

NATURAL RESOURCES CONSERVATION SERVICE
MONTANA CONSERVATION PRACTICE SPECIFICATION

RANGE PLANTING (ACRE)

CODE 550

- I. **Definition:** Establishment of adapted perennial or self-sustaining vegetation such as grasses, forbs, legumes, shrubs and trees.
- II. **Purpose:**
- Restore a plant community similar to the Ecological Site Description reference state for the site or the desired plant community.
 - Provide or improve forages for livestock.
 - Provide or improve forage, browse or cover for wildlife.
 - Reduce erosion by wind and/or water.
 - Improve water quality and quantity.
 - Increase carbon sequestration.
- III. **GUIDELINES**
- A. Guidelines for choosing the appropriate seeding mixture can be found in the following Technical Notes and Field Office Technical Guide (FOTG) materials:
- Range Technical Note No. MT-33, *Montana Species Suited to Planting by Ecological Site*. 2005.
- Plant Materials Technical Note No. MT-46, *Seeding Rates and Recommended Cultivars*. 2005.
- Biology Technical Note No. MT-20, *Habitat Development for Pollinator Insects*. 2010 (Revision 5).
- Ecological Site and/or Forage Suitability Group Descriptions located in FOTG, Section II E.
- Additionally, all plantings must consider the desired plant characteristics relative to the site and producer's objectives including one or more of the following: forage quality and quantity, drought tolerance, wildlife cover, pollinator-friendly, re-growth ability, relative stand life, rooting, and soil protection characteristics.
- B. All seedings will contain a minimum of three species unless otherwise specified. If two or more ecological sites are seeded together, the species mixture can be tailored to match multiple sites, as long as the chosen species meet specifications and the recommended percentage guidelines are followed.
- C. The selection of species for any grass, forb, or shrub seeding will meet the following requirements:
1. Species will be adapted to the site (soil and climatic factors). Refer to Montana Range Technical Note MT-33 and the FOTG, Section II, Ecological Site Descriptions, Historic Climax Plant Community. Reference *Montana Interagency Plant Materials Handbook* for information regarding plant characteristics, adaptation and management.

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2. All seed and planting materials shall be labeled and will comply with current Federal and Montana standards. See FOTG, Section I, State/Tribal/Local Laws for the Montana Agricultural Seed Act and Administrative Rules, State of Montana Department of Agriculture.
3. Use certified seed and recommended cultivars whenever available. See Montana Plant Materials Technical Note MT-46 for a list of all recommended cultivars. When certified seed is not available, common seed may be used that is adapted to local soil and climatic conditions. Seed should not be used if the origin or cultivar is unknown.
4. A rule of thumb is that plantings of native species can be made with seed harvested from native stands in Montana or adjacent states and provinces within a geographic range of 300 miles north or 500 miles south of the planting site. The east-west range is determined by similar elevation and precipitation.
5. All seed must be tested and tagged in accordance with all Federal and Montana Agricultural Seed Act and Administrative Rules.

CAUTION: Seed tests must be performed and dated within one year prior to the date of planting. See FOTG, Section I, State/Tribal/Local Laws, Ordinances, and Regulations.

6. The germination and purity of each species in a mixture must be listed on the seed tag, as well as the percentage of each species in the mixture, to verify adequate amounts of Pure Live Seed (PLS).

CAUTION: It is recommended to obtain separate seed tags for each species, as the percentage of weed and other crop seeds will be shown on the label. These are often not clearly identified on a seed tag for a mixture.

IV. SEEDBED PREPARATION

When a conventional seedbed is prepared, competing vegetation will be controlled and the site will not be subject to erosion. A firm pulverized seedbed ensures seed to soil contact will be provided. A firm seedbed facilitates the capillary movement of moisture to the seed and developing seedling. A good rule of thumb is that a footprint will be no deeper than one-quarter inch in an ideal seedbed.

The presence of weed populations—especially noxious weeds—will impact seedbed preparations. Each field should be evaluated for weed populations. Seeding on fields with significant weed populations will be delayed until weeds are controlled mechanically or chemically with labeled herbicides. Refer to guidelines in FOTG, Section IV, Practice Standard and Specification, Pest Management (Code 595), and *Montana, Utah, Wyoming Weed Management Handbook*. During this period a protective cover crop may need to be planted to control erosion prior to planting.

