

## NORTH CAROLINA SUPPLEMENT – 342-II-1

U. S. DEPARTMENT OF AGRICULTURE  
Natural Resources Conservation Service

Technical Guide - Section IV  
Rev. April 1991

### **CRITICAL AREA PLANTING – Perennial Grasses and/or Legumes**

#### **Conditions Where Practice Applies**

On sediment producing, highly erodible or severely eroded areas where vegetation is difficult to establish with normal seeding or planting methods and where grasses and/or legumes are needed to stabilize the soil.

#### **Specifications Guide**

The task of considering alternatives, specifying treatment and successfully establishing plant cover on critical areas is a challenging one. For example, planting earlier or later than the optimum date for the species increases the risk of failure and makes the need for mulching or irrigation more acute.

Vegetation cannot be expected to provide erosion control cover and prevent soil slippage on soils that are unstable because of structure, water movement or excessive steepness of slope.

Concentrations of surface water and excessive water runoff must be controlled by establishment of needed water control measures such as desilting basins, diversions, berms, furrows, channel liners, waterways or drainage systems.

#### **A. Table of Plants and Mixtures of Plants for Critical Areas**

(See attached Table 1).

#### **B. Site Preparation**

1. Grading or clearing of the areas should be done in such a way as to leave the soil in the best possible condition for seeding. This includes leaving as much topsoil as possible or replacing where needed to modify the condition.
2. Where feasible, grade and shape slopes to a 3:1 ratio slope or flatter to permit the use of conventional equipment for seedbed preparation, seeding, mulch application, and anchoring and maintenance operations.
3. Grading and shaping is desirable, but not necessary when seeding is done by other than conventional means, such as with hydraulic equipment or by hand.
4. No seedbed preparation is necessary on most soil and site conditions where seeding is done immediately after excavation or spoil spreading is completed. Where this type of seeding is done, the excavation work should be completed during the optimum seeding date for the desired plant or mixture of plants.
5. Where adverse soil conditions require modification, apply at least 3 to 4 inches of topsoil or similar soil material. The use of topsoil should be considered where the soil texture at the site is sandy clay, silty clay, or clay. Ripping prior to the addition of new material is usually needed.
6. Remove all woody material, loose rock, and other obstructions that may interfere with planned seeding and maintenance operations.

#### **C. Lime and Fertilizer**

1. Where amendments can be incorporated and soils are reasonably uniform, lime and fertilize according to soil test. In the absence of a soil test, apply 2 tons finely ground dolomitic limestone per acre (92 pounds per 1,000 square feet) and 500 to 800 pounds of 20% superphosphate or equivalent per acre (12 to 18 pounds per 1,000 square feet). Additional amounts and analysis of fertilizers to use at seeding are:

- a. Grasses alone – 700 to 1,000 pounds per acre of 10-10-10 equivalent (18-23 pounds per 1,000 square feet).
  - b. Grasses and legumes or legumes alone – 70 to 1,000 pounds per acre to 5-10-10 or equivalent (18-23 pounds per 1,000 square feet).
  - c. An additional application of 30-50 pounds of nitrogen per acre plus other nutrients is usually needed within three (3) to twelve (12) months after planting. Application should be based on soil test and timed to growing cycle of the species being established. Use low N rate if a legume is present.
2. Where site conditions prevent soil incorporation of lime and fertilizer, soil samples should be taken prior to applying soil amendments. Indicate on the soil test information sheet that the lime and fertilizer will be applied by means of hydroseeding equipment or cannot be incorporated in order to obtain proper recommendations.
    - a. If soil test results are not available at seeding, the first application of lime and fertilizer will be one (1) ton of finely ground dolomitic limestone, 400 pounds of 10-10-10 fertilizer per acre or equivalent. This rate also applies when hydroseeding.
    - b. After seeding, the second application of lime and fertilizer will be the balance of the lime up to one (1) ton and the balance of any P or K required by the soil test. The lime, P, and K plus 30-50 pounds of nitrogen should be timed as in 1c above.
    - c. If a soil sample is not to be taken, apply soil amendments as in 2a above, plus an identical amount at the beginning of the first growing season after seeding.
    - d. Any additional applications of soil amendments will be in accordance with paragraph H.

