# Permanent Seeding

Source: Iowa NRCS, 2004

**BENEFITS**

| | L | M | H |
|---|---|---|---|
| **Flow Control** | ■ | ■ | |
| **Erosion Control** | ■ | ■ | ■ |
| **Sediment Control** | ■ | ■ | |
| **Runoff Reduction** | ■ | ■ | |
| **Flow Diversion** | | | |

**Description:** Permanent seeding is a means of establishing permanent, perennial vegetative cover on disturbed areas. The purpose of permanent seeding is to prevent erosion, remove sediment from runoff, reduce the volume of runoff, and improve water quality.

**Typical Uses:** Permanent seeding is used to stabilize the ground after grading and land-disturbing activities have been completed, or whenever construction activities will be halted for a time period longer than temporary seeding can provide protection (i.e. one growing season).

**Advantages:**
- Relatively low cost.
- Most common method of providing permanent stabilization of disturbed ground.
- Highly effective as a stand-alone measure in all but the most extreme situations (i.e. continuously flowing channels, steep slopes, high flows, etc.).
- Competes with undesirable vegetation and noxious weeds.
- Vegetation absorbs water, reducing the volume of stormwater runoff.
- Vegetation filters out sediment and other pollutants, improving water quality.
- Provides an aesthetically pleasing, finished look to the site.

**Limitations:**
- Does not provide instant protection; requires sufficient time and moisture to establish.
- Difficult to establish in area subjected to concentrated flows.
- Seasonal limitations on planting may not coincide with construction schedule.

**Longevity:** Permanent

**SUDAS Specifications:** Refer to Section 9010 (Seeding)

# A. Description/Uses

Permanent seeding consists of planting perennial vegetation on disturbed/denuded soil areas. Through seeding, a fibrous root system is established. This holds the soil in place and provides a canopy over the soil, protecting it from raindrop impact. The vegetation slows the velocity of the runoff, protecting the surface from sheet and rill erosion, while allowing suspended sediment to be removed. Vegetation also absorbs water from the soil, reducing the total volume of runoff.

# B. Design Considerations

Permanent seeding is the most commonly used method of providing permanent surface stabilization. It is an economical, long-term method of providing highly effective stabilization, and is aesthetically pleasing. However, in order to be effective, the designer must select the proper vegetation and recognize the practical limits of vegetation.

The following should be considered for all sites prior to permanent seeding:

1. **Site Stabilization:** Steep slopes, which increase the erosion hazard, should be minimized. Vegetation alone is normally an effective method of stabilizing slopes that are 3:1 or flatter. For slopes steeper than 3:1, or for flatter slopes carrying runoff from upland areas, a rolled erosion control product may be required to provide slope stabilization until the vegetation is established.

   In addition, slopes that are very steep (2:1 or greater) and areas that receive intermittent concentrated flows may require application of a turf reinforcement mat to provide permanent reinforcement to the vegetation.

2. **Sediment and Water Control Devices:** Measures should be taken to divert sheet and concentrated flows away from areas that are to be seeded until the vegetation is established.

3. **Seeding Methods:** There are four seeding methods to consider:

   a. Broadcast seed spreader/cyclone seeder

   b. Mechanical drill or cultipacker

   c. Hydroseeder in which the seed is intermixed with mulch and water to create a slurry

   d. Pneumatic seeder in which the seed is intermixed with compost or a compost/soil blend

      When hydroseeding and pneumatic seeding are utilized, the surface may be left with a more irregular surface, since these practices will fill small depressions and cover small bumps. These two types of seeding methods can be used in situations where slope and accessibility is a limiting factor and seedbed preparation is not possible, or where the application of seed, mulch and fertilizer (if necessary) in one operation is desirable.

   Hand broadcasting seed may be utilized for small or inaccessible areas; however it is not recommended for larger areas because of the difficulty in achieving a uniform distribution.

4. **Seedbed Preparation:** Proper seedbed preparation is essential for the seed to germinate and develop into a dense, healthy stand of vegetation.

   **a. Subsoil Preparation:** Newly graded areas may be severely compacted by the weight of heavy earth-moving and construction equipment. Disking or tilling reduces compaction in

the uppermost layer of the soil, providing an adequate growing bed for the seed; however, the soil below this level may remain severely compacted. This compacted layer acts as an impermeable barrier, slowing or preventing the infiltration of water into the ground. Infiltration of precipitation reduces runoff, and recharges groundwater supplies. Techniques for reducing ground compaction, such as deep tillage, should be investigated.

