



A good covering of grass and legumes on retired roads, trails, and landings is one of the most noticeable BMP's. It makes logging jobs look good and is a sign to landowners that the logging job was completed properly. A number of Kentucky Master Loggers have indicated that sowing roads, trails, and landings has increased their firms visibility and along with other good logging practices makes it easier to get the larger quality jobs. However, the most important reason why roads, trails, and landings need to be revegetated is to prevent soil erosion. This becomes critical when muddy water running off of roads, trail, and landings can easily reach streams. Muddy water is the most important nonpoint source pollutant from logging operations. Revegetation of these areas is a critical BMP which when used with other BMP's, such as water control structures, will help reduce or eliminate water pollution. A 1998 study of timber harvesting BMP's indicates that only 16 percent of roads and trails are being revegetated. This is well below that required (see page 32 in your BMP manual).

Why can't I let Mother Nature revegetate disturbed ground?

While it is true that most disturbed areas will start to revegetate themselves naturally with briars, brush, and trees this generally does not occur quickly enough to stop the initial surface erosion of soil. The seeding recommendations in Kentucky's BMP No. 2 will provide the soil with the protection from erosion while road, trails, and landings settle to where they are less susceptible to surface erosion. This keeps as much soil as possible on the site. If these revegetated areas are not cared for the grass mixes will eventually fade and be replaced by brush and trees. This is to be expected. By this time the surface soil has settled and erosion problems are less severe.

Does revegetation alone stop erosion?

Proper revegetation of erodible areas is not the only BMP that reduces erosion and water pollution. To successfully deal with erosion and water pollution from roads, trails, and landings, BMP No. 2 must be used in conjunction with:

- proper placement of roads, trails, landings and use of Streamside Management Zones (BMP No. 3)
- water control structures
- removing ruts and berms
- keeping traffic off of retired sites.

Which roads, trails, and landings need to be revegetated?

This is the most common question asked about this BMP. The minimum criteria for this BMP states:

"Revegetate sediment producing, erodible or severely eroded areas, such as logging roads, skid trails, and log landings, as soon as possible. Revegetation should be sufficient to adequately control or significantly abate erosion from the site."

Currently, there is some debate over the exact meaning of the term "erodible". Areas where the leaves and top layer of soil, called duff, have been removed (like a section of a primary skid trail) are susceptible to erosion regardless of the slope of the ground. The steeper the ground the more pronounced the erosion. The Virginia Department of Forestry has stipulated the areas having 70 percent of the ground covered with vegetation is sufficient to prevent erosion and does not need revegetating. However, in Kentucky no such designation of percent ground cover or slope has been made.

Landings always have the duff layer and surface roots removed. Roads will also have the duff layer removed. Where roads are graveled they obviously do not need to be revegetated. Skid trails may or may not be disturbed enough to erode. Normally skid trails that handle 3 to 4 turns have enough disturbed soil to erode. Skidding only one turn generally does not cause enough disturbance to warrant revegetation. The minimum standard in BMP No. 2 states that revegetation needs to be done "as soon as possible". However, no time limits are given. It is clear, that if you are to protect soil from erosion and minimize water quality problems revegetation should be accomplished, weather permitting, as soon as you have stopped using a road, trail, or landing.

If you have a question about whether some of your trails need revegetation it would be prudent to use the following prioritization:

- 1) all roads, landings, and skid trails (that have been used for several turns) that are in close proximity to water or drainage channels regardless of slope percent and are not side sloped to prevent erosion channels,
- 2) steeply sloping disturbed ground (defined as greater than 10 percent slope in BMP No. 2),
- 3) relatively flat areas away from water or drainage channels.

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What do I need to do to prepare the areas for seeding?

