

SURFACE STABILIZATION

Permanent Seeding



Permanent seeding involves the establishment of a permanent vegetative cover to protect soils from erosive forces.

Purpose

- To provide permanent vegetative cover and improve visual aesthetics of a project site.
- To reduce erosion and sedimentation damage by stabilizing disturbed areas.
- To reduce problems associated with mud or dust from unvegetated soil surfaces.
- To reduce sediment-laden storm water runoff from being transported to downstream areas.

Specifications

Seedbed Preparation

Grade and apply soil amendments.

Seeding Frequency

Seed final graded areas daily while soil is still loose and moist.

Density of Vegetative Cover

Ninety percent or greater over the soil surface.

Materials

- Soil Amendments – Select materials and rates as determined by a soil test (contact your county soil and water conservation district or cooperative extension office for assistance and soil information, including available soil testing services) or 400 to 600 pounds of 12-12-12 analysis fertilizer, or equivalent. Consider the use of reduced phosphorus application where soil tests indicate adequate phosphorous levels in the soil profile.
- Seed – Select an appropriate plant species seed or seed mixture on the basis of soil type, soil pH, region of the state, time of year, and intended land use of the area to be seeded (see Table 1).
- Mulch –
 - Straw, hay, wood fiber, etc. (to protect seedbed, retain moisture, and encourage plant growth).
 - Anchored to prevent removal by wind or water or covered with premanufactured erosion control blankets.

Application

Site Preparation

1. Grade the site to achieve positive drainage.
2. Add topsoil (see **Topsoil Salvage and Utilization** on page 25) or compost mulch (see **Compost Mulching** on page 59) to achieve needed depth for establishment of vegetation. (Compost material may be added to improve soil moisture holding capacity, soil friability, and nutrient availability.)

Seedbed Preparation

1. Test soil to determine pH and nutrient levels.
2. Apply soil amendments as recommended by the soil test and work into the upper two to four inches of soil. If testing is not done, apply 400 to 600 pounds per acre of 12-12-12 analysis fertilizer, or equivalent.
3. Till the soil to obtain a uniform seedbed. Use a disk or rake, operated across the slope, to work the soil amendments into the upper two to four inches of the soil.

Seeding

Optimum seeding dates are March 1 to May 10 and August 10 to September 30. Permanent seeding done between May 10 and August 10 may need to be irrigated. Seeding outside or beyond optimum seeding dates is still possible with the understanding that reseeding or overseeding may be required if adequate surface

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cover is not achieved. Reseeding or overseeding can be easily accomplished if the soil surface remains well protected with mulch.

1. Select a seeding mixture and rate from Table 1. Select seed mixture based on site conditions, soil pH, intended land use, and expected level of maintenance.
2. Apply seed uniformly with a drill or cultipacker seeder (see Figure 1) or by broadcasting (see Figure 2). Plant or cover the seed to a depth of one-fourth to one-half inch. If drilling or broadcasting the seed, ensure good seed-to-soil contact by firming the seedbed with a roller or cultipacker after completing seeding operations. (If seeding is done with a hydroseeder (see Figure 3), fertilizer and mulch can be applied with the seed in a slurry mixture.)
3. Mulch all seeded areas (see **Mulching** on page 55 and **Compost Mulching** on page 59) and use appropriate methods to anchor the mulch in place. Consider using erosion control blankets on sloping areas and conveyance channels (see **Erosion Control Blanket** on page 63).

Maintenance

- Inspect within 24 hours of each rain event and at least once every seven calendar days until the vegetation is successfully established.
- Characteristics of a successful stand include vigorous dark green or bluish-green seedlings with a uniform vegetative cover density of 90 percent or more.
- Check for erosion or movement of mulch.
- Repair damaged, bare, gullied, or sparsely vegetated areas and then fertilize, reseed, and apply and anchor mulch.
- If plant cover is sparse or patchy, evaluate the plant materials chosen, soil fertility, moisture condition, and mulch application; repair affected areas either by overseeding or preparing a new seedbed and reseeding. Apply and anchor mulch on the newly seeded areas.
- If vegetation fails to grow, consider soil testing to determine soil pH or nutrient deficiency problems. (Contact your soil and water conservation district or cooperative extension office for assistance.)
- If additional fertilization is needed to get a satisfactory stand, do so according to soil test recommendations.
- Add fertilizer the following growing season. Fertilize according to soil test recommendations.
- Fertilize turf areas annually. Apply fertilizer in a split application. For cool-season grasses, apply one-half of the fertilizer in late spring and one-half in early fall. For warm-season grasses, apply one-third in early spring, one-third in late spring, and the remaining one-third in middle summer.