#### D. Seedbed Preparation

1. Work lime and fertilizer into the soil where conventional equipment can be used. Use disk or similar equipment to prepare to depth of 3-4 inches. Use ripper if necessary.
2. Lime and fertilizer may be applied with seed mixture when a hydroseeder is used and where mulch will be applied. Seedbed preparation may not be necessary where hydroseeding equipment is used.
3. Slopes that are too steep for conventional equipment (2:1 or steeper) should be seeded with hydroseeding equipment.

Where hydroseeding equipment is not available for use on steep slopes, scarify the soil surface with a chain harrow, pick chain, grader blades with chisels, hand tools, or other equipment that will put the soil or make trenches approximately 1-2 inches deep, 6/12 inches apart across the slope in which the seed can lodge and germinate.

#### E. Establishment with Seeds

1. From the attached table, select the plant or mixture best suited for the site based on soil and moisture conditions, slope, aspect and elevation.
2. Seed specifications on contracts:
  - a. Specifications shall state the minimum seed purity percentage and minimum germination percentage that is acceptable for the species being used.
  - b. Seed containing prohibited or restricted noxious weeds may not be accepted.
  - c. All seed shall be labeled to show that it meets the requirements of North Carolina Seed Law.
  - d. All seed used shall have been tested within the six (6) months immediately preceding the date of seeding.
  - e. The inoculant for treating legume seed shall be prepared specifically for the species.

Inoculants shall not be used later than the date indicated on the container. Twice the supplier's recommended rate of inoculant will be used on dry seedlings; four times the recommended rate if hyroseeded.

3. Where hydraulic seeding equipment is used, seed, fertilizer, and wood-fiber mulch materials are mixed into a slurry with water. The inoculant is to the tank immediately prior to seeding. Care should be used to spread the mixture evenly and within 30 minutes after the mixture is made. For best results, keep the mixture well agitated and apply when soil is moist.
4. Where conventional equipment is used, seed shall be applied uniformly with cultipacker-seeders, drills, rotary seeders, or other mechanical seeders. Any equipment that will apply seed uniformly is acceptable. Seedings may be done by hand on areas where it is not practical and feasible to use equipment. When seeding by hand, sow one-half in one direction and the other half at right angles to the first. Cover seed to a depth of approximately ½ to 1 inch, depending on the size of the seed.

When cultipacker-seeder is not used, firm seed-bed and cover seed with suitable equipment, before or after mulching, depending upon type mulch used and method of anchoring.

5. On dikes, ditchbanks, etc., seeding may be made by broadcasting the seed on spoil areas and side slopes immediately following excavation or spoil spreading.

#### F. Establishment with Vegetated Material

1. Select a suitable plant from the attached table.
2. Areas that will be subject to traffic and routine mowing in residential, commercial, or industrial developments may be established by using grass stolons (sprigs or runners). Precaution should be used to make certain only fresh, moist planting material is used.
  - a. Planting Methods for Bermudagrass
    - (1) Prepare a smooth seedbed, shred stolons, broadcast and disk into the top 1-2 inches of soil, and firm the soil. Plantings may be made with a transplanter or hand planting tools.
    - (2) Open shallow furrow 24-30 inches apart, drop clumps of stolons in furrow and cover 1-2 inches deep, and smooth and firm the soil.
    - (3) Fill burlap bags with Bermudagrass roots and soil. Place bags 10-15 feet apart in small gullies or scouring ditches.
    - (4) Spread 3-4 inches of soil filled with Bermudagrass roots and firm the soil.
3. Crownvetch, kudzu, maidencane, and similar plants may be planted in furrows; excavated holes; or with spade, dibble or similar hand tools. When planting in excavated holes, dig holes large enough to allow roots to spread out to full length. When planting in "pot" holes or furrows, place about a level tablespoon of fertilizer per plant in the bottom of planting. Set plants slightly deeper than they grew in the nursery and firm the soil. If vegetative materials are not dormant, water during planting operations.

#### G. Mulching

Mulch is essential on all sites, especially steep, erosive sites where plant establishment may be expected to be different. On some moderately fertile to fertile sites planted at optimum time for the species, mulch may be omitted. It is the responsibility of the conservationist to determine the need for mulching based on the hazards involved; consider materials available; and determine specifications for the job.

