

**NATURAL RESOURCES CONSERVATION SERVICE**  
**CONSERVATION PRACTICE GENERAL SPECIFICATION**

**CRITICAL AREA PLANTING**  
**(Ac.)**

**CODE 342**

**SCOPE**

Various NRCS standards require critical area planting as a component for vegetation and may list specific plant species for that practice.

**OKLAHOMA CRITICAL AREA PLANTING SPECIFICATIONS**

The following Tables provide for the selection of species or combination of species to be used when completing a critical area planting. Specific varieties, areas of adaptation, methods of seeding, seeding dates, seeding rates and seedbed preparation guidelines are found in the Plant Materials Technical Note OK-21 ([http://efotg.sc.egov.usda.gov/references/public/OK/planmat\\_ok-21vegt\\_n\\_82011.pdf](http://efotg.sc.egov.usda.gov/references/public/OK/planmat_ok-21vegt_n_82011.pdf)). Seeding rates for Critical Area Planting will be 200% (double) of the full rates established in the Technical Note OK-21.

**Grass and Legume species for Critical Area Plantings**

<b>Introduced Grasses 1/ 2/</b>	<b>Legumes in Mixtures 7/ 8/</b>	<b>Native Grasses 1/ 2/ 3/ 4/ 5/ 6/</b>
bahiagrass	alfalfa	alkali sacaton
bermudagrass sprigs <sup>8/</sup>	arrowleaf clover	big bluestem
bermudagrass - seeded species	birdsfoot trefoil	blue grama
bermudagrass sodding <sup>9/</sup>	crimson clover	buffalograss
old World bluestems	crownvetch	eastern gamagrass
smooth brome	hairy vetch	indiangrass
tall fescue	hop clover	little bluestem
wheatgrass, tall and pubescent	Lespedeza (Korean, Kobe)	sand bluestem
weeping lovegrass	red clover	sand lovegrass
	sweet clover	sideoats grama
	white clover	switchgrass
	Native forbs and legumes as listed in Oklahoma NRCS Range Planting (550) standard)	tall dropseed
		western wheatgrass

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## Tree Selection for gullied areas

Species	Adaptation	Spacing A/	Remarks
black locust	Greater than a 22" annual rainfall. Not in clayey soils or very shallow soils. Tolerates alkaline soils.	6 - 8 feet apart	Due to soil binding properties of the root system and fast growth, this is the most desirable species outside the native range of shortleaf pine. This species is preferred when planting close to the gully rim and on steep slopes.
loblolly pine	Greater than 40" annual rainfall. Suited to deep soils.	6 - 8 feet apart	Due to the fast growth and heavy needle litter blanketing the soil under the stand, it is the most desirable species within the shortleaf pine native range. It can be planted on steep slopes.
mixtures	Refer to the (612) Tree/Shrub Establishment Standard	6 - 12 feet apart	Plant other adapted trees to add diversity. These species should be planted on the least erosive area of the gully.

A/ Plant trees at the required spacing over the entire gullied area. Plant a minimum of 3 rows around the rim of the gully. Locate the first row on the gully rim approximately 5 feet back from the rim.

**FOOT NOTES:**

- 1/ Seeding rates will be 200% (double) of the full rates established. For species with a range given in the seeding rates, the higher seeding rates should be selected for poorer quality sites.
- 2/ The planting date for warm-season grasses can be extended one month with irrigation that meets the needs of the establishing plants. Mulching following seeding should be considered when extending planting dates to help conserve moisture and aid in establishment.
- 3/ Native harvest is allowable for each species. The origin of native harvest seed, seed quality, and seeding timing shall follow the guidelines listed in the Oklahoma NRCS Range Planting (550) standard and specifications.
- 4/ All native mixes shall consist of a minimum of 3 grass species with no single species exceeding 40% of the mix. Mixtures meet specifications when the applied amount is not more than 5% below or 25% above the PLS pounds per acre listed for the species. For native plantings required in wetlands or where wetness during the normal planting season prevents access, seeding can be done anytime.
- 5/ Select unpalatable species for situations when cattle may be present and grazing is not desired.
- 6/ For seeding into relatively undisturbed soils, such as Filter Strips, adaptation and mixtures found in the Range Planting (550) standard and specification are to be followed.
- 7/ Seeding rates will not be doubled for legumes. Use full rates as established in the Oklahoma NRCS Pasture and Hay Planting (512) and/or Range Planting (550) standards. Use no more than 3% of any one species. No more than 5% of the total mixture is allowed for forbs and legumes. When seeding legumes with mixtures, the seeding dates for the base grasses will apply.
- 8/ For bermudagrass sprigging, the higher rate should be used when sprigging takes place following greenup. Distance between rows shall not exceed 24 inches. Hand planting of bermudagrass sprigs will result in a minimum of three healthy sprigs placed on a maximum of 15 inch centers with soil firmly packed over the planted sprigs.
- 9/ Bermudagrass sodding can take place anytime soil is not frozen and when adequate moisture exists or is provided for the establishment period.