All of the site work such as removing berms, installing permanent water control structures, and grading for proper drainage should be accomplished before seeding. Loosening the seed bed is the next step and is especially important when soils are hard and dry. There are a number of ways to loosen hard soils. Simple methods can be used such as back-dragging dozer and skidder blades. Westvaco, a large forest owner in western Kentucky, often uses a farm tractor and disk to prepare their roads, trails, and landings for seeding. Another logger in western Kentucky has a specially built bog disk which was designed to be pulled behind a skidder. Good seedbed preparation, especially in harsh weather could increase revegetation success and save money. Fertilizing, mulching, and liming can improve establishment (see page 36 in your BMP manual).

How do I select the proper seeding mix?

A number of species mixes for different situations are found in the 5 tables presented here and under BMP 2 in the manual. To do the best job of reducing erosion revegetation should be accomplished by using a combination of a temporary species and a “permanent” mix. The temporary species will come up quickly and provide a thick cover. However, it normally lives for only a short time and the “permanent” mix is needed to sustain the



A skidder making a temporary water bar. Water bars used along with revegetation can help prevent roads and trails from eroding.



A good example of proper revegetation of a primary skid trail on private land in Madison County. Whoever was responsible - good job.

cover for several years. The “permanent” mix is not really permanent. Without mowing or bush hogging, the “permanent” mix will fade and be replaced in several years by brush and trees.

Temporary Species

Table 2-1 in BMP No. 2 shows the recommended temporary species for Kentucky.

Table 2-1—Temporary Cover Crop Species

Species	Seeding Rates (lbs/ac/pls ¹)	Recommended Seeding Dates
winter wheat²	35	Oct. 15 - March 1
grain rye	35	Oct. 15 - March 1
spring oats	35	Oct. 15 - March 1
foxtail millet	12	May 1 - July 15
Japanese millet	15	May 1 - July 1
pearl millet	10	May 1 - July 1
annual ryegrass	5	Aug. 1 - Oct. 15
browntop millet	15	May 1 - July 1
cereal rye (Aroostook)	25	Sept. 15 - Oct. 15

Note that three of the species are in **bold**. Those species in **bold** letters are normally the easiest to obtain and establish. Each of the tables provides the optimum seeding period for each species and the amount of seed which should be used. The amount of seed is indicated in pounds of seed (pls)

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per acre. **Pls** stands for pure live seed. Check with your seed distributor to find out the germination rate and the purity of the seed being sold. If the table calls for 25 pound of **pls** seed and the dealer indicates that the seed is only 90 percent pure and viable then you need to apply 10 percent more seed 25lbs x (1/0.90) or 27.7 pounds per acre. We will deal with how to help establish cover when you are seeding outside of the recommended dates later in the article.

Permanent Mixes

Tables 2-2 through 2-5 provide permanent mixes for different situations. Table 2-2 has mixes which are recommended for ground with less than a 10 percent slope.

Table 2-2—Mixtures for Slopes Less than 10 Percent

Species Mixture	Seeding Rates (lbs/ac/pls) ¹	Seeding Dates for Mixture ²	Special Considerations
a. orchard grass³	8	Feb. 1 - May 1 Aug. 1 - Oct. 15	No fall planting due to lespedesa
red clover	6		
b. orchard grass	8	Feb. 1 - May 1 Aug. 1 - Oct. 15	
ladino clover	2		
c. timothy	4	Feb. 1 - May 1 Aug. 1 - Oct. 15	
ladino clover	2		
d. orchard grass	10	Feb. 1 - May 1	
Kobe or Korean lespedesa	10		
e. switch grass	1	May 1 - June 30	For open canopy conditions only. A good seed bed is required. No fall planting due to lespedesa.
big bluestem	2		
indiangrass	2		
red clover	4		
Korean lespedesa	5		
f. little bluestem	3	May 1 - June 30	
side-oats gramma	3		
Korean lespedesa	5		

Notice that the mixes in bold (a, b, and d) are those with which you will have the most success under these conditions. They all contain orchard grass. Orchard grass provides a more wildlife friendly alternative to Kentucky 31 tall fescue (see information for Table 2-3 below). Mixes a and b have two recommended seeding times compared to one seeding time for mix d. Most landings, which are not poorly drained, and all roads and trails having gentle slopes should be seeded with these mixes. (If you have a flat site that is particularly shady you might consider the creeping red fescue mix found in Table 2-3.) Note that mix e contains species of grasses which are

native to Kentucky such as switch grass. However, this mix and the others containing native species need sunny conditions and will not thrive in deep shade. They also need more care to establish than some of the mixes containing orchard grass or fescue.