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Table 1. Permanent Seeding Recommendations

This table provides several seed mixture options. Additional seed mixtures are available commercially. When selecting a mixture, consider intended land use and site conditions, including soil properties (e.g., soil pH and drainage), slope aspect, and the tolerance of each species to shade and drought.

Open Low-Maintenance Areas (remaining idle more than six months)

Seed Mixtures	Rate per Acre Pure Live Seed	Optimum Soil pH
1. Perennial ryegrass - white clover ¹	70 lbs. 2 lbs.	5.6 to 7.0
2. Perennial ryegrass - tall fescue ²	70 lbs. 50 lbs.	5.6 to 7.0
3. Tall fescue ² - white clover ¹	70 lbs. 2 lbs.	5.5 to 7.5

Steep Banks and Cuts, Low-Maintenance Areas (not mowed)

Seed Mixtures	Rate per Acre Pure Live Seed	Optimum Soil pH
1. Smooth brome grass - red clover ¹	35 lbs. 20 lbs.	5.5 to 7.0
2. Tall fescue ² - white clover ¹	50 lbs. 2 lbs.	5.5 to 7.5
3. Tall fescue ² - red clover ¹	50 lbs. 20 lbs.	5.5 to 7.5
4. Orchard grass - red clover ¹ - white clover ¹	30 lbs. 20 lbs. 2 lbs.	5.6 to 7.0
5. Crownvetch ¹ - tall fescue ²	12 lbs. 30 lbs.	5.6 to 7.0

Lawns and High-Maintenance Areas

Seed Mixtures	Rate per Acre Pure Live Seed	Optimum Soil pH
1. Bluegrass	140 lbs.	5.5 to 7.0
2. Perennial ryegrass (turf type)	60 lbs. 90 lbs.	5.6 to 7.0
3. Tall fescue (turf type) ² - bluegrass	170 lbs. 30 lbs.	5.6 to 7.5

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Channels and Areas of Concentrated Flow

Seed Mixtures	Rate per Acre Pure Live Seed	Optimum Soil pH
1. Perennial ryegrass - white ¹	150 lbs. 2 lbs.	5.5 to 7.0
2. Kentucky bluegrass - smooth bromegrass - switchgrass - timothy - perennial ryegrass - white clover ²	20 lbs. 10 lbs. 3 lbs. 4 lbs. 10 lbs. 2 lbs.	5.5 to 7.5
3. Tall fescue ¹ - white clover ²	150 lbs. 2 lbs.	5.5 to 7.5
4. Tall fescue ² - perennial ryegrass - Kentucky bluegrass	150 lbs. 20 lbs. 20 lbs.	5.5 to 7.5

¹ For best results: (a) legume seed should be inoculated; (b) seeding mixtures containing legumes should preferably be spring-seeded, although the grass may be fall-seeded and the legume frost-seeded (see **Dormant Seeding and Frost Seeding** on page 41); and (c) if legumes are fall-seeded, do so in early fall.

² Tall fescue provides little cover for, and may be toxic to some species of wildlife. The Indiana Department of Natural Resources recognizes the need for additional research on alternatives such as buffalograss, orchardgrass, smooth bromegrass, and switchgrass. This research, in conjunction with demonstration areas, should focus on erosion control characteristics, wildlife toxicity, turf durability, and drought resistance.

Notes:

1. An oat or wheat companion or nurse crop may be used with any of the above permanent seeding mixtures, at the following rates:
 - (a) spring oats – one-fourth to three-fourths bushel per acre
 - (b) wheat – no more than one-half bushel per acre
2. A high potential for fertilizer, seed, and mulch to wash exists on steep banks, cuts, and in channels and areas of concentrated flow.

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Figure 1: Cultipacker Seeder



Figure 2: Broadcast Seeding



Figure 3: Hydroseeding

