Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

CRITICAL AREA PLANTING

CODE 342

(ac)

DEFINITION

Establishing permanent vegetation on sites that have, or are expected to have, high erosion rates, and on sites that have physical, chemical, or biological conditions that prevent the establishment of vegetation with normal seeding/planting methods.

PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Stabilize areas with existing or expected high rates of soil erosion by wind or water
- Stabilize stream and channel banks, pond and other shorelines, earthen features of structural conservation practices
- Stabilize areas such as sand dunes and riparian areas

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to highly disturbed areas such as—

- Active or abandoned mined lands.
- Urban restoration sites.
- Construction areas.
- Conservation practice construction sites.
- Areas needing stabilization before or after natural disasters such as floods, hurricanes, tornados, and wildfires.
- Eroded banks of natural channels, banks of newly constructed channels, and lake shorelines.
- Other areas degraded by human activities or natural events.

Refer to Salinity and Sodic Soil Management (Practice Code 610) for treatment of sites affected by salts and/or sodium.

CRITERIA

General Criteria Applicable to All Purposes

Site preparation

Conduct a site investigation to identify any physical, chemical, or biological conditions that could affect the successful establishment of vegetation.

Clear areas to be planted of unwanted materials and smooth or shape, if needed, to meet planting purpose(s).

Prepare a suitable seedbed for all seeded species. Rip compacted layers and re-firm the soil prior to seedbed preparation, as needed.

As site conditions dictate, when grading slopes, stockpile topsoil to be redistributed over area to be planted.

Species selection
Select species for seeding or planting that are suited to local site conditions and intended uses, and common to the site or location. See 342_IL_GD_Critical Area Planting_Tables and Figures 2022 for approved seed mixtures. Select seed mixtures according to the site type listed in Table 2, 342_IL_GD_Critical Area Planting_Tables and Figures 2022.

No plants on the State of Illinois noxious weed list shall be planted.

Gullies and/or deep rills, if present, will be filled and the soil surface will be shaped to ensure proper site and seedbed preparation and, if feasible, to allow for future farm equipment operation.

Soil amendments will be added as necessaryto ameliorate or eliminate physical or chemical conditions that inhibit plant establishment and growth. Fertilizer requirements will be determined based on Table 4, 342_IL_GD_Critical Area Planting_Tables and Figures 2022 or a soil test. Where soil tests are used to plan the required fertilizers, the recommendations will be based on the recommended soil test levels in the Illinois Agronomy Handbook for the species that will provide the permanent vegetative cover. The need for amendments such as compost and/or manure to add organic matter and improve soil structure and water holding capacity will be determined by the planner. Quantities of organic soil amendments used to meet part or all of the nutrient requirements listed in Table 4, 342_IL_GD_Critical Area Planting_Tables and Figures 2022 will be based on laboratory tests, if available, or book values that provide nutrient content of the material planned for use. Agricultural limestone to increase the pH of acid soils or elemental sulfur to lower the pH of alkaline soils will be determined by soil tests or published soil surveys. All fertilizer, pH adjusting materials, and organic amendments shall be included in site plans that specify amounts, timing, and method of application.

Establishment of vegetation.
Plant seeds using the method or methods best suited to site and soil conditions. All seed shall be of high quality and comply with Illinois Seed and Weed Laws. Seed rates will be based on Pure Live Seed (PLS) per acre. Pure Live Seed will be calculated using the following formula:

PLS = (% germination + % dormant seed) X % purity/100

Standard seed tests are required for all warm and cool season grasses and legumes (excluding companion crops). Seed tests may not be older than 12 months at time of seeding, excluding the month of testing. Legume seeds shall be treated with a pure culture of nitrogen fixing bacteria prepared specifically for the species to be seeded. Where more than one legume is included in the seed mixture, inoculate each species separately. A sticker, as recommended by the inoculant manufacturer, will be used to secure the bacteria to the seed. Refer to Illinois Agronomy Technical Note Number 20 for guidance. Legumes not pre-inoculated will be inoculated within 24 hours of seeding. Pre-inoculated seed must be seeded within 60 days of inoculation unless coated. Coated pre- inoculated seed must be seeded within 12 months of inoculation. In no cases shall inoculum be used after the inoculum expiration date including inoculum that is included with the seed as a pre-treatment. Inoculant rates will be tripled when seed is applied with hydroseeding methods.

The use of sod will be limited to sites that can be irrigated during the establishment period. Place and anchor sod using techniques to ensure that it remains in place until established.

Specify species, rates of seeding or planting, legume inoculation, minimum quality of planting stock (e.g., pure live seed (PLS) or stem caliper), method of seedbed preparation, and method of establishment before application. Use only viable, high-quality seed or planting stock.

Approved seeding dates for permananent seedings are found in IL E-FOTG, Section 1-Maps, Growing Season/Plant Suitability Maps, Plant suitability Zones . The seeding dates may be extended on a site-specific basis by two weeks based on current and forecasted weather.

Plant during approved times for the species to be used.