1. Mulching Materials
  - a. Dry, unchopped, unweathered small grain straw or hay free of seeds of competing plants – Spread at the rate of 1-2 tons per acre depending upon the site and season. Evenly spread mulch over the area by hand or mechanical equipment. Apply mulch uniformly so

that about 25% of the ground surface is visible.

- b. Sericea lespedeza seed bearing stems at a rate of three tons per acre – This mulch may be applied green or dry but must contain mature seed. Liming, fertilizing, and land preparation should precede application of the sericea mulch.
- c. Broomsedge hay mulch – Spread where it is desirable to establish this native plant.
- d. Shredded or hammermilled hardwood bark – Spread at a rate of 35 cubic yards per acre. On slopes of 2:1 or steeper, increase rate to 40 cubic yards per acre. Do not apply asphalt material to tack the hardwood bark.
- e. Local materials such as burlap and pine boughs – Cover entire area; secure in place if flowing water is involved. Do not use green pine branches where pine trees are to be planted because of possible insect or disease injury to plantings.
- f. Barnyard manure and bedding – Apply uniformly so that about 25% of the ground surface is visible.
- g. Jute matting is a coarse, open-mesh material woven of heavy jute twine. It may be used in place of mulch or sod and has the strength to withstand waterflow. It is an accepted practice to sow half the seed before placing the matting. Sow the remaining half after the matting is laid. See the manufacturer's specifications for installing.
- h. Wood fiber (excelsior) is available as mulch material to be blown on after seeding or as a matting to be stapled on steep slopes, waterways, etc. See the manufacturer's specifications for installing.
- i. Wood cellulose fiber mulch is mixed with seed, fertilizer, and water. The resulting slurry is sprayed on with hydraulic seeding equipment. Use at the rate of 500 pounds per acre where straw or hay is to be applied. Use at the rate of 1,000 to 1,500 pounds per acre without other mulching materials. Applied in a slurry, wood cellulose fiber mulch is self-anchoring.
- j. Other commercial products, such as fiberglass and various kinds of nettings, are available. Manufacturer's directions should be followed for applying and securing in place.

## 2. Mulch Anchoring Methods

Anchor mulch immediately after placement to minimize loss by wind and water. Consider size of area, type of site, and cost, and select one of the following:

- a. Mulch anchoring tool with a series of flat-notched disks that punch and anchor mulch material into the soil. A regular farm disk weighted and set nearly straight may substitute but will not do a job comparable to the mulch anchoring tool. The disk should not be sharp enough to cut up the mulch.  

The soil should be moist, free of stones or roots and loose enough to permit penetration to a depth of 3 inches. Operate as near as practical to the contour.
- b. Mulch nettings – Staple light weight paper, jute, cotton, plastic, or wire nettings to the soil surface according to manufacturer's specifications. These nettings are usually in rolls 3 to 4 feet wide and up to 300 feet long.
- c. Peg and twine – Drive 8 to 10 inch wooden pegs to within 2 to 3 inches of the soil surface every 4 feet in all directions. Stakes may be driven before or after applying mulch. Secure mulch to soil surface by stretching twine between pegs in a criss-cross within a square pattern. Secure twine around each peg with two or more round turns. Poles and stakes may also be used to secure brush in place.
- d. Slit – with a square pointed spade, cut mulch into the surface soil in contour rows 18 inches apart.

- e. Asphalt mulch tie-down – Asphalt sprayed uniformly on the mulch as it is ejected from the blower is more effective than applied as a separate operation. Apply so area has uniform appearance. Rates of application will vary with conditions. The higher the grade number assigned each type of asphalt the higher the percentage of asphalt residue. Asphalt should not be used in freezing weather.
  - (1) Emulsified Asphalt – Apply uniformly 0.04 to 0.08 gallons per square yard or 200 to 400 gallons per acre of rapid setting (RS-1, CRS-1, RS-2, CMS-2); medium setting (MS-1, MS-2, or CMS-2); slow setting (SS-1 or CSS-1). Rapid setting (RS or CRS) is formulated for curing in less than 24 hours even during periods of high humidity. Best for spring and fall.
 

Medium setting (MS or CMS) is formulated for curing within 24 to 48 hours.

Slow setting (SS or CSS) is formulated for use during hot, dry weather with 48 hours or more curing time.

