that would normally be planted

Reduce the amount of seed that is normally recommended for a reclamation site. Choose ground covers that are not competitive with the trees for light, water and space. A balanced seed mixture of permanent grasses, legumes, and small grain groundcovers will allow for short term erosion control and not inhibit tree growth or survival.

Recommended seed mixtures and planting rates as follows:

Redtop	3 lbs/acre
Orchard Grass	5 lbs/acre
Perennial Ryegrass	5 lbs/acre
*Birdsfoot Trefoil	8 lbs/acre
Ladino Clover	4 lbs/acre
Oats or Wheat	10 lbs/acre or rye at 3 lbs acre

* If Red Clover is added at 4 lbs/acre reduce Birdsfoot Trefoil to 4 lbs/acre

Fertilizer rates that are based on laboratory soil test.

Fertilizer rates should be based on laboratory soil tests. Inform the soil lab that the area will be planted in trees .The fertilizer recommendation should have an adequate amount of phosphorus and potassium and a low rate of nitrogen. The lower nitrogen rate reduces the height of the herbaceous ground cover.

Mulch rates that are sufficient to reduce erosion and do not impede the tree growth.

The area should be mulched at a rate of 1 to 2 tons of mulch per acre.

Lime rates that are based on laboratory soil analysis.

Lime rates should be based on laboratory soil analysis to achieve a PH ranging from 5-7. Often lime is not required due to the low pyritic content of the final cover