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**12.1 Function of Dry Meadow and Basis of Work** The specifications of Section 12 shall apply to the seeding of native grasses, with or without native wildflowers (forbs), for the purpose of establishing permanent low-maintenance vegetation for upland habitat restoration. All labor, equipment, and materials required for the completion of Section 12 shall be furnished by the seeding contractor, unless specified otherwise.

**12.2 Dry Meadow Seeding and Site Location** Dry meadows shall be seeded in open, sunny sites; they shall not be seeded in sites that receive less than 3/4 day of direct sun exposure, nor in sites that receive frequent foot or vehicular traffic, nor in sites that are prone to flood, nor where rapid vegetation establishment or permanent soil erosion protection is of primary concern. Dry meadows shall not be seeded in any site where soil or other conditions are generally unfavorable for turfgrass establishment or survival.

**12.3a Soil Testing Requirements** Soil shall be tested by an accredited soil testing laboratory for phosphorus (P<sub>2</sub>O<sub>5</sub>), potassium (K<sub>2</sub>O), calcium (Ca), magnesium (Mg), sulfur (S), soil acidity (pH), soluble salts, and soil organic matter percentage; test results for soil nitrate (N) shall also be obtained, if possible. Soil tests shall be completed and their analyses shall be received and interpreted before dry meadow areas are seeded. Soil samples of the upper 4.0 inches of the soil surface shall be used for all soil tests. See Section 12.5 for fertilizer application specifications.

**12.3b Soil Phosphorus, Potassium, Calcium, Magnesium, and Sulfur** Soil shall be tested for phosphorus, potassium, calcium, magnesium, and sulfur. Fertility recommendations based on pasture grass requirements for these nutrients shall be obtained from an accredited soil testing laboratory or the Maryland Cooperative Extension. Deficiencies of these nutrients shall be corrected in accordance with those recommendations with fertilizer and/or compost either before seeding operations are begun, or at the time of seeding.

**12.3c Soil Nitrate** Soil shall be tested for nitrate and fertility recommendations based on pasture grass nitrate requirements shall be obtained from an accredited soil testing laboratory or the Maryland Cooperative Extension. It is recommended that dry meadows be seeded in sites with 'medium', 'medium-low', or 'low' soil nitrate levels. Sites with 'excessive', 'very high' or 'high' soil nitrate levels shall be allowed to dissipate before seeding to dry meadows. Sites with 'very low' soil nitrate levels should be fertilized according to the recommendations of the soil testing laboratory, or up to 0.5 pound of slow-release nitrogen (N as SCU or UF) per 1000 ft<sup>2</sup> may be applied at the time of seeding as a starter fertilizer.

**12.3d Soil Acidity (pH)** Dry meadow seedings shall not be established in sites where the soil acidity (pH) is below pH 4.5 or above pH 8.0. Soil pH modification may be completed before seeding or at the time of seeding, as long as seeding establishment is not reduced by adverse soil conditions. When soil acidity is below pH 4.5, limestone shall be added to the soil according to the recommendations of the soil testing laboratory or the Maryland Cooperative Extension, or according to Table A so that the final soil acidity is pH 4.5 to 6.5. When soil acidity is above pH 8.0, elemental sulfur shall be added to the soil in according to the recommendations of the soil testing laboratory or the Maryland Cooperative Extension, or according to Table B so that the final soil acidity is pH 6.5 to 8.0. At sites where the soil acidity is found to be below pH 4.0 or above pH 8.5, a Certified Professional Soil Scientist, Certified Professional Agronomist, or other qualified professional should be consulted. See Section 6.3 and Section 12.5c for limestone specifications.

**Table A Pounds of Limestone to Add per 1000 ft<sup>2</sup> to Raise Soil pH to 6.5**

Original pH	Sand	Soil Texture Class		
		Loam	Clay	
4.8		85	140	200
5.0		75	125	175
5.2		65	110	150
5.4		55	95	125
5.6		45	80	100
5.8		35	65	80
6.0		25	50	60
6.2		15	35	40
6.4		5	15	20

Note: Table A shall be used for limestone applied according to the specifications of Sections 12.3d and 6.3

**Table B Pounds of Elemental Sulfur to Add per 1000 ft<sup>2</sup> to Reduce Soil pH to 6.5**

Original pH	Sandy Soil	Clay Soil
7.5	10-15	20-25
8.0	25-35	35-50
8.5	35-50	40-50

Note: Table B shall be used for elemental sulfur applied according to the specifications of Sections 12.3d and 6.4