**Note** – In areas of playing children or pedestrian traffic, asphalt application could cause problems of “tracking in” on rugs; damage shoes, clothing, etc. Use ¼ to ½ bushel of rye or 15 pounds of millet per acre broadcast ahead of mulch application.
- f. Mulch can be anchored with rye for fall plantings or millet for summer plantings. Use types RS or CRS to minimize problem.

#### H. Maintenance

Maintenance is the most important controllable factor in retaining an effective vegetative cover.

1. Control of Competition
 

Competitive weed growth during the period of establishment should be controlled by mowing and/or with herbicides. When chemicals are used, follow current North Carolina Agricultural Chemicals Manual recommendations and adhere strictly to instructions on label.
2. Irrigation
 

If soil moisture is deficient, supply new planting with adequate water (3-4” penetration) for plant growth at 10-day intervals, if needed, until they are established. This is most important on late season plantings, in abnormally dry or hot seasons.
3. Repairs
 

Inspect all areas for planting failures and make necessary repairs, replacements, and reseeded within the planting season if possible.
4. Lime and Fertilizer
 

Lime and fertilizer should be applied under a regular program based on soil fertility tests and on the use and general appearance of the vegetative cover. In the absence of a soil test, lime and fertilize as shown below:

  - a. Lime:
 

Apply 1 to 2 tons dolomitic limestone per acre, or 43-92 pounds per 1,000 square feet during late fall or winter every 4-5 years and fertilize annually or as needed to maintain healthy, vigorous growing plants.
  - b. Fertilizer:
 

Pure stands of Tall Fescue, and mixtures of Tall Fescue-Red Fescue and similar cool-season plants. Apply 400-500 pounds per acre or 9-12 pounds per 1,000 square feet of 10-10-10, or its equivalent, in early fall. Additional fertilization with nitrogen or a complete fertilizer is usually needed in early spring. Do not use nitrogen on Fescue or Bluegrass from mid-April to mid-summer.

Pure stands of Bermuda, Bahia, Lovegrass and similar warm season grasses. Apply

400-500 pounds per acre or 9-12 pounds per 1,000 square feet of 10-10-10 fertilizer or equivalent when the plants start to green up in the spring. Topdress with 60-90 pounds of nitrogen per acre or 1-2 pounds per 1,000 square feet, during the growing season. When the higher rate is used, apply in split applications.

Pure stands of Sericea Lespedeza, Crownvetch and similar legumes. Fertilize in early spring with 400-500 pounds of 0-10-20 (9-12 pounds per 1,000 square feet) or equivalent per acre.

Mixtures of Sericea Lespedeza, Fescue, Lovegrass, or Bermudagrass. Fertilize in late winter or early spring with 400-500 pounds per acre (9-12 pounds per 1,000 square feet) of 5-10-10 or equivalent. In Fescue Sericea Lespedeza mixture, apply in the fall if the Sericea Lespedeza is developing better than the Fescue.

Fescue-White Clover, Bluegrass-White Clover and similar mixtures. Apply 400-500 pounds per acre (9-12 pounds per 1,000 square feet) of 0-20-20 or equivalent in early fall. An additional application of nitrogen or complete fertilizer may be needed in the spring to keep plants lush and in balance. Where grass is crowding out the clover, reduce or eliminate spring application of nitrogen.

## 5. Mowing

Mow Kudzu, Sericea Lespedeza, or Sericea Lespedeza and grass mixtures only after a killing frost. Mow grasses at least annually to control weeds and undesirable woody vegetation. Bluegrass should be mowed not closer than 2 inches, Tall Fescue not closer than 3-4 inches, and Bahia and low-growing Bermudagrass may be mowed about 2 inches high.

Care should be taken not to damage the vegetation mechanically through use of improper mowing equipment or by attempting to mow with heavy equipment or by attempting to mow with heavy equipment on steep slopes when the vegetation is lush and slippery, or when the ground is soft enough to be rutted by mower or tractor wheels.

Where mowing fails to control weeds satisfactorily, apply chemicals in accordance with current North Carolina Agricultural Chemicals Manual weed control recommendations and adhere strictly to instructions on label.

