United States Department of Agriculture
NRCS Natural Resources Conservation Service

# Critical Area Planting

***Alabama Guide Sheet No. AL342***

## PURPOSE

The purpose of this guidance is to provide additional information for critical area planting operations outlined in the Alabama NRCS conservation practice standard, Critical Area Planting – Code 342.

## DEFINITION

Critical area planting is establishing vegetation, such as trees, shrubs, vines, grasses and/or legumes, on highly erodible, critically eroding, or potentially critically eroding areas. Examples of critical areas are dams, dikes, mine spoil, levees, cuts, fills, road banks, gullied areas where vegetation is difficult to establish by usual planting methods. These methods are also applicable to establishing vegetation on other conservation practices or farm construction sites where the soil profile is significantly disturbed. Ordinary conservation treatment usually cannot stabilize these areas. If they are left untreated, severe soil erosion and sediment damage can occur. This practice is applied as part of a conservation management system to support one or more of the following:

- Stabilize the soil
- Reduce damage from sediment and runoff to downstream areas
- Improve wildlife habitat
- Improve visual resources

## SITE PREPARATION

Minor grading and shaping using heavy equipment may be needed to provide a surface on which farm equipment can be safely and efficiently used for establishment and maintenance of the vegetation. In some cases it is necessary to remove rock, brush, trees, or other obstructions that will interfere with vegetation establishment or maintenance. Grading and shaping is not normally required where hydroseeding is to be used.

Where possible, salvage topsoil during the grading and shaping operations to return to the site, spreading it uniformly over the area before seedbed preparation.

### Plant Selection

The targeted planting periods, land user desires and planting location for critical area planting are the main factors for selecting the appropriate plant material and seeding mixtures. Consider maintenance requirements, soil fertility, and hydrology when selecting plants for permanent vegetation. Also, consider native species or mixes that are adapted to the site and have multiple values.

Vegetation for critical areas will be perennial grasses, perennial legumes, trees, shrubs, vines or mixtures. Alabama NRCS conservation practice standard, Critical Area Planting – Code 342 is not completed until perennial vegetation is established; therefore short term temporary cover may be necessary (Refer to 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 Conservation Agronomist before they are used.

Inoculate all legume seed with legume-specific, nitrogen-fixing bacteria, if not pre-inoculated,. Handle the inoculant according to manufacturer instructions and use prior to its expiration date.

### Lime and Fertilizer

Use agricultural limestone that has a neutralizing value of at least 90% calcium carbonate equivalent and 90 per cent will pass through a 10 mesh sieve and 50% will pass through a 60 mesh sieve.

Selma chalk shall have a neutralizing value of at least 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**

Determine the need for liming materials by soil testing. However, if a soil test is not made, use 2 tons of agricultural limestone per acre. EXCEPTION: If the cover is tall fescue or and clover, then use 3 tons of agricultural limestone or equivalent per acre.

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**

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

Analyze animal and poultry manure and other agricultural by-products for nutrient content. When a laboratory analysis is not available use the book values in the Alabama NRCS conservation practice standard, Nutrient Management – Code 590 for estimated available nutrient content.

**Plant Nutrient Application Rates**

Apply plant nutrients 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 will 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 begun growth.
- 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:

- Apply and thoroughly mix soil amendments, 4 to 6 inches deep uniformly into the soil during seedbed preparation for broadcast or drilled planting.
- For planting individual plants, mix plant nutrients well with the soil used to fill around plants when holes of furrows are used. Nutrients may be placed in furrows, 3 to 6 inches to the side of plants. Side placement will be used when dibbles are used for planting.
- Broadcast liming materials on top of the ground before preparing holes or furrows for individual plants on unprepared seedbeds.

Follow the below guidelines for application of soil amendments when hydro seeding equipment is used:

- Commercial fertilizer materials, only, will be applied through hydro seeding equipment. Do not add fertilizer to the seed-inoculant mixture but apply it in a separate operation. Mix the fertilizer with water in the hydro seeder and apply 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, follow the below guidance for seedbed preparation for broadcast or drilled plantings:

- Loosen the soil to a depth or at least 6 inches with tillage equipment; alleviate compaction; and, smooth and firm the soil for the proper placement of seed, sprigs or plants.
- Use tillage on the contour where feasible.