**12.3e Soil Soluble Salts** Soil shall be tested for soluble salts concentration. Soluble salts in soils intended for dry meadow seeding shall not exceed 700 parts per million (ppm) or 5.0 ms/cm at the time of seeding. Modifications to reduce soil soluble salts concentrations shall be made according to the recommendations of the soil testing laboratory or the Maryland Cooperative Extension, or by using Table C as follows: When subsoil soluble salts exceed 700 ppm or 5.0 ms/cm, add the amount of gypsum recommended in Table C to reduce soluble salts concentrations below 700 ppm or 5.0 ms/cm. At sites where salts concentrations exceed 1800 ppm or 7.0 ms/cm, it is recommended that a Certified Professional Soil Scientist, a Certified Professional Agronomist, or other qualified professional be consulted.

**Table C Pounds of Gypsum to Add per 1000 ft<sup>2</sup> to Reduce Soluble Salts to Recommended Levels**

Original Salts Level		Pounds Gypsum
millisiemens	parts per million (ppm)	per 1000 ft <sup>2</sup>
8	2500	320
7	1800	230
6	1250	160
5	700	80
4.5	550	40

Note: Table C shall be used for ground gypsum applied according to the specifications of Sections 12.3e and 6.5

**12.4a Vegetation Removal Guidelines** Because dry meadow vegetation is often slow to establish, and because many weed species are difficult or impossible to selectively remove from a permanent dry meadow, it is recommended to kill as much of the pre-existing vegetation as possible before seeding. Unless desirable vegetation is present or there are other compelling reasons to conserve the pre-existing vegetation, as much of the pre-existing vegetation as possible should be killed as standard practice. Therefore, in the absence of any other agreement between the seeding contractor and other affected parties, the seeding contractor shall kill over 99% of the pre-existing vegetation groundcover at the seeding site, including saplings, shrubs, weeds, grasses, or other vegetation, and including the viable roots and rhizomes of these plants.

**12.4b Vegetation Removal Guarantee** When the procedures specified in Section 12.4a are performed, so that over 99% of the pre-existing vegetation is killed prior to seeding, then the seeding contractor may guarantee the success of the seeding. However, if the seeding contractor is contractually precluded from killing over 99% of the pre-existing vegetation groundcover, then the seeding contractor shall not guarantee the success of the seeding.

**12.4c Vegetation Removal Procedures** Unless specified otherwise, the seeding contractor shall use one or a combination of the methods below to kill > 99% of the pre-existing vegetation at the meadow seeding site:

**Tillage** One or two tillage operations (i.e., rototilling, disking, etc.) to an average depth of 2.0 to 4.0 inches. For better performance, one to two weeks should be allowed between tillage operations, so that weed seeds and perennial plant parts may have time to germinate or regrow, and so be killed by the follow-up tilling.

**Herbicide** One or two applications at full label rates of a non-selective herbicide which does not leave an active soil residual such as glyphosate (e.g., Round-up™), Diquat ( e.g., Reward™ ), or glufosinate-ammonium (e.g., Finale™). For better performance, one to two weeks should be allowed to elapse between sprays so that weed seeds and perennial plants may have time to germinate or regrow, and be killed by follow-up spraying.

**12.5a Soil Preparation for Broadcast Seeding** If the site will be seeded by broadcast seeding methods (Section 12.9c), the soil shall tilled and loosened with rototillers, disk harrows, or other soil preparation equipment which shall leave the soil with an irregular open surface. Bulldozers which are used to loosen the soil surface shall leave the surface with an open irregular surface, and with track ridges which run parallel to the slope. In sites where slopes with steepness over 4:1 are present (erodible slopes), the minimum tillage required to disturb the soil surface and reduce the surface cover of dead vegetation is recommended. In the event that substantial vegetation was killed by spraying with herbicide according to the specifications of Section 12.4, and if dead vegetation at the soil surface is excessive (i.e., a mat of dead vegetation greater than 1.5 inches in thickness is present), the site shall be tilled to a suitable depth so that most of the vegetation is incorporated into the soil. All rocks and other debris larger than 3.0 inches in diameter shall be removed from the soil surface. The site shall be leveled so that no irregularities greater than 2.0 inches above or below grade per linear foot are present. The soil at the time of seeding shall be firm, and the surface shall be loose and open, so that dry meadow seeds may readily fall into soil spaces.