Soil amendments will be added as necessaryto ameliorate or eliminate physical or chemical conditions that inhibit plant establishment and growth. Fertilizer requirements will be determined based on Table 4, 342_IL_GD_Critical Area Planting_Tables and Figures 2022 or a soil test. Where soil tests are used to plan the required fertilizers, the recommendations will be based on the recommended soil test levels in the Illinois Agronomy Handbook for the species that will provide the permanent vegetative cover. The need for amendments such as compost and/or manure to add organic matter and improve soil structure and water holding capacity will be determined by the planner. Quantities of organic soil amendments used to meet part or all of the nutrient requirements listed in Table 4, 342_IL_GD_Critical Area Planting_Tables and Figures 2022 will be based on laboratory tests, if available, or book values that provide nutrient content of the material planned for use. Agricultural limestone to increase the pH of acid soils or elemental sulfur to lower the pH of alkaline soils will be determined by soil tests or published soil surveys. All fertilizer, pH adjusting materials, and organic amendments shall be included in site plans that specify amounts, timing, and method of application.

Mulch according to IL CPS 484 or otherwise stabilize (e.g., polyacrylamide (PAM)) plantings as necessary to ensure successful establishment.

Hydroseeding

Seed, fertilizer, lime, and mulch may be applied together. Hydrated lime may not be used in the slurry mix. Slurry mixes will have no more than 125 pounds of solids per 100 gallons of water. The pH of the slurry shall be a minimum of 6.0 when inoculated legumes are included in the seed mixture.

Legumes to be hydroseeded will be inoculated at triple the rate recommended by the manufacturer. When inoculant is added to the fertilizer and lime mixture, begin slurry application within 30 minutes. Re-inoculate slurry if mixture is not completely applied within one hour.

Hydroseeded slurries shall be applied to a moist soil surface.

Dormant Seedings

Prepare a conventional seedbed when soils are conducive to tillage. Apply and anchor mulch according to the Mulching Practice Standard and Specifications (CPS 484). Apply seed using the broadcast or hydroseed method during the dormant seeding period.

Vegetating Natural or Constructed Waterways

To stabilize ephemeral and gully erosion in areas of concentrated water flow, shape and constructed according to the Grassed Waterway practice standard and specifications (Practice Code 412). Prior to seedbed preparation, apply 120 lbs./acre each (N-P_2O5 -K_2O). Apply limestone if necessary for the species to be grown.

Select a suitable seed mixture from Table 1, 342_IL_GD_Critical Area Planting_Tables and Figures 2022. Grade stabilization structures constructed to stabilize grassed waterway outlets may be seeded with the

grassed water way seed mixture. Companion legumes seeded at rates in the table below **may** be added to seed mixtures listed in Table 2.

Legume	PLS/acre
Alfalfa or, Red Clover or, Alsike Clover	8
Birdsfoot Trefoil	12

Vegetating Acid Mine Spoil Material

Slurry and Gob Material

Divert surface runoff from surrounding land where applicable. Smooth the surface to fill rills and gullies.

Slope lengths greater than 100 feet will require terraces and/or diversions.

Apply a minimum of 10 tons/acre of limestone.

Top dress gob or slurry material uniformly with a minimum of 6 inches of suitable soil material. Scarify the surface before applying the soil material. Remove debris such as stones greater than 4 inches in diameter that will interfere with seeding operations.

Apply limestone to the cover material to correct soil pH to a minimum of 6.0. Apply and incorporate fertilizer that will provide 120-120-120 pounds per acre of N-P_2O_5-K_20.

Prepare a firm, conventional seedbed. Use seed mixtures found in Table 3, 342_IL_GD_Critical Area Planting_Tables and Figures 2022. Apply mulch according to the specifications contained in the Mulching practice standard and specifications (Practice Code 484).

Acid Overburden Material

Limestone requirements will be determined using the Acid Base Accounting Method. (Note: The Acid Base Accounting Method is not the same laboratory procedure used for pH and lime requirement used for routine soil testing)

Limestone must have a Calcium Carbonate Equivalent of 80%. The particle size distribution must have at least 10% larger than 8-mesh screen; 30% pass 8-mesh and are held on a 30-mesh screen ; 30% pass 30- mesh screen and are held on a 60-mesh screen; and 30% pass a 60-mesh screen.

Limestone shall not be applied in a single application greater than 25 tons/acre. Sites requiring greater than 25 tons/acre will be limed at 2/3 the calculated rate. Limestone will be incorporated to a depth of 6 inches. The remaining limestone shall be applied within 2 years of the initial seeding.

Delay seeding for 2-4 weeks to allow for some acid neutralization.

Apply and incorporate 120-120-120 lbs./acre of N-P_2O_5-K_2O to a depth of 6 inches.

Establish a green manure crop according to the Cover Crop (CPS 340). The green manure will be managed according to the guidelines listed under the criteria to increase organic matter content. The permanent cover will be established during the next seeding period following green manure incorporation.

The overburden material will be re-tested prior to the permanent seeding using the Acid Base Accounting Method to determine the extent the pH has been corrected and calculate if additional lime required is needed.

Permanent cover will be established using seed mixtures contained in Table 4, 342_IL_GD_Critical Area Planting_Tables and Figures 2022. Add additional lime, if required, to a depth of 3 inches and prepare a conventional seedbed.

