

**BMP 2**

# Vegetative Establishment on Silviculturally Disturbed Areas

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**Purpose**

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Vegetative establishment of herbaceous cover is used to stabilize the soil and reduce damage to downstream areas from sediment and runoff from silvicultural disturbed areas. Vegetative establishment can also be used to improve wildlife habitat and enhance natural beauty. Vegetative establishment is needed on sediment-producing, erodible, or severely eroded areas, such as logging roads, skid trails, and log landings.

**Definitions**

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**Herbaceous cover** includes a mixture of annual and perennial herbaceous species, primarily grasses and legumes. This BMP uses both temporary species and permanent mixes to revegetate disturbed areas. **Temporary cover species** are those that come up quickly and vigorously and act to provide a rooting mass until the permanent mixtures take hold. **Permanent mixes** are a combination of grass and legume species that are compatible and will establish themselves and grow for a number of years on a site until natural seeding can occur. Many of these mixes can also be maintained indefinitely through mowing or other practices. **Silviculturally disturbed areas** include all areas where the duff layer has been removed leaving the bare mineral soil, such as access roads, primary and some secondary skid trails, and landings. Areas that have been harvested and will be naturally regenerated or where artificial regeneration efforts will be undertaken are generally not considered in this BMP.

**Specifications**

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These specifications contain guidelines useful for the planned treatment of an area, based on an evaluation of conditions and needs of the area. Some areas may not be stable due to soil slippage, water movement, or excessive sediment production. Therefore, additional practices may be required in combination with this vegetative practice to effectively stabilize soil. Also, the selection of plant species and methods of establishment are important considerations for adequate establishment of desired vegetation.

Revegetation should be sufficient to adequately control or to significantly abate potential soil erosion from the site and should be established according to generally accepted agricultural principles.

**Preparation of the Site**

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- Grade the area to be vegetated as needed and feasible to permit the use of conventional equipment for seedbed preparation, seeding, mulching, and maintenance.
- Seedbed preparation is generally needed. This can be accomplished using such standard agricultural practices as disking. In cases where this is not practical and the soil surface is glazed or crusted, the surface should be scarified or otherwise roughened before lime, fertilizer, and seed are applied.

**Soil Amendments**

**Fertilizer and Lime**

Applications of fertilizer and lime are recommended. A soil test can be used to determine fertilizer and lime requirements or, in lieu of a soil test, apply fertilizer and lime at rates sufficient to provide adequate vegetative cover, considering site conditions and species of plants.

**General Fertilizer and Lime Recommendation:**  
 Usually a minimum rate of 70 to 80 pounds of nitrogen (N), 120 pounds of phosphorus (P<sub>2</sub>O<sub>5</sub>), and 120 pounds of potassium (K<sub>2</sub>O) per acre is adequate. For native grasses, a maximum of 40 to 50 pounds of nitrogen should be applied at planting to avoid excessive competition. Where the need is indicated, 2 or 3 tons of agricultural ground limestone per acre are generally adequate.

Application of an additional 100 pounds per acre of ammonium nitrate later in the season on areas low in organic matter and fertility will enhance vegetative growth. Additional nitrogen, where needed, should also be applied to native grasses the first year after stands are recognizable and moisture is available. Apply nitrogen thereafter when warm season growth begins in the spring.

Work the fertilizer and lime into the soil to a depth of 4 to 6 inches, if possible, with a harrow, disk, or rake, operated across the slope. See Appendix 1 in this BMP to determine the amount of land area where application is needed.

**Mulch**

Mulch materials should be applied primarily to disturbed areas that are steep, eroding, or are difficult to vegetate to conserve moisture, prevent surface compaction, and reduce runoff and soil erosion (Table 2-1). Mulch materials can be applied by any method that will give even distribution of materials, such as by hand, mulch-blowing machine, or hydraulic-seeding machine.

**Table 2-1—Mulching Materials, Rates, and Uses**

Mulch Material and Quality	Rate Per 1000 Sq. Ft.	Acre	Remarks
a. small grain straw, tall fescue straw or hay	75-100 lbs. (1½-2 bales)	1½ tons (60-80 bales)	Spread uniformly. Leave 10-20% of the area exposed. Subject to wind blowing unless left moist or tied down.
b. wood fiber cellulose air-dried, non-toxic, and no growth inhibiting substances	37-41 lbs.	1600-1800 lbs.	Apply with a hydro-mulcher. No tie-down is required. Packaged in 100 lb. bags.
c. tree bark air-dried, non-toxic and no growth inhibiting substances		6-12 tons	Resistant to wind blowing. Decomposes slowly.

See Appendix 1 in this BMP for determination of land area where mulching is needed.