**Caution:** Pesticides are dangerous. Use only as directed and heed all precautions on the container label. Check the registration number and be sure that the directions for use include the target pests. Drift from aerial spraying can contaminate nearby crops and forage, lakes, and reservoirs. Improper use and careless disposal of unused portions can lead to poisoning of humans, domestic animals, desirable plants, pollinating insects, fish, and wildlife and can contaminate water supplies.

**Table 1. Plants and Mixtures of Plants for Critical Areas**

PLANTS AND MIXTURES	PLANTING RATES/ACRE	PLANTING DATES			NOTES
		1. Coastal Plain	2. Piedmont	3. Mountains	
1. 'Pensacola' Bahiagrass	40-60 lbs.	1. Mar. 15-June 15	2. Apr.-June		Best adapted southeast of line from Charlotte thru Durham, North Carolina. Use scarified seed.
2. Common Bermudagrass (hulled)	6-8 lbs.	1. April- July	2. Apr. 15-June 30	3. May-June 15	In mountains best under 2,000' elevation and south slopes, well-drained sunny sites, stands traffic.
3. Common Bermudagrass (Unhulled)	8-10 lbs.	1. January-March	2. February-March	3. March-April	
4. Hybrid or Common Bermudagrass sprigs	Sprigs 2x2' 30 cu. Ft. or Broadcast 50-80 cu. ft.	1. March-April 15	2. March-April	3. May-June	
5. Kudzu (plants)	Space 4'x5' 2,200 plants	1. Late winter/early spring	2. Late winter/early spring	3. Late winter/early spring	Well adapted to large and very steep cuts and high fills-not suited to soils with poor internal drainage-excellent for gullies.
6. Crownvetch	10-15 lbs.		2. Aug. 20-Sept. 20 Feb. 20-Apr. 15	3. Mar. 15-June	Best in mountains, and upper Piedmont. Spring transplanting preferred. Requires a pH of 6+ and maintenance of lime, P & K every 3-4 years. Slow to establish with seeds. Good plant on slopes that will not be moved.
7. Flatpea "Lathco"	60-70 lbs.		2. Aug. 20-Sept. 20 Feb. 20-Apr.	3. Mar. 15-June	
8. Crownvetch (seed or plants) and Tall Fescue	10-15 lbs. Or plants spaced 3x3' or closer 4,840 plants 10-20 lbs.		2. Aug.20-Sept. 20 Feb. 20-April 15	3. Mar. 15-April	Avoid wet sites – Mow <u>only</u> to control brush. Fescue may be used to increase land cover during establishment of Crownvetch.
9. Weeping Lovegrass	2-3 lbs.	1. March 15-June	2. April 15-June 15	3. May	Gives quick summer cover – well adapted to droughty sites-Best in mixtures with Sericea Lespedeza-tends to become clumpy with age.

PLANTS AND MIXTURES	PLANTING RATES/ACRE	PLANTING DATES 1. Coastal Plain 2. Piedmont 3. Mountains	NOTES
10. Maiden cane (plants)	Space 2'x2' 11,000 plants dig native plants	1. Late winter/spring 2. Late winter/spring	Adapted to all of the Coastal Plain and southeastern half of Piedmont. Good on stream and canal banks, not for small laterals and small stream channels with low velocity.
11. Reed Canarygrass	15-20 lbs.	2. Aug. 20-Sept. Feb. 15-April 3. March-July	Excellent on berms, stream banks and at edge of water-do not use on small streams with low velocity.
12. Sericea Lespedeza (scarified)	30-40 lbs.	1. March-May 2. Mar. 15-June 3. April-May	Avoid wet sites – will persist and furnish cover on eroded droughty sites and subsoil material.
13. Sericea Lespedeza (unscarified)	40-50 lbs.	2. Oct.-February Sept. 15-Feb. 3. Sept.-March	Tolerates low level of management. May be seeded alone or overseeded on Fescue, Lovegrass, small grain and other compatible plants during the fall and winter months. <u>'Appalow'</u> best cultivar.
14. Sericea Lespedeza (scarified) and 'Pensacola' Bahiagrass Annual Lespedeza 'Kobe'	20-30 lbs. 20-30 lbs. 5 lbs.	1. March-May	Adapted south of line – Rockingham to Washington, North Carolina. Tolerates low level of management.
15. Sericea Lespedeza (scarified) and Weeping Lovegrass	30-40 lbs. 1-2 lbs.	1. March - May 2. March 15-June 3. April-May	Lovegrass provides quick protective cover.
16. Sericea Lespedeza (scarified) and Common Bermudagrass (hulled)	30-40 lbs. 4-6 lbs.	1. March – May 2. March 15 - June 3. April – May	Bermuda provides quick land cover, spreads and heals in open areas. Bermudagrass usually disappears where Sericea establishes a canopy.
17. Sericea Lespedeza (scarified) and Tall Fescue Annual lespedeza 'Kobe'	30-40 lbs. 25-30 lbs. 5 lbs.	1. March – April 2. March – April 3. April – May	Scarified Sericea may be spring seeded on Fescue seeded the previous fall.
18. Sericea Lespedeza (unscarified) and Tall Fescue	30-40 lbs. 25-30 lbs.	1. Sept. – Nov. 2. Aug. 15 – Oct. 3. July 15 – Sept.	If Sericea seed unavailable at planting time, it may be overseeded on Fescue later in the winter.