All seedings will be mulched according to the guidelines found in the Mulching (CPS 484) or use a nurse crop if mulching is not feasible.

Tree and Shrub Plantings

Trees and shrubs may be used to vegetate acid mine spoils along with herbaceous seedings that are deemed necessary to control erosion while the tree and shrubs establish. Tree spacing and site preparation shall be performed according to the Tree/Shrub Establishment practice standard and specifications (Practice Code 612)

Additional Criteria to Stabilize Stream and Channel Banks, Pond and Other Shorelines, Earthen Features of Structural Conservation Practices

Bank and channel Slopes
Shape channel side slopes so that they are stable and allow establishment and maintenance of desired vegetation.

A combination of vegetative and structural measures may be necessary on slopes steeper than 3:1 to ensure adequate stability.

To stabilize banks of streams or constructed channels, the area to be planted must be protected in accordance with the criteria of Conservation Practice Standard 580 – Streambank and Shoreline Protection.

Species selection.
Plant material used for this purpose must—

- Be adapted to the hydrologic zone into which they will be planted.
- Be adapted and proven in the regions in which they will be used.
- Be compatible with existing vegetation in the area.
- Protect the channel banks but not restrict channel capacity.

Establishment of vegetation.
Specify species, planting rates, spacing, methods and dates of planting based on local planting guides or technical notes.

Identify and protect desirable existing vegetation during practice installation.

Use a combination of vegetative and structural practices with living and inert material when flow velocities, soils, and bank stability preclude stabilization by vegetative establishment alone. Use Conservation Practice Standard (CPS) Streambank Stabilization (Code 580) for the structural measures.

Control existing vegetation on a site that will compete with species to be established vegetatively (e.g.. bare-root, containerized, ball-and-burlap, potted) to ensure successful establishment of the planted species.

Plant streambank stabilization vegetation in accordance with the NRCS Engineering Field Handbook Part 650, Chapter 16, “Streambank and Shoreline Protection,” and Chapter 18, “Soil Bioengineering for Upland Slope Protection & Erosion Reduction.”

Site protection and access control.
Restrict access to planted areas until fully established.

Additional Criteria to Stabilize Areas Such As Sand Dunes and Riparian Areas

Plants for sand dunes and coastal sites must be able to survive being buried by blowing sand, sand blasting, salt spray, salt water flooding, drought, heat, and low nutrient supply.

Include sand trapping devices such as sand fences or brush matting in the revegetation/stabilization plans where applicable.

CONSIDERATIONS

Species or diverse mixes that are adapted to the site and have multiple benefits should be considered. Native species may be used when appropriate for the site.

To benefit pollinators and other wildlife, flowering shrubs and wildflowers with resilient root systems and good soil-holding capacity also should be considered for incorporation as a small percentage of a larger grass-dominated planting. Where appropriate consider a diverse mixture of forbs to support pollinator habitat.

Planning and installation of other CPSs such as Diversion (Code 362), Obstruction Removal (Code 500), Subsurface Drain (Code 606), Underground Outlet (Code 620), or Anionic Polyacrylamide Application (Code 450) may be necessary to prepare the area or ensure vegetative establishment.

Areas of vegetation established with this practice can create habitat for various type of wildlife. Maintenance activities, such as mowing or spraying, can have detrimental effects on certain species. Perform management activities at the times and in a manner that causes the least disruption to wildlife.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for each field or management unit according to the criteria and operation and maintenance sections of this standard. Record practice specifications using approved Implementation Requirements document.

Address the following elements in the plan, as applicable, to meet the intended purpose(s):

- Practice purpose(s)
- Site preparation
- Topsoil requirements
- Fertilizer application
- Seedbed/planting area preparation
- Timing and method of seeding/planting
- Selection of species
- Seed/plant source
- Seed analysis/pure live seed (PLS)
- Seeding rate/plant spacing
- Mulching, PAM, or other stabilizing materials
- Supplemental water needed for establishment

- Protection of plantings
- Describe successful establishment (e.g., minimum percent ground/canopy cover, percent survival, stand density)

OPERATION AND MAINTENANCE

- Control access to the area to ensure the site remains stable.
- Protect plantings shall be protected from pests (e.g., weeds, insects, diseases, livestock, or wildlife) as necessary to ensure long-term survival.
- Inspections, reseeding or replanting, and fertilization may be needed to ensure that this practice functions as intended throughout its expected life.
- Observe establishment progress and success at regular intervals until the practice has met the criteria for successful establishment and implementation.
- Description of successful establishment (e.g., minimum percent ground/canopy cover, percent survival, stand density).

REFERENCES

Federal Interagency Stream Restoration Working Group. 1998. Stream corridor restoration: principles, processes, and practices. USDA NRCS National Engineering Handbook, Part 653.

USDA NRCS. 2007. National Engineering Handbook, Part 654. Stream restoration guide.

USDA NRCS. 2015. The PLANTS Database (http://plants.usda.gov, 8 December 2015). National Plant Data Team, Greensboro, NC.