## Plant Selection

**Revegetation should be accomplished using both:**

- **Temporary cover crop species**
- **Permanent species mix**

The tables in this BMP provide the recommended seeding rates and seeding dates, as well as specific considerations, such as light requirements for temporary species and permanent mixes. Each table contains recommendations for different environmental or operational situations. Select a table that is most suitable for the particular situation encountered.

- **Table 2-2. Temporary Species.** Select one of these species to be used in conjunction with a permanent mix.
- **Table 2-3. Permanent Mixes for Slopes Less than 10 Percent.** These are grass and legume mixes that can be successfully established on relatively gentle slopes where erosion potential is not extreme. Generally these mixes are suitable for wildlife use. Mix “e” contains native species.
- **Table 2-4. Permanent Mixes for Slopes Greater than 10 Percent.** These mixes are designed to be effective in establishing themselves on sites where the erosion potential is high. Mixes that contain KY 31 tall fescue are not compatible with a number of wildlife species; however, these mixes do have the ability to aggressively establish themselves under conditions where other grass-based mixtures might fail.
- **Table 2-5. Permanent Mixes for Wet or Poorly Drained Areas.** These species have the ability to establish themselves in wet soils. Note that switchgrass is native but must receive full sunlight to thrive.
- **Table 2-6. Permanent Mix for Establishing Native Species.** This mix provides an option for the establishment of native warm season grasses. Please note that the full development of the species in this mix takes several years, and generally good seedbed preparation and full sunlight are needed. Caution should be exercised to ensure that these conditions can be met. Due to the relatively long establishment time, it is not recommended that this mix be used on areas that have a significant erosion potential.

## How to Use the Tables

- **Species:** The species or mixes in **boldface type** have been shown to be the most effective in each table as defined by establishment success and growth in agronomic and wildlife planting situations.
- **Seeding Dates:** In the case of the permanent mixtures the seeding dates are for the mixture and not for each species. For example: the seeding dates in Table 2-2 recommend that mixture “a” be seeded between February 1 and May 1 or between August 1 and October 15.
- **Seeding Rates:** Lbs/acre/pls refers to “pounds per treated acre of pure live seed.” Information on the germination percentage or some other measure of the amount of live seed will be provided with some species. The seeding rates in these tables are based on 100 percent of the seed being viable. Make the appropriate adjustment in seeding rates if germination percentage is significantly below this (see Appendix 1 in this BMP).
- **Special Considerations:** Some mixes have special light requirements or restricted seeding dates. Consider these special needs when selecting a mix.

**Seeding Outside the Recommended Seeding Dates**

When seeding must be accomplished outside of the recommended seeding windows, it is recommended that seeding rates be increased by 50 percent and mulch be used.

**Temporary Cover Crop Species**

The primary temporary cover crop species are winter wheat, rye (grain rye), and spring oats. Other species listed in Table 2-2 can also be used at the recommended rates and times. Footnotes provide important explanatory comments. All legume seed should be inoculated using the proper inoculant.

**Permanent Mixes**

Tables 2-3 through 2-6 below list permanent species options for revegetation plant selection based on specific site conditions. Each mixture in these tables should be mixed with a temporary species. The mixes in **boldface type** have been shown to be the most effective in each table as defined by establishment success and growth.

**Table 2-2—Temporary Cover Crop Species**

Species	Seeding Rates (lbs/ac/pls <sup>1</sup> )	Recommended Seeding Dates
winter wheat <sup>2</sup>	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

1 pls: pure live seed (see Appendix 1 in this BMP).

2 Species in **boldface type** are primary recommendations.

**Table 2-3—Mixtures for Slopes Less than 10 Percent**

Species Mixture	Seeding Rates (lbs/ac/pls <sup>1</sup> )	Seeding Dates for Mixture <sup>2</sup>	Special Considerations
a. <b>orchard grass</b> <sup>3</sup>	8	Feb. 1 - May 1	
red clover	6	Aug. 1 - Oct. 15	
b. <b>orchard grass</b>	8	Feb. 1 - May 1	
ladino clover	2	Aug. 1 - Oct. 15	
c. timothy	4	Feb. 1 - May 1	
ladino clover	2	Aug. 1 - Oct. 15	
d. <b>orchard grass</b>	10	Feb. 1 - May 1	No fall planting due to lespedesa
<b>Kobe or Korean lespedesa</b>	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	No fall planting due to lespedesa
side-oats gramma	3		
Korean lespedesa	5		

1 pls: pure live seed (see Appendix 1).

2 the seeding dates were developed for the mixture and not the individual species. For example, it is recommended that mixture "a" be seeded between February 1 and May 1 or between August 1 and October 15.

