



## 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 practices.

#### 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 water
- Stabilize areas with existing or expected high rates of soil erosion by wind
- Rehabilitate and revegetate degraded sites that cannot be stabilized through normal farming practices
- Stabilize coastal 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 conservation sites, road construction areas, conservation practice construction sites, areas needing stabilization before or after natural disasters such as floods, hurricanes, tornados and wildfires and other areas degraded by human activities or natural events.

#### CRITERIA

##### General Criteria Applicable to All Purposes

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

Select species for seeding or planting that are suited to current site conditions and intended uses. Appropriate seeding and planting selections for use in Alabama are listed in Tables [1](#), [2](#), [3](#), [4](#), [5](#), and [6](#) which are hereby made parts of this standard.

Do not use plants that are on the state noxious weeds list (see the following web link):

<http://plants.usda.gov/java/noxious?rptType=State&statefips=01>.

Select species that have the capacity to achieve adequate density and vigor within an appropriate period to stabilize the site sufficiently to permit suited uses with ordinary management activities.

Specify species, rates of seeding or planting, minimum quality of planting stock, such as 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.

Plant at a time and in a manner that best ensures establishment and growth of the selected species. Specify what constitutes successful establishment, e.g. minimum percent ground/canopy cover, percent survival, stand density, etc. before application.

Schedule planting according to approved dates for the planned vegetation and to optimize soil moisture for germination and/or establishment.

Apply soil amendments (e.g. lime, fertilizer, compost) at rates necessary to insure stand establishment.

Protect plantings from pests (e.g. weeds, insects, diseases, livestock, and wildlife) as necessary to ensure stand establishment.

Follow the requirements in the Field Office Technical Guide (FOTG) for nutrient applications and pest management.

Use approved wind and/or water erosion prediction technology to determine the amount of plant biomass and cover needed to reduce wind and water erosion to the planned soil loss objective.

### **Additional Criteria to Restore Degraded Sites**

Where feasible treat gullies or deep rills that are present to allow equipment operation and ensure proper site and seedbed preparation.

Apply soil amendments according to soil test recommendations as necessary to improve or eliminate physical or chemical conditions that inhibit plant establishment and growth. Include in the site specification the amounts, timing, and method of application for amendments such as:

- compost or manure to add organic matter and improve soil structure and water holding capacity;
- agricultural limestone to raise the pH of acid soils;
- elemental sulfur to lower the pH of calcareous soils

Follow additional guidance under Plans and Specifications.

### **Additional Criteria to Restore Sand Dunes and Coastal Sites**

Choose plants for sand dunes and coastal sites that are able to survive being buried by blowing sand, sand blasting, salt spray, salt water flooding, drought, heat, and low nutrient supply. Refer to [Table 5.](#)

Plant species appropriate for Alabama, general information on coastal dune restoration, and sources for plant materials can be found in the Florida NRCS "Native Plants for Coastal Dune Restoration: What, When, and How for Florida" (<http://www.fl.nrcs.usda.gov/programs/pmc/flplantmaterials.html>).

Plants suited for use along the Florida Panhandle coastline are suited for use on the Alabama coastline. Sand trapping devices such as sand fences or brush matting shall be included in the revegetation and stabilization plans where applicable.

## **CONSIDERATIONS**

Consider species or mixes that are adapted to the site and have multiple values including native species. Avoid using native species where concentrated water flow is expected. Interseed pollinator-friendly plants when feasible (Refer to [Table 6](#)).

Avoid species that may harbor pests. Consider species diversity to avoid loss of function due to species-specific pests.

Develop plans to be in compliance with the Migratory Bird Treaty Act (<http://law2.house.gov/uscode-cgi/fastweb.exe?getdoc+uscview+t13t16+6190+0++%28%29%20%20>).

Manage established vegetation to limit or minimize mowing or other disturbance type practices during primary nesting periods for migratory nesting birds. These dates are April 1 – July 15. Small areas around buildings, in highly traveled areas, or urban areas may be exempt.

Planning and installation of other conservation practices such as Diversions, Land Smoothing, Obstruction Removal, Surface and Subsurface Drains or Underground Outlets may be necessary to prepare a critical area for planting.

If mulching is needed, follow the Alabama NRCS conservation practice standard (AL NRCS CPS), [Mulching – Code 484.](#)

Encourage soil carbon build-up and discourage greenhouse gas emissions when planning nutrient applications and tillage applications.

## **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. Specifications shall describe the requirements for applying this practice to meet the intended purpose.

Record practice specifications using approved specification sheets, job sheets or other acceptable documentation. Forms AL-ECS-1 and AL-ECS-2 are acceptable for this purpose.

The following elements shall be addressed in the plan, as applicable, to meet the intended purpose:

- Site Preparation,
- Topsoil,
- Fertilizer Application,
- Seedbed/Planting Bed Preparation,
- Methods of Seeding/Planting,
- Time of Seeding/Planting,
- Selection of Species,
- Seed/Plant Source,
- Seed Analysis,
- Rates of Seeding,
- Mulching, Planting Trees,
- Shrubs and Vines,
- Supplemental Water for Plant Establishment,
- Protection of Plantings.