When conventional planting methods are used, use the following guidance for seedbed preparation for individual plants:

- Prepare seedbeds by digging holes, opening furrows, using dibbles or other means appropriate for the plants to be used. Make openings large enough to accommodate plant roots without crowding or bending the tap root.
- For pine seedlings planted in 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 seeds conventionally into 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. Plant seed to the proper seeding depth (Tables 1 and 2) during planting with a drill or culti-packer seeder. Use a culti-packer or other suitable equipment to cover the seed immediately after broadcasting seed on the surface.

Plant seed using no-till methods into killed cover crops or into temporary cover that is sparse enough to allow adequate growth of the permanent species.

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. Use a seed carrier such as 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. The seed-inoculant mixture will be applied within one hour after mixing. Do not mix fertilizer with the seed-inoculant mixture. The fertilizer may be applied in a separate operation after seedlings are established.

### Seed Specifications

- All seed used will meet the Alabama Seed Law which includes limits on prohibited or noxious weed seeds. http://alisondb.legislature.state.al.us/acas/CodeofAlabama/1975/coatoc.htm

### Planting – Individual Plants

Plant trees, shrubs, vines and sprigs with appropriate planters or hand tools. Set plants 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 the plants.

Plant nursery stocks plants at the same depth or slightly deeper than when they grew at the nursery. Set tips of vines and sprigs 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; or, on road banks.

### 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

Use of the area shall be managed as long as necessary to stabilize the site and achieve the intended purpose.

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

Inspections, reseeding or replanting, fertilization, and pest control may be needed to insure that this practice functions as intended throughout its expected life. Observation of establishment progress and success should be performed at regular intervals until the practice has met the criteria for successful establishment and implementation.

Where establishment of vegetation creates potential habitat for grass-nesting birds, the impacts of vegetative disturbance upon these birds and their nests should be considered and included in operation and maintenance plans. Maintenance activities that result in disturbance of vegetation will not be conducted during the primary nesting season April 1 – July 15 for grass-nesting birds where occupied habitat for these species exists.

Replanting will be needed on areas with less than an 80% stand:

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

### Restrict Livestock

Livestock should be excluded from critical areas until they are completely established. This can be done through the installation of a temporary power fence.

**TABLE 1. Commonly used Plants for Temporary Cover.**

| Species | Seeding Rate/Acre | Seeding Depth | Seeding Dates | | |
|---|---|---|---|---|---|
| | | | North | Central | South |
| Barley | 3 bu | 1 in | Sep 1-Oct 30 | Sep 1-Oct 30 | Sep 1-Oct 30 |
| Oats | 4 bu | 1 in | Sep 1-Oct 15 | Sep 1-Oct 30 | Sep 1-Oct 30 |
| Rye | 3 bu | 1 in | Sep 1- Nov 1 | Sep 15-Nov 15 | Sep 15-Nov 15 |
| Wheat | 3 bu | 1 in | Sep 1-Nov 1 | Sep 15-Nov 15 | Sep 15-Nov 15 |
| Ryegrass | 30 lbs | ¼ in | Aug 15-Oct 1 | Sep 1-Oct 15 | Sep 1-Nov 1 |
| Millet, Browntop | 40 lbs | ½ in | May 1-Aug 1 | Apr 1-Aug 15 | Apr 1-Aug 15 |
| Sudangrass | 40 lbs | ¾ in | May 1-Aug 1 | Apr 15-Aug 1 | Apr 1-Aug 15 |
| Sorghum-Sudan Hybrids | 40 lbs | ¾ in | May 1-Aug 1 | Apr 15-Aug 1 | Apr 1-Aug 15 |
| Bermudagrass, Common | 10 lbs | ¾ in | Apr 1-Jul 15 | Mar 15-Jul 15 | Mar 1-Jul 15 |
| Partridge Pea | 10 lbs Pls[1] | ½ in | Feb 15 – Mar 31 | Feb 15 – Mar 15 | Feb 1 – Mar 15 |