**12.5b Soil Preparation for Drill Seeding** If the site will be seeded by drill seeding methods with a suitable native grass and forb drill seeder (Section 12.9d), the soil may be tilled as described in Section 12.5a or the site may be seeded by drilling seed directly into the stubble of the previously killed vegetation. In sites where

slopes with steepness over 4:1 are present (erodible slopes), the minimum tillage required to reduce the surface cover of dead vegetation is recommended. In the event that substantial vegetation was killed by spraying with herbicide according to the specifications of Section 12.4, and if dead vegetation at the soil surface is excessive (i.e., a mat of dead vegetation greater than 1.5 inches in thickness is present), the site shall be tilled to a suitable depth so that most of the vegetation is incorporated into the soil. In sites where no tillage will be performed it is assumed that vegetation will have been previously killed by spraying with herbicides according to the specifications of Section 12.4 and if weed debris is not excessively thick then drill seeding without prior tillage may be possible. If tillage prior to drill seeding is performed, then all rocks and other debris larger than 3.0 inches in diameter shall be removed from the soil surface. The site shall be leveled so that no irregularities greater than 2.0 inches above or below grade per linear foot are present.

**12.6a Fertilizer and Limestone Requirements** When soil tests have been performed as specified in Section 12.3a-e, dry meadow seeding sites shall receive fertilizer at rates in accordance with Maryland Nutrient Management Regulations and the recommendations of an accredited soil testing laboratory or the Maryland Cooperative Extension, or according to Section Table A or Table B, as appropriate. Refer to Section 6 for specifications regarding fertilizer and application.

**12.6b Starter Fertilizer** Starter fertilizer (i.e., a fertilizer applied in the absence of soil tests and without regard to nutrient requirements demonstrated by soil testing) shall not be applied to dry meadow seedings.

**12.6c Application of Fertilizer and Limestone** Fertilizer may be applied up to ten (10) days before seeding, or at the time of seeding, or up to five (5) days after seeding operations are completed. Limestone and elemental sulfur shall be applied to dry meadow seeding sites at rates according to soil test recommendations of an accredited soil testing laboratory or the Maryland Cooperative Extension, or according to Table A and Table B in Section 12.3d. Applications of limestone which exceed 50 lbs. per 1000 ft<sup>2</sup> (2,200 lbs. per acre) shall be incorporated into the soil before seeding operations are begun, as specified in Section 12.3d and Section 6.3. Limestone applications which are less than 50 lbs. per 1000 ft<sup>2</sup> may be applied at any time before seeding, or at the time of seeding, or up to five (5) days after the completion of seeding operations. Sulfur applications shall be incorporated into the soil before seeding operations are begun, as specified in Section 12.3d and Section 6.4.

**12.7 Dry Meadow Seeding Dates** Dry meadows shall be seeded during the following times, based upon USDA Plant Hardiness Zones and the region of Maryland.

Eastern Shore	USDA Zone 7a and 7b	02/15 - 04/15 and 09/15 - 11/15
Southern Maryland	USDA Zone 7a and 7b	02/15 - 04/15 and 09/15 - 11/15
Central Maryland	USDA Zone 6b	03/01 - 04/30 and 09/01 - 11/01
Western Maryland	USDA Zone 6a and 5b	03/15 - 05/01 and 08/15 - 10/15

**12.8a Excluded Species for Dry Meadow Seeding** No non-native, introduced, or exotic species shall be included in the seed mix for dry meadow seeding sites. Examples of excluded species are included in, but not limited to, those included in Table H: Excluded Species. Table H shows some of the more common species that shall not be included in dry meadow seed mixes.

**Table H-2 Excluded Broadleaf Species - Some Species Not Suitable for Dry Meadow Seeding**

Note: All Non-Native, Introduced, or Exotic Species are 'Excluded Species'

Yarrow	Rocket Larkspur	Cornflower	Crown Vetch
Shasta Daisy	Lemon Mint	Cosmos	Birdsfoot Trefoil
Ox-eye Daisy	Drummond Phlox	Siberian Wallflower	Sericia Lespedeza
Chicory	Pink Catchfly	Dame's Rocket	Korean Lespedeza
Sweet William	Queen Anne's Lace	California Poppy	White Clover
Blue Flax	Daylily	Corn Poppy	Red Clover
Scarlet Flax	Calendula	Flatpea	Sweet Clover

