

NATURAL RESOURCES CONSERVATION SERVICE CONSERVATION PRACTICE SPECIFICATION

RANGE PLANTING

(ACRE)

CODE 550

I. SCOPE

The work shall consist of furnishing materials, labor, and equipment to plant the areas as shown on the conservation plan map.

II. GENERAL REQUIREMENTS

Document pre-treatment plant community species composition using form NV-ECS-01 *Range Inventory Worksheet*.

Determine and document suitability of soils proposed for planting by referring to soil survey of treatment area, or by on-site investigations referring to attached Table I, *Guide for Rating Soils According to Their Relative Suitability for Range Seedings in Nevada*. Document soil suitability for seeding on the Range Planting (550) Conservation Practice Documentation Worksheet.

The soil suitability rating is a relative rating suggestive of the number of successful seedings that might be expected during a given period of years. Adjective ratings of well suited, moderately suited, somewhat suited, and not suited are used to designate the soil suitability for establishment of the plants best suited to the climate and soil properties.

- Well Suited - rating indicates that a wide selection of plants may be successfully seeded in 7 or more years out of 10.
- Moderately Suited - rating indicates that fewer plants are adapted and can be successfully seeded in 5 to 7 years out of 10.
- Somewhat Suited - rating indicates that only the most drought tolerant plants can be successfully seeded in 4 to 5 years out of 10.
- Not Suited - rating indicates that soils are generally not suited for seeding. Seeding should only be considered under emergency circumstances, such as after construction or other disturbances to keep soil erosion losses to a minimum. Seeding will only be successful in about 3 years or less out of 10.

Criteria considered in the ratings are mainly climate, available water holding capacity, depth, surface texture, rock fragment on the surface, slope and salt or alkali content. Generally, the soil is rated well suited, moderately suited, somewhat suited, or not suited by its most limiting property as listed in the attached guide. However, interaction among soil properties may be great enough to require a change in some of the soil suitability ratings. These are generally noted in the guide. Machinery limitations, such as stoniness and slope, are also considered in the rating.

For treatment of unstable soils and serious erosion problems refer to CRITICAL AREA PLANTING (Code 342), conservation practice standard and specification.

Unless otherwise specifically approved by the State Resource Conservationist, nurse crops, cover crops, or companion crops (e.g. cereal rye) are not to be used in conjunction with dryland seedings in Nevada.

Prior to practice implementation, the following forms will be completed for all areas planted:

- NV-CPA-52 Environmental Evaluation
- NV-EVC-01 Cultural Resources Worksheet
- NV-ECS-01 Range Inventory Worksheet
- NV-ECS-19 Wildlife Habitat Evaluation Guide
- NV-ECS-34 Species Habitat Evaluation Guide for Sage Grouse when in sage grouse range

The following are associated practices that are commonly used in conjunction with Range Planting:

- Brush Management (314)
- Prescribed Grazing (528)

Conservation practice specifications are reviewed periodically and updated if needed. To obtain the current version of this specification contact the Natural Resources Conservation Service.

III. SPECIAL CONSIDERATIONS FOR RESTORING NATIVE PLANT COMMUNITIES INVADED WITH NON-NATIVE ANNUALS

Where the purpose of a range planting is to restore a plant community to its ecological site description reference state, or to create a desired plant community for habitat benefits, an alternative technique termed “assisted succession” may be employed.

Assisted succession is a method of transitioning an annual weed monoculture to a healthy native plant community. Crested wheatgrass, or a similar non-native perennial species, can be seeded into a site to restore biological function, soil health, and water and nutrient cycling. This method also depletes the annual weed seed bank. This may take several years to gain sufficient weed control. A diverse native plant community can be re-established by reducing the cover of the non-native perennial species by mechanical and/or chemical means and interseeding the site with a native seed mixture.

IV. MATERIALS

Selection of plant materials for seeding will be based on the objectives of the project. Refer to the Nevada Range Planting (Code 550) Conservation Practice Standard as well as attached TABLE 1. Guide for Rating Soils According to Their Relative Suitability for Range Seedings in Nevada.

Species (cultivars, varieties) to be planted will be adapted to treatment site conditions as specified in USDA-NRCS and Nevada Cooperative Extension Service joint publication BE-93-01, *Conservation Plantings for Natural Resources Management*, and in Nevada NRCS Plant Guides. Other sources of information regarding seed selection may be found in the USDA-ARS Intermountain Planting Guide AG 510, and the USDA-NRCS Technical Note (Plant Materials) No. 24. Grass, Grass-Like, Forb, Legume, and Woody Species for the Intermountain West (see references below).

In areas of sagebrush habitats, design seed mixes for the native plant community as defined in the ecological site description.

Seed

All seed to be used shall conform to current Nevada State Seed Law and Regulations and current Nevada State Seed Certification Regulations (Nevada Administrative Code [NAC] 587.226).