[1] PLS – Pure Live Seed (lbs. of live seed x % purity = lbs. Pure Live seed)

**Table 2. Perennial Grasses, Legumes and Mixtures; Seeding Rates; and Planting Dates for Critical Area Plantings on Prepared Seedbeds**

| Species | Seeding* Rate/Acre | Planting Depth (in.) | Planting Dates and Adapted Area | | | Remarks |
|---|---|---|---|---|---|---|
| | | | North | Central | South | |
| Bahiagrass | 40 lbs | ¼ - ½ | Mar 1 – Jul 1 | Mar 1 – Jul 1 | Feb 1 – Nov 1** | Low growing, sod forming and may be slow to establish. Tolerant of droughty, low fertility sites. |
| Bermudagrass, Common, (Hulled) | 10 lbs | ¼ - ½ | Apr 1 – Jul 15 | Mar 15 – Jul 15 | Mar 1 - Jul 15 | Quick cover, low growing and sod forming. Intolerant of shade, low fertility and poor management. |
| Bahiagrass+ Common Bermudagrass (Hulled) | 27 lbs 7 lbs | ¼ - ½ | Mar 1 – Jul 1 | Mar 1 – Jul 15 | Mar 1 – Jul 15 | Bermuda will provide quick cover until bahiagrass established. |
| Bermudagrass, Sprigs (Forage Type) or Common | 30 bu – Rows or 45 bu – B. C. | 3-6 2-4 | Apr 1 – Jul 15 | Mar 15 – Jul 15 | Mar 1 – Aug 15 | All hybrids are mot adapted for North Alabama. Hybrid's Intolerant to low fertility and poor management. |
| Bermudagrass, Hybrid (Lawn types) | Solid Sod | --- | Anytime during year | Anytime during year | Anytime during year | Usually needs irrigation to establish. |
| Bermudagrass, Hybrid (Lawn types) | Sprigs 217bu/ac, 6 in. rows Plugs- 1/ft$^2$ | ¼ - ½ | Mar 15 – Aug 1 | Mar 1 – Aug 15 | Feb 15 – Sep 1 | Usually needs irrigation to establish. |
| Fescue, Tall | D – 40 lbs*** B – 50 lbs | ¼- ½ | Mar 1 – Apr 15 Sep 1 – Nov 1 | --- Sep 1 – Nov 1 | --- Sep 15 – Nov 15 | Good shade tolerance and does well on wet sites. Slow to establish. Does not establish well from spring planting |
| Fescue, Tall and White Clover | D – 40 lbs B - – 50 lbs D&B – 3 lbs | ¼ - ½ | Mar 1- Apr 15 Sep 1 – Nov 1 | --- Sep 1 – Nov 1 | --- Sep 15 – Nov 15 | Good shade tolerance. Does well on wet sites and clay soils of Black Belk. |
| Sericea | D – 40 lbs B – 60 lbs | ¼ | Mar 15 – Jul 15 | Mar 1 – July 15 | Feb 15 – Jul 15 | Suited for low maintenance. Well adapted to low fertility soils and mine spoil. Slow to establish. |

| Table 2. Perennial Grasses, Legumes and Mixtures; Seeding Rates; and Planting Dates for Critical Area Plantings on Prepared Seedbeds | | | | | | |
|---|---|---|---|---|---|---|
| **Species** | **Seeding* Rate/Acre** | **Planting Depth (in.)** | **Planting Dates and Adapted Area** | | | **Remarks** |
| | | | **North** | **Central** | **South** | |
| Sericea + Bermudagrass (Hulled) | D-40 lbs, B-60 lbs D & B – 10 lbs | ¼ in. | Mar 15- July 15 | Mar 1- July 15 | Feb 15-July 15 | Bermudagrass will provide quick cover until Common sericea is established. |
| Switchgrass | D & B – 10 lbs. PLS³ | ¼ in. | April 1 – Jul 1 | Mar 15 – Jul 15 | Mar 1 – Jul 15 | Native grass adapted to a wide range of sites. Do not mow below 8 – 12 inches. |

***** Bahiagrass planting: Sand Mountain variety: N,C,S
Pensacola, Tift9, UF Riata, Tifquick: S, C, counties contiguous to Central Alabama plus St. Clair, Calhoun, & Cleburne. Argentine bahiagrass may be planted in South AL.