## **CHANNEL VEGETATION**

The following species of grasses shall be used for *channel vegetation* in areas that will not be inundated except for very short-term flooding.

Bermudagrass

- Mulch sod
- Solid sod
- Sprigs
- Seed

Native Mixture

Switchgrass - 'Blackwell'

Tall Fescue

## **SHORELINE PROTECTION**

The following grasses shall be used in areas where *inundation* is expected. The use of common reedgrass, prairie cordgrass and 'Kanlow' switchgrass can be in combinations or used individually. common reedgrass and prairie cordgrass are adapted to areas of permanent water, such as the water's edge (transition between toe zone and bank zone). 'Kanlow' switchgrass can tolerate fluctuations in water levels, such as that found in the bank zone, or above the shoreline.

### **Common reedgrass/prairie cordgrass**

Harvest - Top growth greater than 2 inches shall be removed before rhizomes are harvested. Rhizomes can be dug with a lister, moldboard plow, or other suitable implement. Rhizomes shall be dormant, healthy and 8-12 inches long. Rhizomes shall be kept moist until planted. For common reedgrass a known variety will be used and applied as stated in the OK vegetation technical note 21. ***Some varieties of reedgrass are invasive and are known to spread off site. Harvesting and planting of unknown types and varieties will not be allowed.***

Site Preparation - The area to be planted should have no more than 5 percent ground cover of living plants present. If plant competition exceeds 5 percent, the area shall be prepared by any method which will result in a fresh, clean, friable, firm seedbed without excessive weedy competition or plow plans.

Planting Dates - Rhizomes shall be planted from January 15 to May 1. An exception would be rhizomes kept in cold storage (dormant) may be planted between May 1 and September 15.

Planting Methods - Rhizomes can be planted by the following methods:

1. Posthole - Postholes shall have a minimum diameter of 8 inches and approximately 6 inches deep. Postholes will be spaced no more than 2 feet apart down the row with 2 rhizomes placed vertically on opposite sides of the hole. If more than one row is planted, rows will be 40 to 48 inches apart. Postholes in adjoining rows shall be spaced to have a staggered type layout. Loose soil shall be pushed over the rhizomes within 15 minutes of planting. The soil shall be firmed and water added immediately.
2. Open Furrow - A furrow shall be opened for each row to a depth of 6 inches. Rhizomes shall be dropped by hand parallel in the open furrow with 6 inches between rhizomes. Loose, moist soil shall be placed over the rhizomes within 15 minutes after planting to prevent drying. The soil shall be firmed around the rhizomes and smoothed to ground level. Rows shall be spaced 40 to 48 inches apart.
3. Stream Channels – Where the soil is muddy, the rhizomes can be buried 3-5 inches deep by any method such as treebar, square nosed shovel, tire tool, or other methods which accomplished the same result. Spacing will be as described for the posthole method.



**'Kanlow' Switchgrass**

Planting Dates - Dec. 1 to May 31

Rate - 6 PLS lbs/ac.

Site Preparation - The seedbed shall be firm, free of clods that restrict seeding equipment, have no restrictive compacted layers, and be free of competitive vegetation.

Seeding - Seed shall be uniformly spread and firmed into the soil surface. Do not cover seed more than 1/2 inch.

**Management**

Common reedgrass, Prairie Cordgrass and 'Kanlow' switchgrass shall not be grazed until well established. Limit grazing only during dormant season. Graze no closer than 12 inches in height.

**TREE AND SHRUB PLANTINGS**

Tree and shrub plantings may be done alone or in combination with grass planting.

The Oklahoma NRCS Tree/Shrub Establishment (612) standard will be used for the establishment, maintenance, species and cultivar selection, and planting rates and dates.

**SOIL BIOENGINEERING**

When the use of soil bioengineering practices are needed to protect and stabilize streambanks and shorelines, Chapter 18 of the Engineering Field Handbook, [NRCS eDirectives - Part 650 - Engineering Field Handbook](#), will be used for guidance and design of vegetative components. These will include but are not limited to live stakes, live fascines, brushlayers, branchpacking, live cribwalls, live gully repair, vegetated rock gabions, vegetated rock walls, and joint plantings.

Erosion control blanket material shall be used as needed to control erosion during vegetation establishment.