3 Mixes in **boldface type** are primary recommendations.

**Table 2-4—Mixtures for Highly Erodible Areas (Areas Exceeding 10 Percent Slope)**

Species Mixture	Seeding Rates (lbs/ac/pls) <sup>1</sup>	Seeding Dates <sup>2</sup> for Mixture	Special Considerations
a. <b>Kentucky 31 fescue</b>	30	Feb. 1 - May 15 Aug. 1 - Oct. 15	High seedling and plant vigor on droughty, exposed sites. The endophyte-free fescue is more valuable for wildlife and is acceptable on lesser slopes.
<b>flatpea<sup>3</sup></b>	30		
b. <b>Kentucky 31 fescue</b>	30	Feb. 1 - May 15 Aug. 1 - Oct. 15	High seedling and plant vigor on droughty, exposed sites. The endophyte-free fescue is more valuable for wildlife and is acceptable on lesser slopes.
<b>birdsfoot trefoil</b>	10		
c. <b>creeping red fescue</b>	20	Feb. 1 - May 15 Aug. 1 - Oct. 15	<b>For use in shaded areas.</b>
<b>white clover</b>	2		
d. <b>switch grass</b>	8	May 1 - June 30	For open canopy conditions only. Switch grass is a native.
<b>partridge pea</b>	5		

1 pls: pure live seed (see Appendix 1).

2 the seeding dates were developed for the mixture and not the individual species. For example, it is recommended that mixture “a” be seeded between February 1 and May 1, or between August 1 and October 15.

3 Mixes in **boldface type** are primary recommendations.

**Table 2-5—Mixtures for Wet or Poorly Drained Areas**

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

1 pls: pure live seed (see Appendix 1).

2 the seeding dates were developed for the mixture and not the individual species. For example, it is recommended that mixture “a” be seeded between February 15 and June 30, or between August 1 and October 1.

3 Mixes in **bold face type** are primary recommendations.

**Table 2-6—Mixtures for Establishing Native Species**

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

1 pls: pure live seed (see Appendix 1).

2 the seeding dates were developed for the mixture and not the individual species. For example, it is recommended that mixture “a” be seeded between February 1 and May 1, or between August 1 and October 15.

## Regulatory Requirements for BMP No. 2

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*(See Appendix A for explanations)*

- All silvicultural operations: (410 KAR 5:026, 5:029, 5:030, and 5:031)
- Activities near high-quality waters and outstanding national resource waters: (401 KAR 5:029, 5:030, and 5:031)
- Activities near wild rivers: (KRS 146.200 *et seq.* and 401 KAR 4:100-140)

### **Summary: AWQA Minimum Requirements for BMP No. 2**

The producer should:

- 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 and to significantly abate erosion from the site. For the purpose of this minimum requirement, erodible areas include those with slope equal to or greater than 10 percent.

## Appendix 1

### Determining the Amount of Seed Needed on Roads and Trails

Multiply the appropriate acre figure times the pounds/acre that is recommended in seed mixtures. For example:

1500-foot-road length of 12-foot-wide access road was produced. According to the table this area = 0.41 acres. The recommended seeding rate for winter wheat is 35 lbs/ac. The total amount of seed that is needed is 35 lbs/ac times 0.41 acres = 14.35 lbs.

#### Determining the Amount of Acreage in Other Areas

To determine acreage and pounds of seed for other areas, such as log landings or denuded areas, use the following procedure:

1. Measure the width across the area in several locations and determine the average width.
2. Measure the length of the area in several locations and determine the average length.
3. Multiply the average width by the average length to get the square feet of disturbed area.
4. Divide the square feet of disturbed area by 43, 560 feet/acre to get the acreage of the area.
5. Multiply the acreage of the area by the recommended amount of seed per acre to determine the amount of seed required.

Table 2-7—Road and Trail Surface Area Determination for Fertilizer, Seed, Lime, and Mulch

Road Length (feet)	Road Width (feet)				
	8	10	12	14	18
	acres				
50	.01	.01	.01	.02	.02
100	.02	.02	.03	.03	.04
250	.05	.06	.07	.08	.10
500	.09	.12	.14	.16	.21
750	.14	.17	.21	.24	.31
1000	.18	.24	.28	.32	.41
1500	.28	.34	.41	.48	.62
2000	.36	.48	.56	.64	.83
5000	.92	1.15	1.38	1.16	2.07
5280	.97	1.21	1.45	1.70	2.18

**Pure Live Seed** is determined by multiplying percent germination by percent purity. Divide result into recommended pounds of seed per acre, which gives the bulk seed needed. For example: fescue can have 98 percent purity, 80 percent germination. To seed 40 lbs/ac of pure live seed, the procedure would be:

Multiply 0.98 purity by 0.80 germination = 0.784

Divide 40 lbs/ac by 0.784 = 51 lbs needed