Seed shall be labeled in accordance with Nevada State laws and the U. S. Department of Agriculture rules and regulations under the Federal Seed Act.

Nevada State Seed Law and Seed Certification Regulations can be viewed at: <http://www.leg.state.nv.us/NAC/NAC-587.html>

- All commercially produced seed from *introduced and native (including wildland collections) plant species* shall be labeled “certified seed” as defined in the current Nevada State Seed Certification Regulations (NAC 587.222-236 inclusive.)
- Seed shall be from the latest crop available. *No seed will be used having a date of test more than nine (9) months prior to the date of delivery to the site.*
- Seed that has become wet, moldy, or otherwise damaged in transit or storage will not be used.
- Seed is to be certified as free of noxious weeds (NAC 587.173,175)
- Weed seed shall not exceed 1.5 percent (by weight) of the bulk seed supplied.

Seed label or seed tag information will include percent purity and percent germination as tested.

Refer to Nevada NRCS Plant Materials Technical Note No. 18 for definitions of seed label terms.

Seed lots of commercially produced species should be at least 80 percent pure live seed (PLS) and have a minimum purity of 80 percent.

Seed Inoculant

All legume seed shall be inoculated. Inoculant for treating legume seeds shall be a pure culture of nitrogen-fixing bacteria prepared specifically for the species and shall not be used later than the date indicated on the container. A mixing medium, as recommended by the manufacturer shall be used to bond inoculate to the seed.

For *pellet* inoculated seed, a minimum of 30-pounds of inoculant shall be used per 1,000-pounds of bulk seed.

For *non-pellet* inoculated seed, two times (2X) the amount of inoculate recommended by the manufacturer shall be used and seed shall be sown within 24-hours of treatment.

Pellet inoculated seed shall be labeled to show Lot Number, Expiration Date, and Percent Coat of the finished product. Pellet inoculated seed shall be stored in a cool environment and planted within 180 days of the inoculation date.

V. SEEDBED PREPARATION

Once suitable soils have been identified, and adapted, high-quality, plant materials are selected, a well-prepared seedbed becomes the most important factor that can be controlled to ensure successful stand establishment.

Several methods of seedbed preparation are available. The choice depends on the kind and amount of vegetation present, slope, and soil factors such as stoniness, susceptibility to erosion, salinity, texture and depth.

Mechanical Seedbed Preparation

The soil surface is to be worked to a depth of 3 to 4-inches by disking, harrowing, or chiseling. If the prepared seedbed is too soft, the seedbed will be firmed using a ring roller or cultipacker.

Seedbeds shall be free of competitive vegetation. If utilizing assisted succession techniques, seedbeds should be free of woody vegetation and existing herbaceous vegetation should be disturbed and/or thinned, resulting in an adequate seedbed.

Seedbed preparation shall be suspended when soil moisture conditions are too high for suitably obtaining a satisfactory seedbed.

Soils subject to compaction will not be tilled when wet.

Chemical Seedbed Preparation

Chemical summer fallow can be effective in controlling weeds and storing soil moisture in seedbeds preparatory to planting in the fall. Chemical seedbed preparation requires that the competing, resident vegetation be killed or adequately suppressed and the herbicide applied be broken down or leached away by the time seeded species germinate or are not toxic to seedlings of the seeded species.

The application of herbicides will require a Pest Management Plan in accordance with conservation practice PEST MANAGEMENT (Code 595) specification.

Seedbed Preparation by Burning

On sites where the resident plant species are readily killed by fire, burning can be an effective seedbed preparation since it generally leaves the seedbed firm. Dense cheatgrass sites are generally unadapted to seeded preparation by fire only. Burning will require a Prescribed Burn plan in accordance with conservation practice PRESCRIBED BURNING (Code 338) specification.

Seedbed Preparation by Grazing Animals

Targeted grazing by livestock can be used to prepare seedbeds by reducing competing, resident vegetation or breaking apart a dense mulch layer. Targeted grazing will require a Prescribed Grazing plan in accordance with

conservation practice PRESCRIBED GRAZING (Code 528) specification.

VI. PLANTING

Seeding rates (i.e. pounds/acre) are to be specified in terms of pure live seed (PLS). Multiply percent germination by percent purity and divide by 100 to calculate PLS.

Example: (95% germination. × 80% purity)/100 = 76% PLS. Therefore, if the desired PLS application rate is 10 pounds/acre divide 10 by 76% or 0.76 which results in 13.2 pounds/acre needed in order to meet the objective of 10 PLS pounds/acre.

Seeding rate(s) shall be recorded for the (PLS) weight of seed exclusive of any coating material.