Minor grading and shaping may be needed to facilitate vegetation establishment, provide a surface on which desired equipment can safely and efficiently be used for establishment of vegetation and performance of maintenance such as mowing. Loose rock, scattered brush and trees and other obstruction which will interfere with vegetation establishment and maintenance should be removed. Major land shaping will be done in accordance with AL NRCS CPSs, [Land Smoothing – Code 466; Obstruction Removal – Code 500.](#) or [Recreation Land Grading and Shaping – Code 566.](#)

Grading and shaping is not normally required where hydraulic seeding and fertilizing equipment is to be used. However, vertical banks shall be sloped, if possible, to enable plant establishment.

### **Topsoil**

Salvage topsoil during shaping and grading and return to the site, spreading it uniformly over the area, before seeding preparation.

## Plant selection

Vegetation for critical areas will be perennial grasses, perennial legumes, trees, shrubs, vines or mixtures. Critical area planting is not completed until perennial vegetation is established, therefore short term temporary cover may be necessary (see [Table 1](#)).

Perennial plant species approved for use on critical areas are contained in Tables [2](#), [3](#) and [4](#). Species not listed shall be approved by the Agronomist before they are used.

All legume seed shall be properly inoculated with appropriate nitrogen fixing bacteria prepared specifically for the legume to be inoculated. Store the inoculant appropriately and use prior to its expiration date.

## Liming materials

Agricultural limestone shall have a neutralizing value of not less than 90% calcium carbonate equivalent and 90% will pass through a 10 mesh sieve and 50% will pass through a 60 mesh sieve.

Selma chalk shall have a neutralizing value of not less than 80% calcium carbonate equivalent and 90% will pass through a 10 mesh sieve.

Industrial by-products shall have a neutralizing value that is guaranteed on the label.

## Liming Rates

A soil test should be used to determine the need for liming materials. However, if a soil test is not made, use 2 tons of agricultural limestone per acre.

EXCEPTION: If the cover is tall fescue and clover, then use 3 tons of agricultural limestone or equivalent.

Liming materials are not required for alkaline soils or other areas that have been limed during the preceding 3 years unless recommended based on current soil tests.

## Plant Nutrients

Sources of plant nutrients may be animal or poultry manure, agricultural by-products or commercial fertilizer.

Animal and poultry manure and other agricultural

by-products should be analyzed for nutrient content. When a laboratory analysis is not available use the book values in the standard AL NRCS CPS, [Nutrient Management – Code 590](#), for estimated available nutrient content.

## Plant Nutrient Application Rates

Plant nutrients for a particular crop should be applied according to a current soil test report from Auburn Soil testing Laboratory or other laboratories that make recommendations based on soil analysis. A soil test shall be considered current if made within the prior 3 year period. When a soil test is not made, use the following rates of plant nutrients.

- For grasses seeded alone use 30 lbs. nitrogen, 100 lbs. P205, and 100 lbs K20 per acre at planting. Apply 30 lbs. of additional nitrogen when grass has emerged and is actively growing.
- For grass and legume mixtures, use 30 lbs. nitrogen, 100 lbs. P205 and 100 lbs. K20 per acre.
- For legumes seeded alone use 100 lbs. P205 and 100 lbs. K20. per acre.
- For woody ground covers, shrubs vines and trees planted on prepared seedbeds apply 100 lbs. nitrogen, 100 lbs. P205 and 100 lbs. K20 per acre in 3 split applications during the growing season.

## Application of Soil Amendments

Where conventional seeding methods are used, application of soil amendments will be as follows:

- Soil amendments (liming materials and plant nutrients) will be uniformly applied and thoroughly mixed into the soil during seedbed preparation for broadcast or drilled planting.
- When holes or furrows are used for individual plants, plant nutrients will be well mixed with the soil used to fill around plants or placed in separate holes or furrows 3 to 6 inches to the side of plants. Side placement will be used when dibbles are used for planting.
- Liming materials will be broadcast on top of the ground before preparing holes or furrows for individual plants on unprepared seedbeds.

When hydro seeding equipment is used, application of soil amendments will be as follows:

- Commercial fertilizer materials only will be applied through hydro seeding equipment. Fertilizer will not be added to the seed-inoculant mixture but will be applied in a separate operation. The fertilizer will be mixed with water in the hydro seeder and applied after the seedlings are established.
- Liming materials may be added to the seed- inoculant mixture and applied at seeding or it may be applied with the fertilizer mixture.

## Seedbed Preparation

Seedbed preparation is not required where hydraulic seeding or conservation tillage will be used to establish vegetation.

When conventional seeding methods are used, seedbed preparation will be as follows for broadcast or drilled plantings:

- As a minimum, use tillage to loosen the soil to a depth of at least 6 inches; alleviate compaction; and smooth and firm the soil for the proper placement of seed, sprigs or plants.
- Conduct tillage on the contour where feasible.