**BERMUDAGRASS SODDING**

1. Mulch Sodding. A mixture of topsoil and bermudagrass roots shall consist of fertile, loamy textured (<70% sand) topsoil containing a sufficient quantity of bermudagrass rhizomes of any adapted variety to provide a uniform stand of plants on emergence. The rootstock shall be viable and the grass vigorous as indicated by well formed, deeply rooted, thick rootstock. At least 70 percent of the plants in the sod shall be bermudagrass with no invasive species. The proportion of soil in the soil-grass mixture shall be sufficient to protect the grass roots from the drying action of the sun after placing, spreading, and compaction has taken place. Top growth taller than 2 inches shall be removed before harvesting. The soil should be moist to the harvested depth. Sod shall be disked two directions until grass is well mixed with topsoil to a depth of 4 to 8 inches. Keep the mulch sod moist until placed and plant within 30 hours of harvest. The bermudagrass-topsoil (sod-mulch) shall be uniformly spread over the area to be treated at a minimum depth of 3 inches. After spreading, the soil shall be lightly packed to firm the soil around the roots.

2. Existing Bermudagrass - When engineering practices are constructed in an area with an existing, adequate stand (>70% bermudagrass), efforts should be made to salvage and stockpile the mixture of topsoil and bermudagrass. The stockpiled mixture will be spread uniformly over the completed practice at a minimum depth of 3 inches and lightly packed to firm the soil.

3. Solid Sodding - Solid bermudagrass sod will be obtained from adapted grass that is dense, well rooted and vigorous. Top growth taller than 2 inches shall be removed before harvesting. The sod shall be cut into slabs 10 to 12 inches wide with a minimum of 3/4 inches of soil thickness. The soil should be moist to the depth of cut. It shall be placed within 48 hours of harvesting unless methods are in place to keep sod moist, and protected from sun, wind, and freezing temperatures. Sod shall be placed on tilled, moist soil by hand,

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soil side down, in rows at right angles to the slope. Each slab of sod shall be packed tightly against the edge of adjoining slabs and pinned. Row joints shall be offset and not aligned. Fill all openings with fertile, friable soil. The outside edge of the solid sodded area will be flush with the ground level.

### **SITE PREPARATION**

Necessary shaping and smoothing will be made before seedbed preparations are started. Where practical, the area should be shaped and graded to allow the use of conventional equipment for seedbed preparation, seeding, and mulching.

Where needed to aid with revegetation, topsoil will be salvaged from borrow areas and re-spread onto shaped and graded areas. Topsoil may be replaced in lifts no greater than 6 inches. Prior to topsoil application, the re-graded area will be deep chiseled or ripped to reduce soil movement and to promote root penetration.

Compacted construction sites may need site preparation prior to vegetating by ripping or tillage.

Where needed to aid with vegetation establishment, topsoil may be taken from borrow areas and placed onto shaped and graded areas at a minimum depth of 4 inches. Ideally, topsoil will be placed a minimum depth of 1 foot and in lifts no greater than 6 inches. Prior to replacing topsoil, the area shall be tilled and/or ripped to provide adequate bonding of soils, reduce soil movement and to promote root penetration.

If there is a potential for excessive quantities of sediment to be washed into surface waters or other sensitive areas during site preparation and prior to establishment of plants, additional erosion control practices may be needed.

### **SEEDBED PREPARATION**

Seedbed preparation shall take place after final site preparation. Where feasible, tillage operations should be performed across the slope and to a depth of 3 inches. All loose soil will be smoothed and packed to a degree that results in a firm seedbed.

### **PLANTING METHODS**

Seeding operations will be applied according to guidelines found in the Oklahoma NRCS Pasture and Hay Planting (512), Range Planting (550) and Tree and Shrub Planting (612) standards except for the following:

1. On areas too steep for normal planting operations, hydroseeding may be used. Mulching material and application shall be applied according to manufacturer's recommendations. Hydroseeding plans must be developed by state office technical staff; contact the State Resource Conservationist for planning.
2. Overseeding - When vegetating sites where a quick cover is needed in combination with native grass plantings, or where bermudagrass has thinned out or is not fully established, introduced plants and/or native grasses from Table 2 may be overseeded. When these plants are overseeded at the time of initial bermudagrass sprigging, the seeding rate shall be at 100% of the full rate. When overseeding poor stands of bermudagrass, 200% of the full rate shall be used. All other aspects of the planting shall be followed except that shallow tillage is acceptable for seedbed preparation.
3. Bermudagrass sodding may be used in the following situations: 1) graded, denuded or bare areas are subject to erosion; 2) outlet channels; 3) where perennial vegetative cover is needed sooner than can be established by planting. Adequate moisture is critical before and during the establishment period.