**Table H-1 Excluded Grass Species - Some Species Not Suitable for Dry Meadow Seeding**

Note: All Non-Native, Introduced, or Exotic Species are 'Excluded Species'

Kentucky Bluegrass	Annual Ryegrass	Cereal Rye	Miscanthus spp.
Orchardgrass	Perennial Ryegrass	Wheat	Zoysiagrass
Timothy	Tall Fescue	Barley	Bermudagrass
Smooth Bromegrass	Hard Fescue	Oats	Pampas grass
Creeping Bentgrass	Sheep Fescue	Foxtail Millet	Japanese Millet
Redtop	Chewings Fescue	Weeping Lovegrass	Alkaligrass

**12.8b Suitable Species for Dry Meadow Seeding** The species and seeding rates shown in Table G-1: Native Warm Season Grasses; Table G-2: Native Cool Season Grasses; and Table G-3: Native Forbs are suitable for dry meadow seeding sites. Other native species may be included in the dry meadow seed mix, but no native species which is not listed in Table G-1, Table G-2, or Table G-3 shall be seeded at an individual seeding rate higher than 0.25 pounds pure live seed (PLS) per acre.

**Table G-1 Native Warm Season Grasses Suitable for Dry Meadow Seeding**

All Rates in Pure Live Seed (PLS), Pounds per Acre

Species Common Name	Seeding Range	Don't Exceed	Comments
Big Bluestem	0.50 - 1.50	3.00	Prefers moist sites. Avoid dry, low fertility sites.
Bluejoint	1.00 - 2.00	4.00	Prefers moist to wet soils. Tall.
<u>Broomsedge</u>	0.50 - 1.50	3.00	Adaptable. Does well on dry, low fertility sites. Avoid wet sites.
Buffalograss	0.50 - 1.00	2.00	Prefers well drained sites. Avoid clay soils.
<u>Deertongue</u>	0.25 - 0.75	1.50	Good for most sites. Tolerates partial shade and moist sites.
Eastern Gamagrass	1.00 - 3.00	6.00	Prefers moist to wet sites.
Florida Paspalum	1.00 - 2.00	4.00	Good for most sites. Tolerates dry sites.
<u>Indiangrass</u>	0.50 - 1.00	2.00	Good for most sites.
<u>Little Bluestem</u>	0.50 - 1.50	3.00	Good for most sites. Avoid wet sites, clay soil.
Nimblewill	0.50 - 1.00	2.00	Adaptable. Best in average to moist sites, tolerates some shade.
Side-oats Grama	1.00 - 2.00	4.00	Prefers dry sites, limestone soils, in full sun.
<u>Switchgrass</u>	0.50 - 1.00	2.00	Widely adapted. Tolerates dry and moist sites.

**Table G-2 Native Cool Season Grasses Suitable for Dry Meadow Seeding**

All Rates in Pure Live Seed (PLS), Pounds per Acre

Species Common Name	Seeding Range	Don't Exceed	Comments
<u>Bottlebrush</u>	0.50 - 1.00	2.00	Prefers moist sites with partial shade.
Canada Wildrye	1.00 - 2.00	4.00	Widely adapted, but prefers moist or partially shaded sites.
<u>Virginia Wildrye</u>	1.00 - 2.00	4.00	Widely adapted, but prefers moist or partially shaded sites.
<u>Fowl Bluegrass</u>	0.50 - 1.00	2.00	Prefers moist sites, tolerates some shade.
Junegrass	0.25 - 0.75	1.50	Prefers dry sites, shade tolerant.
<u>Purpletop</u>	0.50 - 2.00	4.00	Widely adapted, but prefers full sun or partial shade.
<u>Sea Oats</u>	0.50 - 1.00	2.00	Prefers moist sites with partial shade.

