Critical Area Planting

Iowa Job Sheet

United States Department of Agriculture
Natural Resources Conservation Service

Natural Resources Conservation Service (NRCS)
Des Moines, Iowa

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Criteria for Critical Area Planting

A. Seeding Periods

Permanent, perennial vegetative cover and/or trees will be established during the first recommended seeding or planting period for the selected species or mixture. Planting dates are outlined on Table 1 of this job sheet.

B. Fertilizer and Lime Requirements

Soil fertility and pH level will be amended to satisfy the needs of the specific plant species planted. Recommendations for establishment will be determined by an approved testing laboratory from soil samples collected in the area to be seeded. In lieu of soil sampling, see Table 5 for general fertilizer.

C. Companion Crop

All critical area plantings will contain a companion crop or will be mulched. Mulching will be required on slopes steeper than 4:1 where mowing of a companion crop may be difficult or dangerous. Mulch of small grain straw shall be used at the rate of 2 tons/ac.

For spring seedings of introduced species, oats shall be seeded at a rate of 1 1/2 bushels/acre to reduce soil erosion and help control weed competition. The oats shall be clipped at the time of seed head emergence to promote growth of the new permanent cover. The use of the companion crop is not required when interseeding.

D. Seedbed preparation and Seeding

1. Conventional seeding for spring and late summer seeding periods where site conditions allow for safe operation of equipment.
   - » The seedbed shall be worked to a depth of 3”, smooth, friable and firm before seeding.
   - » All tillage operations shall be performed across the general slope of the land.
   - » Grass and legume seed shall be drilled uniformly over the area at a 1/4-1/2 inch depth, or broadcast uniformly over the area and rolled into the seedbed.

   - » Where erosion is a concern prepare a seedbed with tillage tool that will leave enough residue or provide mulch to provide adequate protection.
2. No-till seeding for spring, late summer and dormant seeding periods where site conditions allow for safe operation of equipment.
   - » Approved herbicides shall be applied to kill or suppress existing weed competition, as necessary.
   - » A drill designed for no-till planting shall be used to plant the seed at a depth of 1/4 - 1/2 inch.
3. Frost Seeding
   - » Broadcast seed for only those species approved for frost seeding as shown in table 2 and table 3.
4. Hydroseeding

Hydroseeding can be used on all sites but especially on sites that are too steep for regular seeding equipment to operate. The prescribed procedure will be to apply the seed and fertilizer in a water slurry uniformly over the surface. A second trip will be needed to apply an asphalt emulsion to long fiber mulch as it is blown on.

5. Sodding

All sod used shall be free of noxious weeds as listed in Iowa State Laws and shall be cut from stands giving not less than 90 percent ground cover.

Only moist, fresh sod shall be used. Lay sod as soon as possible after delivery to the site. Wet soil to a depth of 2 inches or more prior to laying the sod. Lay the sod from the lower end of the slope. Sod strips shall be laid at right angles to the flow of water; stagger joints. Fill any open joints with loose soil. Tamp or roll laid sod to insure a solid contact of root mass to soil surface.

On severely steep sites or when anticipating overland flow, sod shall be held in place by woven wire, wooden pegs, wire staples, or similar material. Pegs or staples will be a minimum of 10 inches long.

E. Seeding Stand Improvement

This includes any stand modification that maintains some vegetative component of the original stand.

1. Incorporation of grasses and/or legumes with light tillage.
   - » Weaken the existing stand in the fall or early winter by use of herbicides, grazing, mowing or a combination of these methods.
   - » Use a disk, cultivator, or similar tool to disturb 40-50% of the existing stand.
   - » Grass and legumes shall be drilled uniformly over the area at 1/4-1/2 inch depth, or broadcast uniformly over the area and rolled into the seedbed.
   - » Remove early spring regrowth by mowing to reduce competition and allow the new seedlings to become established.
2. Incorporation of grasses and/or legumes with no-tillage (interseeding) for spring, late summer and dormant seeding periods.
   - » When interseeding into existing sod, graze, burn, mow or apply herbicides to kill strips or suppress existing vegetation and to control weed competition.
   - » Control broadleaf weeds by applying herbicide at least two weeks prior to applying contact herbicides and prior to seeding.
   - » Grass and legumes shall be drilled uniformly over the area at 1/4-1/2 inch depth.
   - » Remove early spring regrowth by mowing to reduce competition and allow the new seedlings to become established.
3. Incorporation of grasses and/or legumes with frost seeding.
   - » Broadcast seed only species approved for frost seeding as shown in table 2 and table 3. Small smooth (shiny) seeded species are best for incorporation into the soil during freezing and thawing.
   - » Frost seeding is likely to be more successful if existing stand is weak and less than 50 percent of the ground is covered with live vegetation.