### **Supplemental Water for Establishment**

Planting operations will be planned to take advantage of seasonable rainfall. However, if moisture is not available when needed, the area to be planted shall be moistened to a depth of at least 3 inches prior to planting. A second application of similar amount shall be made following planting. Additional watering shall be done consistent with establishment needs. Water will be applied uniformly and at rates that will not exceed intake rate of the soil. When irrigation is used seeding dates can be extended up to one month.



### **Stabilizing areas with existing or expected high rates of soil erosion by water**

A technical determination shall be made as to whether or not areas of concern should be mechanically shaped, managed for natural recovery or other structural practices installed.

An example of natural recovery would be where livestock trailing is causing concentrated flow of water and exclusion of livestock or re-routing their movement will allow vegetation to naturally re-establish and stabilize the area. Facilitating practices such as Fencing may be needed. Refer to the Oklahoma NRCS Fence (382) standard.

### **GULLY SHAPING**

Mechanical shaping may be needed to stabilize severe overfalls or active headcuts. Mechanical treatment will consist of gully shaping. Use form OK-ENG-32 for gully shaping design. An evaluation must be made of the amount and velocity of water flowing through the gully.

To the extent practical, runoff should be diverted before treatment. Needed management practices should be applied to the upslope contributing area to retain as much water as practical on the watershed above the gully.

The gully must be shaped to handle the runoff from a 10-year frequency storm. The Engineering Field Manual, Chapter 7, should be used in making this determination.

If *dispersive soils* are present in the area to be shaped, potential erosion shall be controlled by a soil treatment of 1.5 lbs of gypsum per square foot and incorporate a minimum of 3 inches into the soil.

Any topsoil shall be stockpiled prior to shaping. Following shaping stockpiled topsoil will be spread evenly over the treated area.

Side slopes will be shaped only to the extent needed to establish the desired vegetative cover. Side slopes shall be no steeper than 2:1. It is recommended that the side slopes be made no flatter than 5:1 in order to keep the treated area exposed to erosion to a minimum. For mechanical maintenance, side slopes should not be steeper than 3:1. The finished side slopes will need 8 to 12 inches of soil material capable of supporting adequate vegetation and having at least one to one and one half inches of available water-holding capacity per foot. If material is not available, consideration should be given to alternatives.

All areas with fill shall be thoroughly compacted with construction equipment. Equipment should be routed in the placement of fill so as to give the best compaction practical. Any fill portion shall be further compacted by running the construction machinery lengthwise on the gully at intervals of 20 - 30 inches.

All trees, rubbish, etc., that will interfere with compaction, vegetative establishment or maintenance shall be removed from the treated area. The material shall not lead to the development of voids.

Items removed will be buried with a minimum of 36" of soil covering.

### **Non-Natural Materials**

All non-natural materials must be removed and disposed of prior to NRCS providing technical assistance, unless the site has been certified to be free of hazardous materials. The certification of "No Hazardous Materials Being Present" must be a written statement signed by appropriate personnel from the Oklahoma Department of Environmental Quality (ODEQ), or equivalent authority for Indian tribes. NRCS will not be involved in recommendations for disposal of these materials except for the following:

1. Ascertain if the proposed site is near or within the 100-year floodplain.
2. Determine if the proposed site is located within a known wetland.
3. Provide recommendations for vegetation cover and erosion control measures for the site during the reclamation process.



**RESTORING DEGRADED SITES**

Degraded sites are typically sizeable areas that have been denuded of topsoil and associated vegetative cover and have no chance of natural recovery without application of soil amendments such as organic matter. Some situations may also warrant additional topsoil.

If gullies or deep rills are present, they will be treated, if feasible, to allow equipment operation and ensure proper site and seedbed preparation.

Additional soil testing may be needed to determine organic matter content and pH so that needed soil amendments can be added to improve or eliminate physical or chemical conditions that inhibit plant establishment and growth. Required amendments, such as compost or manure to add organic matter and improve soil structure and water holding capacity; agricultural limestone to increase the pH of acid soils; or elemental sulfur to lower the pH of calcareous soils, shall be included in the site specification with amounts, timing, and method of application.

**SOIL AMENDMENTS**

All grass plantings will follow preparation and planting guidelines found in the Plant Materials Technical Note OK-21 ([http://efotg.sc.egov.usda.gov/references/public/OK/planmat\\_ok-21vegtn\\_82011.pdf](http://efotg.sc.egov.usda.gov/references/public/OK/planmat_ok-21vegtn_82011.pdf))



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