**Table G-3 Native Forbs / Wildflowers Suitable for Dry Meadow Seeding**

All Rates in Pure Live Seed (PLS), Pounds per Acre

Species Common Name	Seeding Range	Don't Exceed	Flower Color and Comments
<u>Beardtongue</u>	0.10 - 0.20	0.30	White Widely adapted, prefers full sun.
<u>Black-eyed Susan</u>	0.20 - 0.40	0.80	Yellow Widely adapted, prefers well drained sunny sites.
Blue False Indigo	0.10 - 0.30	0.60	Blue Prefers moist sites, tolerates some shade.
Blue Lupine	1.00 - 2.00	4.00	Blue. Prefers poor, dry sites in full sun or some shade.
Butterfly Weed	0.20 - 0.40	0.80	Orange Prefers well-drained sites in full sun.
<u>Crooked-stem aster</u>	0.10 - 0.20	0.40	Blue Prefers moist sites.
Daisy Fleabane	0.10 - 0.20	0.40	White Adaptable. Short-lived, may be weedy.
Flat-topped Aster	0.10 - 0.20	0.40	White Prefers moist sites in full sun.
<u>Flowering Spurge</u>	0.10 - 0.20	0.40	White Prefers well-drained sites in full sun.
Gayfeather	0.20 - 0.40	0.80	Purple Prefers moist sites, tolerates some shade.
Gray-head Coneflower	0.20 - 0.40	0.80	Yellow Widely adapted, prefers full sun.
Heath Aster	0.05 - 0.10	0.20	White Widely adapted. Can be weedy.
<u>Lanceleaf Coreopsis</u>	0.50 - 1.50	3.00	Yellow Prefers moist sites, tolerates some shade.
<u>New England Aster</u>	0.20 - 0.40	0.80	Purple Widely adapted, prefers moist sites.
<u>New York Aster</u>	0.20 - 0.40	0.80	Purple Widely adapted, prefers moist sites.
Ox-eye Sunflower	0.50 - 1.00	2.00	Yellow Prefers moist sites, tolerates some shade
<u>Partridge Pea</u>	1.00 - 2.00	4.00	Yellow Prefers well-drained sites in full sun.
<u>Perennial Gaillardia</u>	0.50 - 1.00	2.00	Red Prefers well-drained sites in full sun.
<u>Plains Coreopsis</u>	0.25 - 0.50	1.00	Red Prefers well-drained sites in full sun, annual.
Prairie Coneflower	0.50 - 1.00	2.00	Yellow Widely adapted, prefers well drained sunny sites.
<u>Purple Coneflower</u>	0.50 - 1.00	2.00	Purple Widely adapted, prefers moist sites, tolerates shade.
Rd-headed Bush-clover	0.05 - 0.10	0.20	Cream Prefers well-drained sites in full sun.
Rattlesnake-masters	0.20 - 0.40	0.80	White Prefers full sun, fertile sites.
Showy Tick-trefoil	0.50 - 1.00	2.00	Pink Prefers well-drained sites in full sun.
Stiff Goldenrod	0.10 - 0.20	0.40	Yellow Widely adapted.
Sweet Goldenrod	0.10 - 0.20	0.40	Yellow Widely adapted.
Threadleaf Coreopsis	0.20 - 0.40	0.80	Yellow Prefers well-drained sites in partial shade.
<u>Virginia Mt. Mint</u>	0.10 - 0.30	0.60	White Widely adapted. Prefers full sun.
<u>Wild Indigo</u>	0.10 - 0.30	0.60	Yellow Prefers well drained sites in full sun.

**12.8c Dry Meadow Seed Mixes** The seed mix for dry meadows shall include species from Table G-1 and Table G-2, so that a minimum of two 'Key Species' from Table G-1 (underlined) are combined with a minimum of one 'Key Species' from Table G-2 (underlined). A minimum of three additional species from Table G-1 and/or Table G-2 shall also be included in the seed mix, and it is recommended that as many species from Table G-1 and Table G-2 as are appropriate to the seeding site be included in the seed mix. The inclusion of species in Table G-3 is optional, but in most cases the inclusion of at least four forb (native wildflower) species is appropriate and beneficial to a dry meadow seeding site ('Key Species' of forbs are underlined).

**12.8d Dry Meadow Seeding Rates** It is recommended that seed of species included in Table G-1, Table G-2, and Table G-3 be seeded at the rates shown, below. However, if at least 80% of the species in the seed mix are sown within the 'Seeding Range' and no species are included at a rate above the 'Don't Exceed' limit, the seed mix shall be considered suitable for dry meadow seeding. Other native species which are not shown in Table G-1, Table G-2, or Table G-3 may be included in the seed mix, but the total weight of such species may not account for more than 10% of the seed mix by weight, and no species which are not shown in Table G-1, G-2, or G-3 may be seeded at a rate higher than 0.25 pounds PLS per acre.

**12.9a Seeding Methods** The seed of most dry meadow species are small and do not benefit from deep seeding. A seeding depth of 0.10 - 0.25 inches in combination with a firm seedbed is ideal.