F. Inoculation

1. Legume seed shall be inoculated and the inoculant shall be specific to the legume seeded.
2. When more than one legume species is used, each species shall be inoculated separately.

G. Seed Quality

1. All seed shall be of high quality and comply with Iowa Seed and Weed Laws.
2. Cool season (introduced) grass and legume seeding rates are expressed in bulk pounds/acre. Seed quality shall not drop below 70% Pure Live Seed (PLS) where PLS = (% germination + dormant seed) X % purity).
3. Native grass species seeding rates are expressed in PLS pounds/acre.

H. Approved Plant Species and Seeding Rates.

Plant species and cultivars shall be selected based upon:

1. Climatic conditions such as annual rainfall, seasonal rainfall, growing season length, humidity levels, temperature extremes and the USDA Plant Hardiness Zones.
2. Soil condition and position attributes such as pH, percent slope, available water holding capacity, aspect, drainage class, inherent fertility, flooding and ponding, and levels of salinity and alkalinity.
3. Plant characteristics such as season of growth, vigor, ease of establishment, longevity of the species, growth habit, adaptation to soil conditions, and conservation value.
4. Resistance to diseases and insects common to the site or location.
5. Compatibility with other plant species and their select-

ed cultivars in rate of establishment and growth habit when seeded together as a mixture.

6. Seeding Rates

The pure stand rates in table 2 of this standard are the minimum rates for planting a single species stand into well-prepared seedbed at the proper placement. The pure stand rates are decreased to a percentage of the desired stand when used to calculate a mixture of two or more species. Select combinations of plant species and cultivars best adapted to site conditions.

7. When frost seeding is used, the seeding rate shown in table 2 and table 3 shall be multiplied by 1.5.

8. Introduced Species

   » Approved introduced plant species, allowable mixture composition and the pure stand seeding rate are shown in Table 2.

   » A designed seeding mixture shall meet criteria specified in table 2 as to species composition and seeding rate.

   » For critical area seeding used for erosion control, at least 50% of mixture shall be composed of grasses.

   » Tall Fescue shall not compose more than 10% of the mixture if the secondary purpose is for wildlife.

   » Mixtures may include up to 20% native grasses. Use the criteria for the predominant species in the mixture for stand establishment.

9. Native Species

   » Approved native plant species, allowable mixture composition and a pure stand seeding rate are shown in Table 3.

   » A designed seeding mixture shall meet criteria specified in table 3 as to species composition and seeding rate. At least 50% of the mixture shall be composed of grasses. For seeding mixtures with the secondary purpose of wildlife not more than 20% of the mixture will be composed of switchgrass.

   » When developing seeding mixtures, except eastern gama grass, use 60 seeds/sq. ft. for grass stands.

   » Mixtures may include up to 20% introduced legumes. Use the criteria for the predominant species in the mixture for stand establishment.

I. Weed Control during the Establishment Year

Weed control during the establishment year shall be provided to ensure survival of the new permanent seeding.

1. To manage severe weed competition, native species may be mowed no closer than 8 inches and introduced species no closer than 4 inches.

2. Approved herbicides may be used on both introduced and native plantings to control weed species.

J. Establishment of Temporary Cover

Temporary cover may be required to reduce potential weed and erosion problems where one of the following conditions exists.

1. Fields with herbicide carry over.

2. Where planting is delayed due to unavailability of seed.

3. The normal planting period has passed.

Temporary cover or mulching will be established on sites where construction delays or shutdowns occur if the delay or shutdown will last more than 30 days.

The temporary cover shall be seeded as specified in Table 4.

Table 1. Seeding dates for cool and native species

Type of Seeding	Introduced Species[2] (Grasses and Legumes)	Native Species[3]
Spring	March 1 - May 15	April 1 - June 1
Late Summer	August 1 - September 15	Not Recommended
Dormant	November 15 - Freeze	November 15 - Freeze
Frost[1]	Februrary 1 - March 15	February 1 - March 15

1 Refer to Table 2 and 3 for applicable plant species.
2 Includes all species generally considered introduced.
3 Includes all warm and cool season natives when planted in mixture.