****** Fall planting of bahiagrass should contain 45 pounds of small grain to provide cover during winter months.

******* D - drilled, B - broadcast, and PLS - pure live seed.

******** Tall fescue plantings in South Alabama are limited to land capability subclass w soils. Use novell endophyte infected types of fescue, or fungus free fescue.

**Notes**:

1. Legume seed will be properly treated with the inoculant specific for the species of legume.
2. Seeding rates for FSA and State cost share practices shall be the rate specified in the program handbook.
3. PLS – Pure Live Seed (lbs. of live seed x % purity = lbs. Pure Live seed)
4. Use hybrid broadcast rates for rows greater than 24 inches.

**TABLE 3. Woody Plants, Shrubs, and Vines for Critical Area Planting**

| Species | Spacing | Mature Height | Remarks |
|---|---|---|---|
| American Beautyberry (Callicarpa americana) | 1-2 ft centers | 2-4 ft | |
| Indigo Bush (Amorpha fruticosa) | Seeded | 2-4 ft | Established by seeding. |
| Memorial Rose *(Rosa wichuriana)* | 3-4 ft centers | 2 ft | May be used on slopes as steep as 1 to 1. Rampant grower. |
| Periwinkle *(Vinca spp.)* | 1-2 ft centers | 6-12 in | May use on slopes as steep as 1 to 1. Will spread. Tolerant to semi-shade. Blue flowers in Spring. |
| Shore Juniper *(Juniperus conferta)* | 5 ft centers | 2-3 ft | Emerald Sea or Blue Pacific cultivators are good. Adapted to wide range of soils. Tolerant of light shade. |

Notes:
1. Woody plants, shrubs or vines may take 2 years or more to provide complete cover; therefore, the area should be well mulched at planting and the mulch maintained until cover is obtained.
2. Plants would be set in late fall and winter (December 1 to March 1). Container grown plants may be planted anytime of the year if they can be watered until established.
3. Other plants may be used with approval of the Conservation Agronomist.

**TABLE 4. Trees for Critical Area Planting**

| Soil Type | Species | Spacing | Remarks | Ph Range |
|---|---|---|---|---|
| **Acid** | Loblolly pine | 6 ft x 8 ft | Adapted to sandy, loamy, and clayey soils. | 4.5 - 6 |
| | Longleaf pine | | Best on sandy soils. | |
| | Virginia pine | | Adapted to wide range of sites. | |
| | Slash pine | | Plant only in South Alabama. Well suited to wet, sandy soil. | |
| | Black Alder | | Best adapted to mine spoil. | 7-Apr |
| | Yellow Poplar | | | |
| | Black Cherry | | | |
| | Hickory | | | |
| | Black Walnut | | | |
| **Alkaline** | Eastern red cedar | 6 ft x 8 ft | Adapted to chalky Black Belt soils. | 6 – 7.5 |
| | Cottonwood | | Adapted to mine spoil & wet sites. | |
| | Sycamore | | Suited for mine spoil & wet sites. | |
| | Green Ash | | Suited for low rich moist soils | |
| | Black alder | | Best adapted to mine spoil. | 7-Apr |

**NOTES**: 1. Planting dates are December 1 to March 15. These dates may be extended if in trees are in containers or seedlings have been kept in cold storage.
2. Other trees and shrubs with wildlife value may be interplanted to enhance wildlife.
3. The 6 ft. x 8 ft. spacing will result in about 900 trees per acre.