Table 2-3 has recommended mixes for highly erodible areas where the soils or the slope percent makes the erosion situation particularly bad. Kentucky 31 tall fescue is recommended for these situations. However, it is important to remember that Kentucky 31 tall fescue is not wildlife

Table 2-3—Mixtures for Highly Erodible Areas (Areas Exceeding 10 Percent Slope)

Species Mixture	Seeding Rates (lbs/ac/pls) ¹	Seeding Dates ² for Mixture	Special Considerations	
a. Kentucky 31 fescue	30	Feb. 1 - May 15 Aug. 1 - Oct. 15	High seeding and plant vigor on droughty, exposed sites. The endophyte-free fescue is more valuable for wildlife and is acceptable on lesser slopes.	
flatpea³	30			
b. Kentucky 31 fescue	30	Feb. 1 - May 15 Aug. 1 - Oct. 15		
birdsfoot trefoil	10			
c. creeping red fescue	20	Feb. 1 - May 15 Aug. 1 - Oct. 15		For use in shaded areas.
white clover	2			
d. switch grass	8	May 1 - June 30	For open canopy conditions only. Switch grass is a native.	
partridge pea	5			

friendly. Most wild animals will not eat Kentucky 31 tall fescue. It is also difficult for birds, such as quail, to nest and feed in thick stands of Kentucky 31. For these reasons conservation professionals in the state are trying to reduce the amount of Kentucky 31 fescue planted for pastures and hay. However, both the Kentucky Department of Fish and Wildlife Resources and the Natural Resource Conservation Service have endorsed the use of Kentucky 31 in mixes for logging conditions where erosion may be particularly bad and where little seed bed preparation is practical. While fescue can stand a moderate amount of shade, note that mix c contains creeping red fescue and is particularly suitable for heavily shaded situations.

Mixtures for wet or poorly drained soils are listed in Table 2-4. The native grass, switch grass, is again

recommended. However, open sunny conditions are required for its survival.

Table 2-4—Mixtures for Wet or Poorly Drained Areas

Species Mixture	Seeding Rates (lbs/ac/pls) ¹	Seeding Dates ²	Special Considerations
a. redtop	7	Feb. 15 - June 30	
alsike clover or birdsfoot trefoil ³	6	Aug. 1 - Oct. 1	
b. switch grass	8	May 1 - June 30	For open canopy conditions only.
alsike clover or birdsfoot trefoil	6	Aug. 1 - Oct. 1	

What about landowners who want to reseed with native species?

Table 2-5 contains a native species mix. We have also seen where native species have been recommended in some of the other tables. Some landowners may be particularly interested in using native species on their properties. The

Table 2-5—Mixtures for Establishing Native Species

Species Mixture	Seeding Rates (lbs/ac/pls) ¹	Seeding Dates ²	Special Considerations
a. switch grass	2.0	May 1 - June 30	For open canopy conditions only.
indiangrass	2.0		
big bluestem	1.5		
little bluestem	1.5		
partridge pea	5.0		

problem most loggers will encounter with the use of these species is that they need a relatively good seedbed, require special care in seeding, have a narrow range of seeding dates, and take a year or more to establish. Both the landowner and the logger must be aware of these special considerations before making a decision to use them. Generally log landings, in full sun, away from streams or other waters could be candidates for the native species mix.

What if I am seeding outside of the recommended seeding dates?