Table 2. Seeding chart for introduced plant species

	% of Mixture (Range Allowed)		
Plant Species	Critical Areas Grassland[3/]	Trees, Shrubs & Wildlife	Seeding Rate Bulk lbs./acre
Smooth bromegrass[1]	0-80	0-25	25
Kentucky bluegrass[1]	0-80	0-10	25
Orchardgrass[1,2]	0-25	0-100	10
Timothy[1,2]	0-25	0-100	10
Alfalfa[2]	0-50	0-50	20
Red clover[2]	0-50	0-50	16
Birdsfoot trefoil[2]	0-50	0-25	16
Reed canarygrass	0-50	0	16
Ladino clover[2]	0-50	0-50	8
Redtop	0-50	0-80	10
Crownvetch	0-50	0	16
Alsike clover[2]	0-50	0-50	8
Tall fescue[1]	0-50	0-10	16
Sweetclover[2,4]	0-210	0-20	10

1 For critical area seeding used for erosion control, at least 50% from the grassland or wildlife seeding mixture shall be composed of sod forming grasses. (Tall Fescue should not consist of more than 10% of the mix if primary or secondary purpose is for wildlife.)
2 Species suitable for frost seeding, increase seeding rate by a factor of 1.5.
3 Mixtures may include up to 20% native grasses. See Table 3 for seeding rates. Use the criteria for the predominate species in the mixture for establishment.
4 Sweetclover is to be used in mixtures only.

Table 3. Seeding chart for native plant species

Grasses[1]	% of Mixture (Range Allowed)	Pure Stand Seeding Rate PLS lbs./acre	Seeds/Sq. ft.	Seeds/lb.
Big bluestem, *Andropogon gerardi*	0-100	16	60	165,000
Blue grama, *Bouteleloua gracilis*	0-20	4	75	825,000
Buffalograss, *Buchloe dactyloides*	0-20	65	60	40,000
Canada wildrye, *Elymus canadensis*	0-20	22	61	121,000
Eastern gamagrass, *Tripsacum dactyloides*	0-100	20	4	7,500
Indiangrass, *Sorghastrum nutans*	0-100	15	60	175,000
Little bluestem, *Schizachyrium scoparium*	0-20	11	60	240,000
Sideoats grama, *Bouteloua curtipendula*	0-20	14	61	191,000
Switchgrass, *Panicum virgatum*[2]	0-100	7	62	389,000
Virgina Wildrye, *Elymus virginicus*	0-20	27	60	96,000
Western wheatgrass, *Agropyroni smithi*	0-20	24	61	110,000

1 When developing seeding mixtures, except eastern gama grass, use 60 seeds/sq ft for grass stands. Grass and forbs/legume mixtures use 40 seeds/sq. ft for the grass component and minimum of 20 seeds/sq ft for forbs/legume component.
2 Species suitable for frost seeding, multiply seeding rate by factor of 1.5.

Table 4. Temporary Seeding Recommendations

Fields with atrazine[1] carryover, lack of suitable seed or late planting date	
Sudangrass	20 lbs./acre
Sorghum-Sudangrass hybrid	20 lbs./acre
Corn	2 bushels/acre
Fields where planting is delayed, due to lack of suitable seed or late planting date	
Oats	3 bushels/acre
Winter rye	2 bushels/acre
Spring or winter wheat	2 bushels/acre

1 For other herbicide carryover problems, check with the area office.

Table 5. Lime and Fertilizer Recommendations for Exposed Subsoil

		Fertilizer lbs./Ac.		
Soil Association Area	**Lime lbs./ac (ECCE)**	**N**	**P_2O_5**	**K_2O**
Adair-Grundy-Haig	3000-4000	50	200	100
Adair-Seymore-Edina	3000-4000	50	200	100
Clarion-Nicollet-Webster	0-2000	50	200	100
Clinton-Keswick-Lindley	3000-4000	50	100	100
Cresco-Lourdes-Clyde	3000-4000	50	200	100
Dinsdale-Tama	3000-4000	50	100	100
Fayette	3000-4000	50	50	50
Fayette-Dubuque-Nordness	3000-4000	50	100	100
Galva-Primghar-Sac-Moody	0-2000	50	200	100
Grundy-Haig	3000-4000	50	100	100
Kenyon-Floyd-Clyde	3000-4000	50	200	100
Lindley-Keswick-Weller	3000-4000	50	150	100
Marshall	0-2000	50	100	50
Mine spoils	0-10,000	100	200	100
Monona-Ida-Hamburg-North	None	50	200	100
Monona-Ida-Hamburg-South	None	80	250	50
Otley-Mahaska-Taintor	3000-4000	50	100	100
Sandy and droughty soils	2000-4000	50	100	100
Shelby-Sharpsburg-Macksburg	2000-3000	50	100	50
Tama-Muscatine	3000-4000	50	100	100
Very poorly drained soils	0-4000	50	100	100

