Michigan Department of Environment, Great Lakes, and Energy (EGLE)
Water Resources Division

Seeding

Description

Seeding is the establishment of a temporary or permanent vegetative cover by planting seed. For the purposes of this best management practice (BMP), the terms “grass” and “turf” are used interchangeably.

This BMP does not address planting individual sprigs of grasses or other vegetation, referred to as “sprigging.” See the Trees, Shrubs, and Ground Covers BMP for information on this practice.

Other Terms Used to Describe

- Hydroseeding
- Vegetative Cover

Pollutants Controlled

Once established, turf helps keep soil on-site, absorbs nutrients, and allows groundwater recharge.

Application

Land Use: This BMP is applicable to all land uses.

Soil/Topography/Climate: Vegetative establishment is important on all exposed areas, but particularly on sloping terrain and areas adjacent to waterbodies or wetlands. It is also important in areas which frequently flood, or which are impacted by spring runoff or strong winds.

When to Apply: Apply seed immediately after grading and preparation of the seed bed is finished on each small segment of a construction project. Use mulch and/or soil erosion control blankets to keep seed in place until the vegetation is established.

Where to Apply: Apply on all construction or earth change sites which require temporary or permanent vegetative stabilization.

Relationship with Other BMPs

Seeding can be used in conjunction with almost all temporary and permanent soil erosion and sedimentation control measures. Apply any fertilizer or lime based on soil test results. See the BMP, Soil Management to Encourage Vegetation Growth. Use mulch in conjunction with seeding to ensure establishment of an effective vegetative cover.

Proper grading is needed to ensure the seed bed is adequate for seed application. See the "Site Preparation" section, below.

Specifications

Seed Selection

Select the proper species of seed following basic integrated pest management practices (see the Pesticide Management BMP). To reduce the amount of fertilizer, pesticides, or other inputs needed, choose adapted varieties based on environmental conditions, management level desired, and the intended use. Consider seed mixes that might be more adaptable than single species.

Seed mixtures for **permanent cover**: Consult Table 1 for appropriate seed mixtures and application rates for providing permanent cover (Exhibit 1). Various land use and minimum acceptable moisture conditions are represented in the first two columns of Table 1. Select conditions from these columns that most closely resemble the area being planted, then select a seed mix corresponding to those conditions. All seed application rates are provided in units of pounds per acre.

Note that some species that appear in the source material for Table 1 (USDA NRCS, 2018) are excluded here. Specifically, all references to and seed mixtures containing birdsfoot trefoil (*Lotus corniculatus*), crownvetch (*Coronilla varia* or *Securigera varia*), and white clover (*Trifolium repens*) are absent, because they are considered invasive. There are alternatives to some of these species. For example, alternatives to crownvetch include creeping phlox (*Phlox subulata*), goat's rue (*Tephrosia virginiana*), purple vetch *(Vicia americana*), and roundhead bush clover (*Lespedeza capitata*) (Indiana, undated).

Seed mixtures for **temporary cover**: Temporary vegetative cover is provided to protect spoil piles and large disturbed areas. Table 2 provides recommended seed types for establishing temporary vegetative cover (Exhibit 2).

Ensure that any proposed wildflower seeds or mixed don't contain any invasive or otherwise undesirable plant species. For example, some mixes might include purple loosestrife, which is an invasive species in Michigan, and is detrimental to native cattail populations. The Michigan Department of Environment, Great Lakes, and Energy (EGLE) therefore does not recommend wildflower plantings unless the seed can be certified as being native to Michigan and is appropriate to the soil and other site conditions.

Timing

The proper time to seed depends on the climate of the area. For determining ideal seeding times, Michigan is split into three climatic zones. These zones are depicted in Figure 1 (Exhibit 3) and are referred to in Tables 2 and 3.

Table 3 provides recommended seeding date ranges for establishing permanent cover, for both the growing season, and dormant seeding (Exhibit 4). Dormant seeding is done after the normal growing season, using seed which will lay dormant in the winter but start growing as soon as soil conditions are favorable. Use perennial grasses for all permanent cover.

Table 2 provides recommended seeding date ranges for establishing temporary cover. Note that the plant species listed in the table are all annual grasses, which is the recommended plant type for providing temporary cover. Seed mixtures for temporary cover typically include cereal rye or wheat, which grow better after overwintering, through a process called vernalization.

Dormant seeding is completed in the late fall, typically after the soil temperature remains consistently below 50°F. This is appropriate if construction on a site is completed in the fall, but seed was not planted prior to normal growing season seeding dates. Since the initial soil temperature for seed germination is approximately 50°F, the intent of this practice is that germination not occur until spring. Use perennial grass species for all dormant seeding. Extra cereal rye, a cool-season annual grass, can be added to attempt to get some fall growth.