When planning a seeding, the previous several years of herbicide application must be considered. Any potential carryover problems must be addressed by delaying seeding, establishing a cover crop, and/or changing species to be planted. If a cover crop is necessary, refer to guidelines in FOTG, Section IV, Practice Standard and Specification, Forage and Biomass Planting (Code 512).

Seeding of depleted range and/or pastureland, or cropland fields will require control of existing perennial and annual vegetation. This may be accomplished through chemical or mechanical methods. If tillage is used, a minimum of two years of cultivation and cropping is recommended to control existing vegetation and to store soil moisture. Standing cereal grain stubble provides an excellent seedbed if proper seeding equipment is used.

If chemical methods are used, multiple applications are generally required to achieve satisfactory control of perennial competition. Litter may need to be reduced to allow for proper seed placement and good seed-to-soil contact.

The type of grass seeding equipment available will strongly influence the options for seedbed preparation. If seeding into standing stubble or crop residue a double disk, furrow drill, or no-till drill with coulters will be required to achieve proper seed placement.

V. FERTILIZER

The application of nitrogen is not usually required for grass/legume establishment. However, if soil test results show that nitrogen levels are low or very low (below 10 ppm), light rates of available nitrogen may be incorporated during site preparation or applied with the seed at planting—maximum of 15 pounds actual Nitrogen (N).

Native species do not generally respond well to fertilizer applications under dryland conditions. Phosphorus, potassium, and sulfur applications will be based on soil test results. See FOTG, Section IV, Practice Standard and Specification, Nutrient Management (Code 590), and *Fertilizer Guides for Montana*.

VI. SEEDING RATES AND MIXTURES

1. Seeding rates will be calculated on a PLS basis.
2. Use Montana Range Technical Note MT-33, and the FOTG, Section II E, Forage Suitability Group and Ecological Site Descriptions, to assist in species selection by ecological site. Where wildlife management is an objective, the food and cover value of the planting can be enhanced by using an approved habitat evaluation procedure to aid in selecting plant species and providing for other habitat requirements necessary to achieve the objective. Use the Plant Materials Technical Note MT-46 to determine pounds of PLS required for a pure stand.
3. For calculating mixtures of three or more species, determine the total pounds of PLS required by multiplying the full seeding rate of each species by the percentage desired within the total mixture. See Montana Plant Materials Technical Note MT-46 or Montana Range Technical Note MT-33.
4. Seeding rates of plus or minus 10 percent of the recommended rate (on a PLS basis) will be considered as meeting this standard for successful application/as-built.
5. Native grass mixtures generally consist of a variety of seed sizes, shapes, and textures that will result in a uniform flow through the seed box. Rice hulls or other carriers are usually only required for adequate flow through the drill box when small, light seed dictates carriers are needed. Fungicide recommendations must adhere to all manufacturers' label directions and precautions for treatment and, fluffy, or winged seeds (blue grama, big bluestem, sideoats grama) are planted alone, or in high percentages (greater than 50 percent).
6. An agitator is very useful to assist in seed flow when seeding native grasses. In seed drills that do not have an agitator, watch for settling of the smaller and heavier species.

VII. SEED TREATMENT

1. Many species of grasses are attacked by soil-borne fungi that reduce emergence and vigor. Seed may be treated before planting with an appropriate fungicide if past experience or field history handling of seed.
2. Legume seed shall be inoculated with the proper, viable symbiotic rhizobia before planting.

CAUTION: Select inoculates that have been stored in a cool, dry environment. Do not use inoculates after the expiration date indicated on the container.

VIII. TIME OF SEEDING

1. Spring seedings will be completed by May 15. This is the best time for cool season species, and second best period for planting warm season species.

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2. Seedlings will be made after May 15 only when there is a minimum of two feet of moist soil. The soil must also be moist to within two inches of the surface. These seedlings must be completed by August 1. The best period for planting warm season species is May 15 through June 15, if there is adequate soil moisture.
3. Dormant fall seedings can be made after October 15 or when the soil temperature at two inches below the soil surface remains at 40° F for ten days or more. Warm season species are not generally recommended for dormant seeding—except switchgrass.
4. Species with dormant seed such as green needlegrass and Indian ricegrass must be planted as a dormant fall seeding unless germination by standard seed test is greater than 50 percent. Spring seeding is acceptable if dormant seed species are a minor component of a mixture—less than 50 percent.