**TABLE 5. Perennial Vegetation for Use in Gulf Coast Sand Dune Treatment**

**Other plants may be recommended and available. Refer to the publication "Native Plants for Coastal Dune Restoration: What, When, and How for Florida, USDA-NRCS".**

| Species | Recommended Site | Comment |
|---|---|---|
| Cordgrass, Salt Meadow or Marshhay (*Spartina patens*) | Back dunes to saline meadows | Perennial, rhizomatous warm season grass less than 40-inches tall. Three cultivars are recommended in Florida: 'Flageo', 'Sharp', and 'Avalon'. |
| Cordgrass, Smooth (*Spartina alterniflora*) | Intertidal areas of low energy shores to salt marshes | Dominant plant in the regularly flooded intertidal zone. 'Vermillion' was released by the Golden Meadows, LA, Plant Materials Center. |

| | | |
|---|---|---|
| Panicgrass, Coastal (*Panicum amarum* var. *amarulum*) | Mid to upper areas of frontal and back dunes | A strong, perennial, short rhizomatous, salt spray tolerant grass 3 to 7 feet plus in height. The selection 'Atlantic' is recommended. |
| Panicum, Bitter (*Panicum amarum*) | Mid to upper areas of frontal and back dunes | Perennial, warm season grass, prostrate to a height of 7 feet. The cultivars 'Northpa' and 'Southpa' and 'Fourchon' should be considered. |
| Mangrove, Black (*Avicennia germinans*) | Upper intertidal to lower supratidal areas of low energy shoreline | A native shrub or small tree with elliptical, evergreen leaves. A selection called 'Pelican' has been released by the Golden Meadow, LA, Plant Materials Center. |
| Seaoats (*Uniola paniculata*) | Mid to upper areas of frontal and back dunes | Perennial, erect, strong, rhizomatous, colonizing grass. Local ecotypes readily available. The selection 'Caminada' released by the Golden Meadow, LA, Plant Materials Center. |
| Sunflower, Beach (*Helianthus debilis*) | Lower to upper areas of frontal and back dunes | Low growing, broadleaf plant with yellow daisy-like flowers. Acts as a perennial in south Florida and as a reseeding annual further north. The selection 'Flora Sun' is available in the nursery trade. |

**Table 6. Pollinator-Friendly Plants**

| Plant Name | Bloom Period | Shade Tolerance | Site Condition |
|---|---|---|---|
| Apple (Malus spp.) | March – April | Full Sun | Moist, well drained |
| Crabapple, (Malus angustifolia) | March – April | Full Sun | Moist, well drained |
| Dogwood, Silky (Cornus amomum) | March – April | Shade Tolerant | Moist to poorly drained |
| Chickasaw Plum (*Prunus angustifolia Marsh. var. angustifolia*) | March – May | Shade Tolerant | Dry Well drained |
| Plum, American Wild (*Prunus americana)* | April – May | Shade Tolerant | Moist, well drained |
| Peach (*Prunus persica)* | March – May | Full Sun | Moist, well drained |
| Chinkapin (*Castanea pumila)* | April – June | Partial Shade | Dry, well drained |
| Indigo bush (Amorpha fruticosa) | April – June | Full Sun | Moist, moderately well drained |
| Sumac, fragrant (Rhus armoatica) | April – June | Partial Shade | Dry Well drained |
| Sumac, shining (Rhus copallinum) | June - July | Full Sun | Dry Well drained |
| Sumac, staghorn (Rhus hirta) | June - July | Shade Tolerant | Dry Well drained |
| American beautyberry,(Callicarpa. americana) | May - July | Partial Shade | Moist, moderately well drained |
| American Elderberry (Sambucus nigra spp canadensis) | May - July | Partial Shade | Moist, somewhat poorly drained |
| Persimmon (Diospyros virginana) | May - June | Sun to partial shade | Dry to moist |
| Viburnum, mapleleaf (Virburnum acerifolium) | May - August | Shade Tolerant | Moist, well drained to dry |
| White clover (Trifolium repens) | April - August | Shade Tolerant | Moist |

**NOTE:** Pollinator-friendly plants may be interplanted with other perennial covers to provide pollinator benefits.

# GEOGRAPHICAL AREAS FOR SPECIES ADAPTATION AND SEEDING DATES