Site Preparation

Consider protecting seeded areas from pedestrian access using construction barriers.

Where possible, divert concentrated flows away from the seeded area at least until the vegetation is established. Follow specifications in the Diversions BMP.

Conduct soil tests to determine nutrient and pH content. Depending on the results of soil tests, soil management to encourage vegetation growth might be necessary to adjust the pH to between 6.5 and 7.0 (for most conditions). For all lime, fertilizer, and other soil amendments, follow the specifications of the BMP, Soil Management to Encourage Vegetation Growth. Note that sandy loam, loam, and silt loam are the preferred soils for seeding. Consider incorporating these soils into the seedbed.

Prepare a three (3)- to five (5)-inch deep seedbed, with the top three (3) to four (4) inches consisting of topsoil. Place the seedbed at the proper grade.

Ensure that the seedbed is firm but not compact, and that the top three inches of soil are loose, moist, and free of large clods and stones. For most applications, rake and remove all stones larger than two (2) inches in diameter, roots, litter and any foreign matter. Ensure that the topsoil surface is in reasonably close conformity to the lines, grades, and cross sections shown on the grading plans.

Roughen any slopes steeper than 3H:1V.

Planting

Apply seed as soon after seedbed preparation as possible, when the soil is loose and moist. If the seedbed has been idle long enough for the soil to become compact, harrow the topsoil with a disk, a spring-tooth drag, a spike-tooth drag, or other equipment designed to condition the soil for seeding. Harrow horizontally across the face of the slope.

Always apply seed before mulch.

Apply seed at the appropriate rate, such as those specified in Tables 2 and 3, using calibrated spreaders, cyclone seeders, mechanical drills, or hydroseeders.

Incorporate broadcast seed into the soil by raking or chain dragging, or otherwise floated, then lightly compacted to provide good seed-soil contact.

For hydroseeding operations:

- Apply seed at the recommended rate. If no rate is provided, use 150 to 200 pounds per acre.
- Use two (2) tons per acre straw mulch, unless otherwise recommended. Use three (3) tons per acre when dormant.
- If using recycled newsprint, follow specifications in the Mulching BMP. Protect all newly seeded areas from erosive forces by using mulch.

For grass species that can't be planted with seed, plant by sprigging or sodding. See the Trees, Shrubs and Ground Covers BMP for information on sprigging, and the Sodding BMP for information on that practice.

Dispose of excess topsoil following specifications in the Spoil Piles BMP.

Maintenance

Inspect newly seeded areas frequently for the first few months to ensure the grass is growing. If seeded areas are damaged due to runoff, additional storm water measures might be needed. Spot seeding can fill in small bare spots where the grass has not grown properly.

After the vegetation is well established:

- Remove construction barriers.
- Water the grass following specifications in the Lawn Maintenance BMP.
- If the grass is to be mowed, keep it to a height appropriate for the species selected and the intended use. Follow mowing specifications in the Lawn Maintenance BMP.
- Collect and analyze occasional soil samples to determine if the soil is appropriately fertilized. Follow the procedures in the BMP, Soil Management to Encourage Vegetation Growth.
- Control pests following specifications in the Pesticide Management BMP.
- Refer to the Lawn Maintenance BMP for determining how to improve unhealthy turf.

Exhibits

Exhibit 1: Table of seed mixtures for permanent cover: Modified from Michigan Common Seeding Tables – Section 4, Table 2, USDA NRCS.

Exhibit 2: Table of seed mixtures for temporary cover: Modified from Michigan Common Seeding Tables – Section 4, Table 4, USDA NRCS.

Exhibit 3: Map of Michigan's three climatic zones: Based on Michigan Common Seeding Tables – Section 4, Table 4, USDA NRCS.

Exhibit 4: Table of seeding times for permanent cover for each of Michigan's climatic zones: Modified from Michigan Common Seeding Tables – Section 4, Table 6, USDA NRCS.

Literature Cited

State of Indiana (Indiana). Undated. *Invasive Plant Species Fact Sheet: Crown Vetch*. Invasive Plant Species Assessment Working Group.

United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). 2018. *Michigan Common Seeding Tables*. Prepared by Jerry Grigar, CCA, NRCS State Agronomist, Michigan.
(The link provided was broken and has been removed.)