PLANTS AND MIXTURES	PLANTING RATES/ACRE	PLANTING DATES 1. Coastal Plain 2. Piedmont 3. Mountains	NOTES
19. Tall Fescue	30-40 lbs.	1. Sept. – Nov. Feb. – Mar. 2. Aug. 15 – Oct. Feb. 15 – Apr. 15 3. July 15 – Sept. March - April	Not well suited to infertile, droughty, sandy soils. Requires good maintenance. Seeding date in mountains varies with elevation and aspect.
20. Tall Fescue and White Clover	30-50 lbs.  3-4 lbs.	1. Sept. – Nov. Feb. – March 2. Aug. 15 – Oct. Feb. 15 – April 15 3. July 15 – Sept. March and April	Can be used where regular mowing is desired and high level of maintenance will be provided.
21. Tall and Red Fescue	20-30 lbs.  15-20 lbs.	2. Aug. 20-Oct. 10 Feb. 15-Apr. 15 3. July 15-Sept. 1 March and April	Red Fescue in this mixture has a tendency to fill in voids. It is shade tolerant.
22. Tall Fescue and Bluegrass	20-30 lbs.  10-15 lbs.	2. Aug. 15-October Feb. 15-Apr. 15 3. July 15-Sept. March-April	Limited to fertile well-drained soils in Northern Piedmont and Mountains.
23. Tall Fescue and Browntop Millet or Sorgham-Sudan Hybrids	40-60 lbs. 25-35 lbs. 25-30 lbs.	1. Aug.-Sept. 2. July 15-August 3. July-Aug. 15	Keep annuals cut back to 10-12 inches. Mulching is desirable.
24. Tall Fescue and Rye	40-60 lbs. 25-30 lbs.	1. Dec. - Jan. 2. Nov. – Jan. 3. Oct. – Feb.	Use only when necessary to complete a job. Mulching will be necessary to provide erosion control. Keep annuals cut back to 10" – 12".
25. Centipede	8-10 lbs.	1. April-July 2. April 15-June 30	
26. Road Mix #1 Tall Fescue Centipede Bahia	50 lbs. 5 lbs. lbs.	1. Jan. 1- 2. Dec. 31	
27. Road Mix #2 Tall Fescue Kentucky Bluegrass Hard Fescue	60 lbs. 10 lbs. 10 lbs.	2. August 1 – 3. June 1	
28. Road Mix #3 Tall Fescue Kentucky Bluegrass Hard Fescue Annual Lespedeza	60 lbs. 10 lbs. 20 lbs.	2. March 1 – 3. September 1	

There will be conditions and interest that will warrant the use of other plants or mixtures not listed in the above table. Their use should be evaluated for each site.

Some rules of thumb for conversions:

Lbs./Ac. x .367 = Oz./1,000 sq. ft.

Lbs./Ac. x .0023 = Lbs./100 sq. ft.

Lbs./Ac. x .023 = Lbs./1,000 sq. ft.

Lbs./Ac. x .000207 = Lbs./Sq. Yd.

Lbs./Ac. x .0207 = Lbs./100 sq. yds.

Lbs./Ac. x .207 = Lbs./1,000 sq. yds.

Sq. Ft. of area x .000023 = Acres (valid up to 10 acres)