**12.9b Choice of Seeding Methods** Seed for dry meadow seedings shall be applied with broadcast seeders or with specialized seed drills only. Hydraulic seeders shall not be used for seeding dry meadows.

**12.9c.1 Broadcast Seeding Definition and Methods** Broadcast seeding shall involve the use of a properly calibrated reciprocating spreader (e.g., Vicon™), or a properly calibrated rotary spreader (e.g., Scotts™ model R-8), or similar equipment which is equipped with an agitator to ensure continuous mixing. All of the grass and forb seed intended for the dry meadow seeding site shall be combined in a barrel or other suitable container with one or more coarse, low density, non-toxic bulking agents such as calcined clay (Kitty Litter™, or similar product), fine cocoa shell mulch, coarse vermiculite, or coarse perlite, and thoroughly mixed at the time of seeding. Thorough mixing and the use of one or more bulking agents is required to ensure continuous seed flow through the spreader, and to improve seed distribution by preventing seed mix segregation.

**12.9c.2 Broadcast Seeding Soil Incorporation and Rolling** After seeding, the seed shall be raked or dragged into the soil surface to an average depth of 0.10 to 0.25 inch. When the soil is in a loose or fluffy condition, the seedbed shall be rolled with a weighted roller, so that the grass and forb seed is firmly pressed into the soil.

**12.9d.1 Drill Seeding Definition and Methods** Drill seeding involves the use of a drill seeder that is manufactured specifically for fluffy grass and forb seed. Suitable seeders typically include three separate seed hoppers with positive-feed mechanisms, and include Truax™ and Tye™ seeders, among others. The seed of each species to be seeded shall be obtained unmixed, and shall be sorted by size as directed by the manufacturer of the seeding equipment. All instructions provided by the manufacturer of the seeding equipment shall be strictly observed and followed by the contractor.

**12.9d.2 Drill Seeding Soil Incorporation and Rolling** Most suitable seeders include soil openers to ensure a seeding depth of 0.10 to 0.50 inches as well as rollers to ensure a firm seedbed. However, if the seeding equipment is not equipped with a heavy roller, so that the soil is left in a loose or fluffy condition after seeding, the seedbed shall be rolled with a weighted roller in a separate operation, so that the grass and forb seed is firmly pressed into the soil.

**12.10a Seed Mulch Materials** When mulch is specified for dry meadow seedings, the use of straw with or without hydraulic mulch products are acceptable as specified in Section 12.10b-c. Erosion control blankets are generally not recommended for dry meadow seeding but may be used if they are loosely woven so that native grasses and forbs may readily penetrate and grow through the blanket.

**12.10b Straw, Fiber Mulch, and Erosion Control Blankets** Seed mulches for dry meadow seeding shall include straw, or straw + tackifier, or straw + hydraulic mulch (wood fiber and/or paper mulch) or erosion control blankets. The composition of straw used as a dry meadow seed mulch shall conform to Section 12.10c, and its use shall conform to the specifications of Section 12.11. The composition and use of hydraulic mulch products and accessories shall conform to the specifications of Section 7.2, 7.3, and 7.4 and their use in conjunction with straw shall conform to the specifications of Section 12.11. Erosion control blankets that conform to the definitions of Section 7.5 and which are applied according to the specifications of Section 7.9b may be applied over dry meadow seedings which are composed entirely of grass species.

**12.10c.1 Straw Definition and Use** The use of clean straw with a low content of viable cereal grains and viable weed seed is important. Class 'AA' and Class 'A' straw are generally recommended as mulch for dry meadow seedings; Class 'B' straw is not recommended. Neither Class 'C' straw nor hay shall be used as a mulch for dry meadow seeding. See Section 7.6 for more information about straw and mulch application.

**12.10c.2 Classes of Straw**

**Class 'AA' Straw** shall be specially grown for use as a seeding mulch and shall be composed entirely of the air-dried stems and leaves of native grasses such as little bluestem, broomsedge, and other species which are compatible with dry meadow seeding sites. Class 'AA' straw may contain any amount of the viable seed of the native grass species from which it is derived.

**Class 'A' Straw** shall consist entirely of the straw of wheat, barley, oats, or cereal rye which has been specially grown for use as a seed mulch, and which is guaranteed by the producer of the straw to contain a maximum of 1.0 oz. of viable wheat, barley, oats, or cereal rye seed per standard small bale of straw (c. 40 lbs. of straw).