Exhibit 1

Table 1. Appropriate Seed Mixtures for Establishing Permanent Cover

Suitable Uses[1]	Minimum Drainage[2]	Seed Mix	Rate (lb/ac)	Note
CA, CO, HU, WW	MWD	Creeping Red Fescue	40	
CA, CO, HU	MWD	Creeping Red Fescue Kentucky Bluegrass	20 20	For waterways, if management as a lawn.
CA, CO, FR, HU, WW	SPD	Creeping Red Fescue Tall Fescue Kentucky Bluegrass Perennial Ryegrass	25 20 5 5	On soils which have higher clay content, increase Tall Fescue and reduce Creeping Red Fescue.
CA, CO, HU	PD	Creeping Red Fescue Redtop Smooth Bromegrass Perennial Ryegrass	20 1 20 5	
CA, CO, HU, WW	SPD	Tall Fescue Smooth Bromegrass	15 15	
CA, WW	MK, SPD	Tall Fescue Redtop Perennial Ryegrass	30 2 5	For close mowing and for waterways with < 2.0 ft/sec velocity.
WW	SPD	Tall Fescue Smooth Bromegrass	20 20	
WW, CA	MWD	Smooth Bromegrass	30	
WW	SPD	Smooth Bromegrass Red Top Perennial Ryegrass	25 2 5	
Sand Dune Areas	MWD	Big Bluestem Prairie Sandreed Little Bluestem	5 5 5	Plant after sand is stabilized with beach grass (2 years).
Sandy areas subject to blowing	WD	American Beachgrass	Planted as Plugs	
CA, CO, HU	SPD	Switchgrass Perennial Ryegrass Ladino Cover Orchard Grass	2 5 3 1	
CA, CO	MWD	Big Bluestem Little Bluestem Switchgrass	2 2 2	
FR	MWD	Orchard Grass Ladino Clover Red Top	8 2 3	
CO, CA, FR	MWD	Creeping Red Fescue Perennial Ryegrass Red Clover	20 6 3	

(Table 1 continued on next page.)

Exhibit 1 (continued)

Table 1. Appropriate Seed Mixtures for Establishing Permanent Cover (continued)

Suitable Uses[1]	Minimum Drainage[2]	Seed Mix	Rate (lb/ac)	Note
FR	MWD	'Lathco' Flatpea Perennial Ryegrass	30 20	For shaded woodland.
FR	MWD	'Lathco' Flatpea Tall Fescue	20 20	For shaded woodland.
FR	MWD	Orchard Grass Ladino Clover Redtop	10 2 3	For wood edges and openings.

Source: USDA NRCS, 2018. Section 4, Table 2.

Notes 1. Suitable use codes:
CA = critical areas
CO = construction areas
FR = forestry harvest trails and landing sites
HU = heavy-use areas
WW = waterway-type areas

2. Minimum drainage codes:
MK = muck soils
MWD = moderately well drained
PD = poorly drained
SPD = somewhat poorly drained
WD = well drained

Exhibit 2

Table 2: Seeding for Temporary Vegetation Cover Types

Plant Type	Planting Zone[1]			Seeding Rate	
	1. Upper Peninsula	2. Northern Lower Peninsula	3. Southern Lower Peninsula	Pounds Per 1,000 Square Feet	Pounds Per Acre
Buckwheat	6/15 to 7/15	6/1 to 7/15	6/1 to 7/15	2	75
Cereal Rye	8/1 to 10/1	8/1 to 10/10	8/1 to 10/15	3	120
Oats	5/1 to 8/1	4/15 to 8/1	4/1 to 9/15	2	96
Perennial Ryegrass	8/1 to 10/1	6/1 to 8/1	8/1 to 10/15	0.5	20
Sudangrass	Not Recommended	6/1 to 7/15	6/1 to 7/15	1	40
Wheat	9/10 to 10/1	9/10 to 10/1	9/20 to 10/15	3	120