IX. PREPARATORY NURSE OR COMPANION CROP

Nurse or Companion Crops. In general, seeding nurse or companion crops with perennial grasses or forbs is not recommended as they provide too much competition for seedlings and will typically reduce the subsequent seedling and stand establishment and forage yield, particularly when moisture is limited. However, under eroding conditions, in heavy clay soils prone to crusting, or in higher precipitation areas, they can be successfully used.

Decrease the nurse or companion crop seeding rate to a maximum of 15 PLS pounds per acre and seed the crops at right angles or in alternate rows to reduce competition. If a nurse or companion crop is necessary, refer to guidelines in FOTG, Section IV, Practices Standard and Specification, Forage and Biomass Planting (Code 512).

X. SEEDING METHODS

1. Planting. Seeding will be done with a drill or air seeder that will place the seed at the proper depth, provide a uniform flow of seed at the proper rate, and have packer wheels to press the soil firmly over the seed. In lieu of packer wheels, the area will be cultipacked after seeding.

Install plantings with equipment calibrated to the correct seeding rate and set for the correct depth of planting. Use depth bands if available. Acceptable planters include, but are not limited to, a single-disk, double-disk or furrow drill, hoe drill, or air seeder. Reference NRCS Plant Materials Technical Note MT-30, Calibrating a Drill, dated May 1985.

2. Broadcast Rates. If planting is to be completed by broadcasting the seed—hand planted, mechanical or aerial seeded: (1) seeding rates must be doubled if no other operation will take place after seed broadcasting, or (2) recommended seeding rates may be used—from Montana Plant Materials Technical Note No. 46 – if the seedbed is roughened, seed broadcast, covered with a spike-tooth harrow or similar implement, and then rolled with a packer or cultipacker.
3. Seed Placement. Native grasses, forbs, and shrubs need to be seeded at a shallow depth, as light plays a key role in the germination of many species. Native grass mixtures that contain varying seed sizes should be planted at a depth not to exceed one-half inch. Drills fitted with depth bands and packer wheels are strongly recommended.

CAUTION: Many rangeland shrubs (big sagebrush, silver sagebrush, and others) require light for germination and MUST be seeded no deeper than one-quarter inch. Research has shown that if these seeds are mixed with other seeds and planted deeper than one-quarter inch, the seeding will be a complete failure. Reference NRCS Plant Materials Technical Note MT-31, Restoration of Woody Plants within Native Range Communities.

For guidance on planting shrubs or trees using containerized stock, dormant poles, etc., refer to the FOTG, Section IV, Practices Standard and Specification, Tree and Shrub Planting (Code 612).

When seeding warm season grasses, native forbs and shrubs with small-sized seed, species must be drill seeded separately in alternate rows, or broadcast on the soil surface and lightly covered, for successful establishment. Another option is two seeding operations with the second operation perpendicular to the first.

4. Row Spacing. Row spacing for most rangeland mixtures will be between 6 and 14 inches. The minimum row spacing for Basin wildrye is 18 inches. Where row spacing is greater than 12 inches, hazards from wind or water erosion, or weed encroachment may exist and must be managed.
5. Slope. Where slopes are greater than five percent, planting will be completed on the contour or across the general slope of the land.

XI. Plans and Specifications:

The Range Planting (Code 550) Job Sheet is required for this practice. A range planting plan will include the following information:

1. Location map – tract and field numbers (if applicable) and a map or sketch of the area to be planted.
2. Measured acres.
3. Job Class.
4. Rangeland inventory information – including ecological sites. Information regarding pasture or cropland species density and composition as well as soil/site condition.
5. Date practice is scheduled and applied.
6. Planned seedbed preparation and necessary weed control.
7. Seeding method and depth of seeding.
8. Erosion prediction before and after if primary purpose is for erosion control.
9. Mixture and seeding rate (PLS) including selected cultivars.
10. Seed inoculation or treatment required.
11. Erosion protection provided during establishment period, if needed.
12. Prescribed Grazing Plan, including the Feed/Forage Balance Worksheet and other useful documentation regarding expected forage productivity and harvest management guidelines.
13. Date and signature of producer and NRCS

XII. MANAGEMENT OF NEW PLANTINGS

All range plantings will be protected from domestic grazing from the date of seeding for at least two consecutive growing seasons (April 15 to October 1), or longer if the seeding is not well established at the end of two years. If shrubs are included in the planting, their successful establishment should be used as the criteria for grazing deferment.