**12.10c.3 Straw Physical Condition and Weed Content** Straw shall be bright in color, and shall not be wet, musty, moldy, caked, decayed, or dusty. Straw should be easy to loosen when removed from the bale and able to be uniformly spread by hand or with the use of a straw blower. All straw used as mulch in dry meadow seeding sites shall be free of the seeds, rhizomes, or other viable parts of the following weeds:

Balloonvine	Canada Thistle	Johnsongrass & hybrids	Serrated Tussock
Bermudagrass	Curly Thistle	Musk Thistle	Sicklepod
Bindweed	Dodder	Phragmites	Spurred Anoda
Corn cockle	Giant Foxtail	Plumeless Thistle	Wild Garlic
Cocklebur	Horse Nettle	Quackgrass	Wild Onion

**12.11a Use of Straw** On level or gently rolling sites the use of straw is optional. Where soil erosion is likely, straw shall be uniformly applied over the surface of the seeded area at a rate of 1.0 to 2.0 tons per acre. The straw shall cover a minimum of 80% of the soil surface in a layer from 0.5 to 2.0 inches thick. On slopes over 4:1 in steepness, 2.0 tons of straw per acre shall be applied and secured from wind/water erosion by one of the methods described below and the seeding rate shall be adjusted as required.

**12.11b Straw Anchoring with Crimper** Straw shall be secured with a mulch anchoring tool (straw crimper), by pressing the straw to a minimum average depth of 2.0 inches below the soil surface.

**12.11c Straw Anchoring with Tackifier** Straw shall be secured with tackifier or mulch binder when the tackifier or mulch binder is applied over the straw in a separate operation with hydraulic seeding equipment at the minimum rate recommended by the manufacturer, so that 80+% of the straw is covered by the tackifier or mulch binder.

**12.11d Straw Anchoring with Hydraulic Mulch** Straw shall be secured with paper or wood fiber + paper hydraulic mulch when the mulch is applied in a separate operation over the straw with hydraulic seeding equipment at the rate of 150 lbs./acre, so that 80+% of the straw is covered by the hydraulic mulch. This method is not recommended when the dry meadow seed mix contains native wildflowers (forbs). However; if this method is used, the seeding rate of each forb species included in the seed mix shall be increased to 1.5 times (1.5x) the recommended seeding rate.

**12.12a Irrigation During Germination** For optimum germination of dry meadows it is recommended that these sites be seeded when a minimum of 0.25 inch of natural rainfall or irrigation will be received within 10 days after seeding. If sufficient natural rainfall is not received within 10 days, it shall be the responsibility of the owner, general contractor, or seeding contractor (as a special clause of the contract) to irrigate the new seeding with a minimum of 0.25 inch of water, or so that water penetrates the soil to a uniform minimum depth of 4.0 inches. It is recommended that when natural rainfall is not able to provide the water needs of germinating seeds, irrigation should be supplied as needed to ensure that the upper 0.5 inches of the soil surface does not dry to the extent that seedlings are allowed to wilt or die.

**12.12b Irrigation During Establishment** The soil of the seedbed should be maintained in a moist condition favorable for the establishment dry meadow species for a minimum of 45 days after seeding. Occasional irrigation after that period, particularly in the late Spring or early Summer following a spring seeding, may be



necessary for the survival of seedlings. It shall be the responsibility of the seeding contractor to provide written notice and verbal explanation of the irrigation needs of flower meadows to the owner, general contractor, or other parties responsible for maintaining newly seeded flower meadows; the text of Section 12.12 shall be considered sufficient for the purpose.

**12.13 Grow-In Period** The seeding contractor shall not provide grow-in care for flower meadows unless the terms of the seeding contract specifies such care.

**12.14 Site Clean Up** Grading stakes, stones, trash, and other debris which may hinder maintenance of the seeding site shall be removed when seeding operations are completed. Soil, fertilizer materials, seed, straw, hydraulic mulch and other debris shall be removed from paved areas as soon as possible after seeding operations are completed. Clean up shall be completed by the seeding contractor before acceptance is given.

**12.15a Materials Acceptance** The seeding contractor shall inform all affected parties of the composition of the fertilizer, compost, limestone, and seed mixtures which are intended for application at the seeding site before any of these materials are applied; acknowledgment of acceptance of these materials shall be given by the owner, general contractor, landscape architect, or other person(s) authorized to make such a decision before seeding and spreading operations are begun. Labels and other material identification pertaining to the materials which are applied shall be retained by the seeding contractor for a minimum of 90 days after the completion of seeding and spreading operations.