The above fertilizer needs are based on sites denuded of topsoil. P & K amounts may be adjusted on more favorable sites.

Table 6. Critical Area Seedbed Mixtures for Specific Site Conditions

Site Conditions	Seeding Mixture	Rate lbs./acre
Moderately to well drained, limed or nonacid, fertile soils	1. Alfalfa Red Clover Smooth bromegrass	3 2 15
	2. Alfalfa Timothy Smooth bromegrass Or Orchardgrass	6 2 15 Or 8
Imperfectly drained soils	3. Red clover Ladino clover Orchardgrass	4 1 8
	4. Birdsfoot trefoil Smooth bromegrass Timothy	5 12 3
	5. Big bluestem Switchgrass	14 2
Poorly drained soils	6. Birdsfoot trefoil Timothy Or Orchardgrass	4 8 Or 12
	7. Alsike clover Ladino clover Tall fescue Or Timothy	2 3 8 5
Very wet sites with high nutrient loading (i.e. animal waste filter strips)	8. Reed canarygrass	16
	9. Tall fescue	16
	10. Switchgrass	7
Medium acid to strongly acid (6.0-5.1) with well drained to poorly drained soil that has a high clay content	11. Birdsfoot trefoil Tall fescue Bromegrass	7 5 8
Medium to strongly acid (pH 6.0-5.1) shallow (20in) with poorly drained soils with low fertility and low level management	12. Birdsfoot trefoil Tall fescue Red Top Switchgrass	4 4 3 2
Deep or course sands, droughty, usually acid (pH 6.0)	13. Sand Lovegrass Switchgrass Prairie Sandreed grass	2 5 4
Reclaimed acid mine spoil (pH 4.0)	14. Birdsfoot trefoil Red clover Crownvetch Tall fescue	4 4 4 4
Reclaimed acid mine spoil, deep coarse sands, droughty, low fertility (pH 4.0)	15. Switchgrass Big bluestem Indiangrass Little bluestem	2 4 4 3
Alkaline mine spoil (pH 7.4)	16. Crownvetch Alfalfa	8 10
	17. Bromegrass Timothy	14 5

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Seeding Plan

Name _____ **Date** _____ Tract No. _____
Field No. _____
Contract No. _____

Type of Seeding _____ **Prepared by** _____

*To figure Pure Live Seed (PLS) rates, multiply the percent purity by the percent germination. Divide the seeding rate by the percent PLS to find the bulk seed needed per acre.

For example, 98% purity X 60% germination = 0.588% PLS
10lbs./acre X 0.588% PLS = 17 lbs./acre

Species	Acres	Lbs./Acre: Bulk or PLS (Circle One)	Total Needed
		Pounds	
		Pounds	
		Pounds	
		Pounds	
		Pounds	
		Pounds	

☐ ***Soil Amendments, based on recent soil test (less than 4 yrs. old)***
☐ ***Soil Amendments from Table 5, based on generic recommendation***

Apply soil amendments pior to seedbed preparation or before seeding, if a no-till drill is used.

Amendment	Acres
Fertilizer & Lime	
Lime (ECCE)	
Nitrogen	
Phosphate (P_2O_5)	
Potash (K_2O)	

Establishment Method: No-Till _____ Conventional _____ Frost _____ Dormant _____

Seeding Completion Date _____

Mulch Needed _____

Additional Seeding Criteria _____

_____

Seeding Complete by _____
(Date)

_____ _____
(Producer's Signature) (Date)

Field Office _____ **Certified by** _____
(NRCS Representative)

When seeding is completed, return the seeding plan to the USDA-NRCS office. For cost-share projects, attach receipts for seed, fertilizer, lime and mulch. For Federal cost-share projects, return receipts to the Farm Service Agency (FSA).