FOTG, Section IV, Practice Standard and Specification, Prescribed Grazing (Code 528) will address a short-term prescribed grazing strategy and a long-term prescribed grazing strategy:

- A short-term prescribed grazing strategy will address how the loss of acres (for grazing) due to deferment or rest of treated pastures will alleviate any harmful effects from livestock grazing which may potentially occur to untreated pastures.

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- A long-term prescribed grazing strategy will be developed to include pastures where the treatment occurred as well as for other untreated pastures that would be part of a grazing management unit (e.g., where one herd would typically graze through multiple pastures during the growing season or for a significant portion of a growing season).

During the two-year establishment period, excessive amounts of competitive weeds will be controlled by applying herbicides or by clipping. Control weeds that compete with seedlings for sunlight and/or moisture during the growing season of the species planted and initiate clipping when weeds reach a height of six to eight inches. Clipping will be done before weed seed development, or prior to significant soil moisture competition. Heavy weed infestations should be clipped and removed from the site, while lighter stands can be spread uniformly across the planting site.

Herbicides must be applied very carefully to avoid injuring new seedlings. Apply herbicides according to label instructions. See FOTG, Section IV, Practice Standard and Specification, Herbaceous Weed Control (Code 797), and *Montana, Utah, Wyoming Weed Management Handbook* for herbicide recommendations.

REFERENCES

Calibrating a Drill. USDA, Natural Resources Conservation Service, Plant Materials Technical Note MT-30, May 1985.

Fertilizer Guidelines for Montana. Montana State University, Extension Service Bulletin EB 104, March 1997.

Montana Interagency Plant Materials Handbook. Montana State University Extension Service, EB 69, April 1993.

Montana, Utah, Wyoming Weed Management Handbook, 2001 – 2002. Cooperative Extension Services, April 2001.

Native Grass Seed Production Manual. USDA, Natural Resources Conservation Service, 1996.

NRCS, Montana Biology Technical Note 20, Habitat Development for Pollinator Insects. 2010 (Rev. 5).

NRCS, Montana Plant Materials Technical Note 46, Seeding Rate Specifications and Recommended Cultivars and Germplasm for All Vegetative Practices in the Montana FOTG. 2004.

NRCS, Montana Range Technical Note 33. Species Suited to Planting by Ecological Site. 2005.

Species Selection Criteria for Seeding Dryland Pastures in Montana and Wyoming, Montana State University Extension Service, EB 19, September 2000.

Restoration of Woody Plants within Native Range Communities. USDA, Natural Resources Conservation Service, Plant Materials Technical Note MT-31, June 1999.

Plant Materials for Acidic/Heavy Metal Contaminated Soils. USDA, Natural Resources Conservation Service, Plant Materials Technical Note MT-32, June 1999.

Tips for Drilling Chaffy Grass Seed: Attention to Detail Essential, Land and Water Magazine, July/August 1997.

Users Guide to Description, Propagation, and Establishment of Native Shrubs and Trees for Riparian Areas in the Intermountain West. USDA, Natural Resources Conservation Service, Plant Materials Technical Note MT-36, February 2001.

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USDA, Natural Resources Conservation Service, Field Office Technical Guide (FOTG), Section II E8 – Technical Ecological Site Descriptions.

Rangeland Resource Unit Map–Montana, May 2005.

USDA, Plant Hardiness Zone Map. USDA–ARS, Miscellaneous Publication No. 1475, January 1990.

USDA, Natural Resources Conservation Service, Field Office Technical Guide (FOTG), Section IV, Conservation Practice Standards and Specifications:

Brush Management (Code 314), most current version

Forage and Biomass Planting (Code 512), most current version

Prescribed Grazing (Code 528), most current version

Grazing Land Mechanical Treatment (Code 548), most current version

Herbaceous Weed Control (Code 797), most current version

Nutrient Management (Code 590), most current version

Pest Management (Code 595), most current version

Wetland Wildlife Habitat Management (Code 644), most current version

Upland Wildlife Habitat Management (Code 645), most current version