**12.15b Performance Acceptance** Acknowledgment of acceptable performance shall be given by the owner, general contractor, landscape architect, or other person(s) authorized to inspect the seeding site upon the satisfactory completion of each subsection of Section 12. The seeding site shall be inspected within 24 hours of the completion of each subsection, or upon the completion of seeding operations, as indicated by the seeding contractor, unless specified otherwise. Final acceptance and payment shall be made within 24 hours of such notification, or within the timeframe specified in the contract.

**12.16 Professional Guarantee** The seeding contractor shall guarantee that native forb and grass seed shall be selected and seeded under the supervision of the seeding contractor according to the specifications of Section 12, and that seed mixtures shall be appropriate for the site and intended use of the site. Although a minimum of 10% living dry meadow groundcover is typically established within 90 days after seeding, the seeding contractor shall not guarantee the establishment of living groundcover at the seeding site within any timeframe. When seeding operations are completed outside the times specified in Section 12.6a because of contractual obligations or delays not caused by the seeding contractor or when the seeding contractor is precluded from eliminating over 99% of the pre-existing groundcover vegetation prior to seeding, the seeding contractor shall not guarantee the success of the seeding. The seeding contractor shall guarantee that the dry meadow shall resist significant damage from soil erosion for a period of 60 days after seeding is completed.

**12.17a Site Protection** It shall be the responsibility of the owner, general contractor, or other authorized party to install signs, flagging, etc. at the perimeter of the seeding site which shall serve to notify foot and vehicular traffic that a sensitive area may be damaged by their entry. Under no circumstances shall the seeding contractor be held liable to repair a seeding site that is damaged by the entry of such traffic.

**12.17b Erosion Protection and Repair** It shall be the responsibility of the seeding contractor to ensure that seed and other materials applied according to the specifications of Section 12 are not blown or washed from the site, and that nearby areas and streams are protected from soil, fertilizer materials, hydraulic mulch and unwanted flower or grass seed. In the event of heavy rain or wind that causes damage to the site which may have been anticipated and prevented by the seeding contractor, then the seeding contractor shall repair the damaged areas so they are restored to a condition acceptable under the specifications of Section 12; when soil or other material is moved from the site and deposited on nearby areas the seeding contractor shall restore those areas to a condition substantially similar to that which prevailed before the damaging event.

**12.17c Repair Limitations** The seeding contractor shall not be obliged to repair the site or nearby areas when damage to them was substantially caused by water, soil, or other materials which passed into the site from an area not stabilized or under the supervision of the seeding contractor. Examples of situations which shall void the responsibility of the seeding contractor to repair the site and nearby areas shall include the failure of responsible parties to provide effective groundcover, spillways, drainage diversions, water settlements, silt fence, etc., which would have prevented the damage.

**12.17d Damages Disclaimer** The seeding contractor shall not be held liable to repair damages incurred to the site as a result of materials not applied under the supervision of the seeding contractor, nor by vandalism, nor by acts of God. The seeding contractor shall not be held liable to repair or otherwise amend the site as a result of the use of fertilizer or soil amendments which are labeled in error or which are otherwise not in accordance with the label or description provided with them by the manufacturer or distributor of the products, when they are applied by the seeding contractor in good faith, in accordance with their label or description.

**12.17e Hazards Disclaimer** Because the seeding site is a construction zone not under the ownership or legal control of the seeding contractor it may present hazards to persons or property which enter the site. The seeding contractor specifically disclaims any and all responsibility for the safety and security of persons or property which may enter the site before the seeding contractor has begun work or when work is underway or at any time after work has been completed, and without regard to whether such entry is legal or otherwise. The seeding contractor shall assume no responsibility for personal injury or property damage, nor be subject to any claims of negligence, when the seeding contractor has performed work according to the specifications of MSA-GS-05.0, as mutually agreed, or has applied products or materials according to the recommendations of their manufacturer or distributor.

**12.18 Payment** The seeding contractor shall give notification upon the completion of Section 12. The seeding site shall be inspected within 24 hours of such notification and payment shall be made at that time or as specified in the contract. When payment is not received within the specified time period the seeding contractor may void any guarantees related to Section 12, and may seek appropriate legal remedies.