**b. Topsoil:** In order to provide an adequate growing medium, a minimum of 8 inches of topsoil should be placed over the disturbed area prior to seeding. Deeper topsoil depths (8-12 inches or greater) are desirable as they increase the organic matter available for use by the plants, allow for deeper root penetration and increase the moisture holding ability of the soil. These benefits will increase the drought tolerance and long-term health of the vegetation. Where sufficient topsoil is not available, composted material may be incorporated at the rate of 1 inch of compost for every 3 inches of deficient topsoil. This will increase the organic matter content of the soil, and provide an adequate growing medium for vegetation.

**c. Soil pH:** The soil pH should have a range of 5.5 to 7.5. Where soils are known to be highly acidic (pH 6.0 and lower), lime should be applied at the rate recommended by the soil-testing laboratory.

**d. Soil Fertilization:** Soil fertilization is required for permanent seeding. Fertilizer rates specified in the SUDAS Specifications are recommended for most applications. Sites without sufficient topsoil or low organic matter may require higher fertilizer rates, or fertilizer with a higher nitrogen concentration.

**5. Seeding Properties:**

**a. General Mixtures:** The SUDAS Specifications provide a number of seed mixes that are acceptable for most general applications. These mixes and a description of their intended usage are shown in Table 7E-24.01.

**Table 7E-24.01:** SUDAS Seeding Mixtures

| Description | Typical Uses | Allowable Seeding Dates |
|---|---|---|
| Type 1 - Permanent Lawn Mixture | Used for residential and commercial turf sites. Fertilized; typically mowed. | March 1 - May 31<br>August 10 - September 30 |
| Type 2 - Permanent Cool - Season Mixture for Slopes and Ditches | Not typically mowed. Reaches maximum heights of 2 to 3 feet; low fertility requirements; grows in spring and fall; can go dormant in summer. | March 1 - May 31<br>August 10 - September 30 |
| Type 3 - Permanent Warm-Season Slope and Ditch Mixture | Not typically mowed. Reaches heights of 5 to 6 feet; stays green throughout summer; responds well to being burned in spring; do not apply fertilizer. | March 1 - June 30 |
| Type 4 - Temporary Erosion Control Mixture | Short-lived (6 to 8 months) mix for erosion control. | March 1 - September 30 (seeding dates vary by seasonal mix) |
| Wetland Seeding | Used in areas designated for wetland grass seeding. | April 1 - June 30<br>August 1 - August 31 |
| Native Grass and Wildflower Seeding | Used in areas designated for native grass and wildflower seeding. | April 1 - June 30 |

b. **Special Mixtures:** Some sites require specifically designed or selected mixtures to address individual site characteristics. Site characteristics that require special consideration include very shady areas, detention ponds, wet areas, streambanks, severe slopes, and areas with poor soils.

6. **Weather:** When seeding, be aware of the weather. Do not seed when heavy rainfall is predicted, during windy weather or on wet/frozen ground (hydroseeding and pneumatic seeding may be an exception to seeding on wet/frozen ground).

7. **Matting:** A rolled erosion control product is recommended for slopes steeper than 3:1. RECPs may also be required for flatter slopes greater than 100 feet in length, to hold the seed in place and protect new vegetation from runoff until it becomes established. Refer to Section 7E-5 - Temporary Rolled Erosion Control Products.

8. **Mulching:** Mulching is recommended for most permanent seeding applications. Mulch aids in stabilizing the surface until vegetation is established. Mulch also helps retain soil moisture and maintains temperature conditions favorable to germination. Refer to Section 7E-17 - Erosion Control Mulching.

9. **Moisture:** If normal rainfall is insufficient to ensure vegetation establishment, mulching, matting, or controlled watering should be completed to keep seeded areas adequately moist.

## C. Application

In order to achieve a dense, healthy stand of vegetation that will provide long-term surface stabilization, seed mixtures and fertilizer should be applied at the rates specified in the SUDAS Specifications.

## D. Maintenance

Once the area is seeded, it should not be disturbed and should be protected from traffic. Newly seeded areas should be inspected weekly as part of the overall erosion control inspection, to ensure that grass is growing satisfactorily. Areas that have bare spots, or where erosion has occurred should be re-seeded.

## E. Time of Year

The seed mixtures within the SUDAS Specifications should be placed within the dates specified, or as weather conditions allow and if approved by the Jurisdictional Engineer.