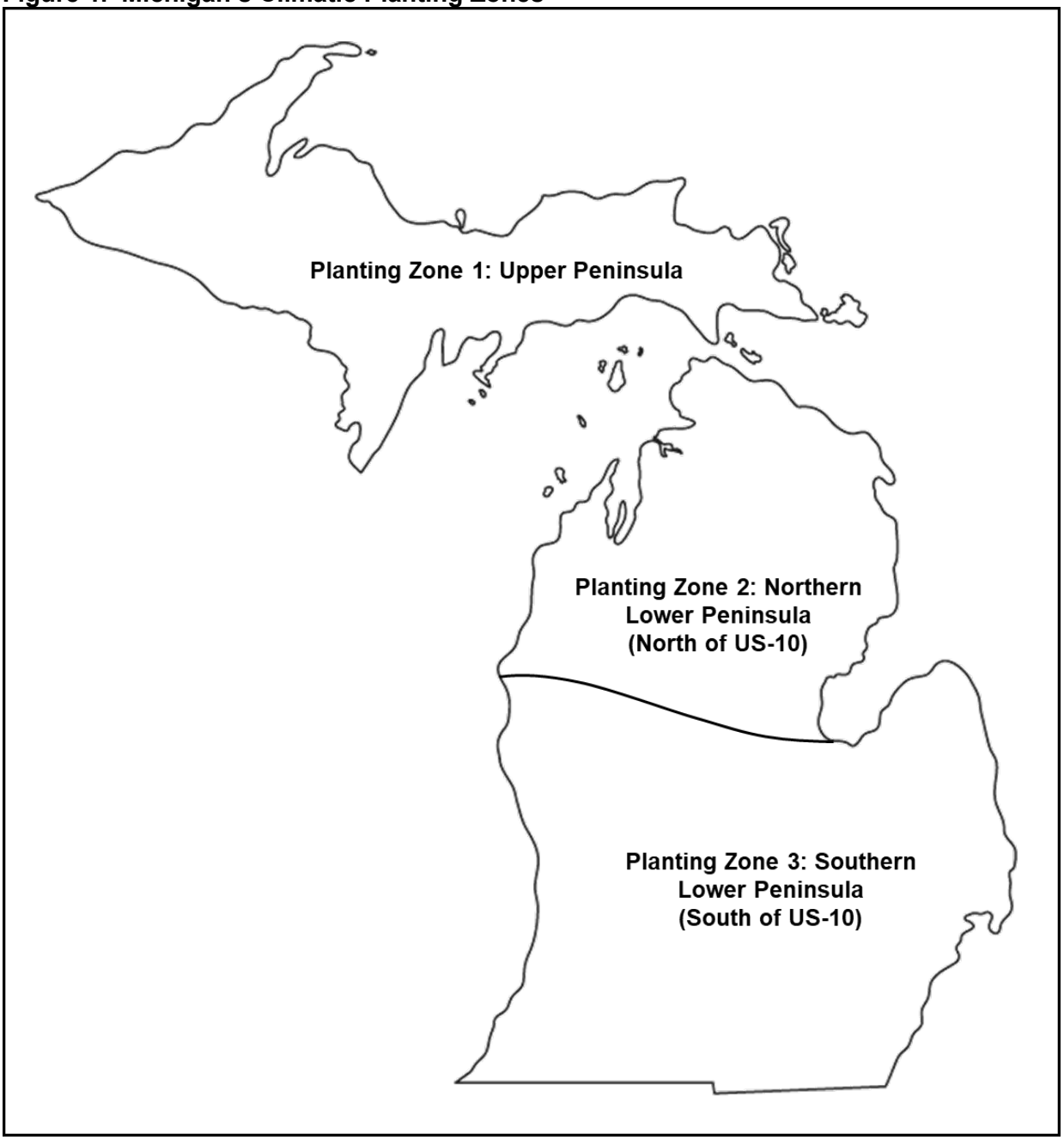
Source: USDA NRCS, 2018. Section 4, Table 4.

Note

1. Refer to Figure 1 (Exhibit 3) for a depiction of the three planting zones in Michigan.

Exhibit 3

Figure 1. Michigan's Climatic Planting Zones



Source: USDA NRCS, 2018.

Exhibit 4

Table 3: Seeding Date Ranges for Permanent Vegetation Cover

Planting Zone[1]	With Irrigation and/or Mulch[2]	Without Irrigation or Mulch	Dormant Seeding with Mulch[3]
1. Upper Peninsula	5/1 to 9/10	5/1 to 6/15 or 8/1 to 9/20	10/25 to freeze-up
2. Northern Lower Peninsula	5/1 to 9/20	5/1 to 6/10 or 8/1 to 9/20	10/25 to freeze-up
3. Southern Lower Peninsula	4/1 to 8/1	4/1 to 5/20 or 8/10 to 10/1	11/1 to freeze-up

Source: USDA NRCS, 2018. Section 4, Table 6.

Notes

1. Refer to Figure 1 (Exhibit 3) for a depiction of the three planting zones in Michigan.

2. Seed and mulch grassed waterways by September 15.

3. Dormant seeding can be done in the late fall so that it germinates in the spring. Do not seed when the ground is frozen or snow-covered. Do not use dormant seeding on grassed waterways. Mulch all dormant seeding.