Many times you may be closing out a job when it is not a good time to seed. In the case of extremely bad weather you may need to wait until the soils are in better shape. Outside of the recommended seeding dates the BMP manual recommends using 50 percent more seed. The use of mulch, usually a light coating of straw or hay, will help during the summer and so will fertilizing and liming. Page 36 in your BMP manual contains information on mulching, fertilizing and liming. Soil samples can be taken to your county Cooperative Extension agent for analysis and recommendations. However, a general fertilizer

application of 80 pounds of nitrogen (N), 120 pounds of phosphorus (P₂O₅), and 120 pounds of potassium (K₂O) per acre can be used in most situations.

How do I determine the amount of seed I need?

A number of loggers get their local seed distributor to mix their seed for them. They provide the distributor with the number of pounds (or ratio) of the temporary species and the species in the permanent mix.

FOR EXAMPLE: if you wanted to buy a mixture of winter wheat and orchard grass/red clover you could have your distributor mix the 3 species in a 35:8:6 ratio (35 pounds per acre for wheat, 8 for orchard grass, and 6 for red clover). Normally you buy a mix in a 50 pound bag. The total amount, or weight, of this mix that should be used per acre is a sum of all the recommendations for the species in the mix. In this case, 35 + 8 + 6 = 49 pounds per acre of mix should be used.

While some people are good at estimating the acreage of a landing, others (such as the author) are not. Here are some easy-to-remember guidelines:

- 100 ft. by 100 ft. square: one quarter of an acre**
- 150 ft. by 150 ft. square: one-half of an acre**
- 200 ft. by 200 ft. square: approximately one acre.**

While the acreage of a landing is relatively easy to determine, it is often harder to determine the acreage of roads and trails. Table 2-7 in your BMP manual makes this task easier by providing information which allows you to take the average width and length of your roads and trails and determine the acreage.

Seeding roads, trails, and landings is important for reducing erosion and water pollution. While protection of water quality is the primary aim of our BMPs they also make good business sense. Surveys show that when loggers use BMPs over 80 percent of the landowners are satisfied with the logging job; only 40 percent are satisfied when BMPs are not used. It is also important to remember that under our current laws BMPs are required to be used on all commercial logging operations after July 2000 (including those where horses are being used for skidding).





Continuing Education Credit Test

How to properly revegetate your harvest.

Name: _____
KML Card# _____
Address: _____

Phone #: _____

Complete test and send to:
Kentucky Master Logger
University of Kentucky
Department of Forestry
213 T.P. Cooper Building
Lexington, KY 40546-0073

Circle the letter that best answers the question.

1. What is the most important reason why roads, trails and landings need to be revegetated?
 - a. aesthetics
 - b. prevent atv use of trails
 - c. to prevent soil erosion
 - d. it is good business practice
2. The revegetation of erodible areas should be used in conjunction with which of the following?
 - a. water control structures
 - b. removing ruts and berms
 - c. keeping traffic off retired sites
 - d. all of the above

True or False: Please circle the correct response

3. The steeper the ground the less erosion will result.
True False
4. In KY at least 70% of the ground area must be covered with vegetation according to BMP No. 2.
True False
5. Landings always have the duff layer removed.
True False
6. Graveled sections of roads always need to be revegetated.
True False
7. Time limits on when to revegetate are explicitly set at exactly 24 hours after the section of the job is retired.
True False
8. Slopes under 10% never need to be revegetated.
True False
9. All seeding should be done before installing permanent water control structures.
True False
10. Once trails and landings are seeded, with a "permanent" grass mixture, there will always be grassy patches in these woods.
True False
11. All seed and seed mixes need the same growing conditions.
True False
12. Kentucky 31 Fescue is not wildlife friendly.
True False
13. To do the best job of revegetating a mixture of temporary and permanent species should be used.
True False
14. I cannot seed any areas outside of the recommended seeding dates.
True False
15. 80% of landowners are satisfied with the harvesting job when loggers use BMPs.
True False