With conventional planting methods, use the following seedbed preparation for individual plants:

- Prepare seedbeds by digging holes, opening furrows, using dibbles or other means appropriate for the plants to be used. Create openings large enough to accommodate plant roots without crowding or bending the tap root.
- Where pine seedlings are to be planted on compacted soils, subsoil under the row 24 inches deep on the contour 4 to 6 months prior to planting. Do sub-soiling when soil is dry.

## Planting Seeds

Plant seed conventionally on a freshly prepared and firmed seedbed. Distribute the seed uniformly over the area to be treated with a culti-packer seeder, drill, rotary seeder, other mechanical seeder, or by hand seeding. Cover the seed with soil material to the proper seeding depth (Tables [1](#) and [2](#)) during planting with a drill or culti-packer seeder. If seed are broadcast on the surface use a culti-packer or other suitable equipment to cover the seed immediately after seeding.

No-till seeding may be done in killed cover crops or in temporary cover that is sparse enough to allow adequate growth of the permanent species. The appropriate seeding equipment will be used for no-till planting.

Where hydraulic seeding equipment is used, mix seed, inoculant if required, and a seed carrier with water and apply as slurry, uniformly over the area to be treated. The seed carrier will be a cellulose fiber, natural wood fiber or cane fiber mulch material which is dyed an appropriate color to facilitate uniform application of seed. Use the correct inoculant at four times the rate specified on the package. Fertilizer will not be

mixed with the seed-inoculant mixture, but may be applied in a separate operation after seedlings are established. The seed-inoculant mixture will be applied within one hour after mixing.

### **Planting – Individual Plants**

Plant trees, shrubs, vines and sprigs with appropriate planters or hand tools. Plants will be set in a manner that will avoid crowding the roots. Firm the soil around the roots. If possible, apply water to settle soil around the roots and prevent drying out of shrubs, vines and sprigs.

Nursery stocks plants shall be planted at the same depth or slightly deeper than they grew at the nursery. The tips of vines and sprigs must be at or slightly above the ground surface.

### **Mulch**

Use mulch on all slopes steeper than three percent; when grass or legumes are planted so late in the fall and winter that germination cannot be expected until spring; on dams and spillways; cut slopes, concentrated flow areas and on road banks.

If mulch is used to stabilize an area until a perennial is planted, then 100% mulch coverage is required. Otherwise, approximately 75% coverage is required. This will require approximately 1.5 tons of straw mulch per acre or 2 tons of dry hay per acre.

Follow AL NRCS CPS, [Mulching – Code 484.](#)

### **Irrigation**

Use irrigation when available and needed to insure establishment. Irrigation will be applied at a rate that will not cause erosion.

## **OPERATION AND MAINTENANCE**

Manage the use of the area as long as necessary to stabilize the site and achieve the intended purpose.

Control or exclude pests or animals that will interfere with the timely establishment of vegetation.

Conduct inspections, reseeding or replanting, fertilization, and pest control as needed to insure that this practice functions as intended throughout its expected life. Replanting will be needed on areas with less than an 80 per cent stand:

- For sites with less than 50 percent ground cover, follow original recommendations for replanting.
- For sites with 50 to 79 per cent cover, reestablish using half of the original planting recommendations.

Observation of establishment progress and success should be performed at regular intervals until the practice has met the criteria for successful establishment and implementation. For herbaceous plantings, apply maintenance fertilizer in the amounts of 45 lbs of actual N-P-K per acre, annually. However, if legumes are established, only apply P & K.

Where establishment of vegetation creates potential habitat for grass-nesting birds, consider the impacts of vegetative disturbance upon these birds and their nests.

- Include considerations in the operation and maintenance plans.
- Do not conduct maintenance activities that result in disturbance of vegetation during the primary nesting season for grass- nesting birds where occupied habitat for these species exists.

## **REFERENCES**

The PLANTS Database (<http://plants.usda.gov>, 19 October 2006). USDA NRCS.

National Plant Data Center (<http://plants.usda.gov>), P.O. Box 74490. Baton Rouge, LA 70874-4490 Tel: (225) 775-6280. Fax: (225) 775-8883.

Blaser, R. E. Part II. Development and Management of Low Maintenance Vegetation for Erosion Control along West Virginia Highway Corridors In: Project 55: Low Maintenance Vegetation for Erosion Control...1980. West Virginia Dept. Of Highways, U.S. Dept. of Transportation, and the Federal Highway Administration.

Dickens, R. and W. J. Johnston. Comparison of Mulch Materials for Highway Vegetation Establishment. Bulletin 499. 1978. Agricultural Experiment Station /Auburn University.

Diseker, E.G., E. C. Richardson, and B.H. Hendrickson, Road bank Erosion and Its Control in the Piedmont Upland of Georgia. ARS-41-73. 1963. USDA, Agricultural Research Service, Washington, D. C.

Kentucky Guide for Classification, Use and Vegetative Treatment of Surface Mine Spoil. Revised 1973. USDA NRCS Lexington, Kentucky.

[Critical Area Planting Standard – Code 342](#), USDA NRCS, Florida.

[Native Plants for Coastal Dune Restoration, What,When, and How for Florida, USDA NRCS.](#)