Unless otherwise specified, seed shall be drill seeded at the depth recommended in USDA-NRCS Technical Note (Plant Materials) No. 24. Grass, Grass-Like, Forb, Legume, and Woody Species for the Intermountain West (see reference below) for the species/cultivar being planted. When a mixture of small-seeded and large-seeded species is planned, optimum depth is determined by the small-seeded species.

Fall plantings are generally more successful than spring seedings as a result of taking advantage of a longer soil moisture window from fall to spring, higher seedling vigor (with bigger soil moisture window), and using winter to provide settling of seedbed in order to improve seed to soil contact, resulting in higher germination potential.

Seeding shall be performed across slope (with the contour) wherever practical in order to maximize on-site water capture and infiltration.

PLANTING METHODS

Drill Seeding

Drill seeding is the preferred method of seed placement except where terrain or obstructions prevent the use of a drill. No-till drills are suited for range seeding where soils are not rocky and the terrain is not broken.

Where available, drills equipped with furrow openers, depth control devices, seed flow/rate control mechanisms, seed agitators (for light, fluffy, seed or seed mixtures), and press wheels or drags will be used.

Standard grain drills may be used but should be followed by press wheels or other packing devices. Rangeland drills are best suited on areas too rough or rocky for conventional drills.

If the area is to be drill seeded, specify drill row spacing for each seed box used.

Seeding into annual-type vegetation is acceptable when *all* of the following conditions are met:

- The soil is firm.
- Existing annual-type vegetation is not allowed to set seed prior to seeding operations and is of low-stature.
- There is sufficient cover over the entire treatment area to protect soil from wind erosion after seeding operations. Normally more than 500 pounds per acre of litter is required to prevent wind erosion on loamy soils and 750 pounds on coarse textured soils.
- There are not enough perennial plants to present significant competition to seeded species.
- Following seeding, annual-type vegetation will be controlled by mowing, shredding, grazing or chemicals until planted species are established.

Seeding without any soil cultivation is also applicable on lands where BRUSH MANAGEMENT (Code 314) or PRESCRIBED BURNING (Code 338) have been applied (in accordance with practice standards and specifications) and there are insufficient perennial herbaceous plants to re-establish in the area following treatment.

Seeding into areas where woody vegetation has been killed using herbicides or by prescribed burning may present problems for equipment. Rubber tires on both tractors and drills are easily punctured by woody debris. In addition, drills must be able to be effective where woody skeletons are present and also need to be able to be resilient in such an environment and withstand encounters with standing woody stems.

Refer to Technical Note Plant Materials No. 19 *Calibrating a Seed Drill for Conservation Plantings* for calibration of seed drills (USDA NRCS Idaho – April 2007).

Broadcast Seeding

Broadcast seeding should be limited to situations where terrain or obstructions inhibit the use of a drill seeder.

Broadcasting of seed by either aerial or ground operation is applicable when competing vegetation has been eliminated (i.e.: post fire).

Ground operations may be by hand, ATV, cyclone seeder or by drill not using a seed placement mechanism.

Seeding rates for broadcast seeding are normally two times (2x) the amount of PLS seed that is recommended for drill seeding.

Broadcast seed uniformly and cover by dragging, harrowing, rolling or cultipacking.

Where trees or large shrubs have been mechanically cleared and drill seeding is not practical due to high amounts of woody debris, seed by broadcasting disturbed areas before rains settle the soil. On burned areas, seed should be broadcast before rain or snow settle the ashes and a surface crust is formed.

VII. OPERATION AND MAINTENANCE

Cultural practices recommended for establishing range plantings and guidelines for management of new plantings are included in USDA-NRCS and Nevada Cooperative Extension Service joint publication BE-93-01, *Conservation Plantings for Natural Resources Management*, and in Nevada NRCS Plant Guides.

Seeded areas will be deferred from all grazing by domestic livestock for at least two full growing seasons or until establishment objectives have been met. New plantings will not be harvested until plants are well-established and cannot be hand-pulled out of the ground. It is usually necessary that grazing be deferred to the end of the second growing season following planting to allow seeded plants to build vigor. **If dry years prevail during the establishment period, deferment for a third growing season, or more, may be required.**

Refer to Nevada NRCS Plant Materials Technical Note No. 32, *Determining Success of Forage Production Seedings*, for guidance in making evaluations of planting success.

REFERENCES:

USDA-ARS Forage and Range Research Lab and Utah State University Extension. 2001. Intermountain Planting Guide AG 510. Logan, Utah.

USDA-NRCS Technical Note (Plant Materials) No. 24. Grass, Grass-Like, Forb, Legume, and Woody Species for the Intermountain West. February, 2007 Revision. Idaho, Montana, and Washington.

McAdoo, J.K., and Davis, R. 2003. Northeastern Nevada Revegetation Guide: Planting Desirable Vegetation to Compete with Invasive Weeds in Upland Habitats. University of Nevada Cooperative Extension.

Heady, H.F. and Child, R.D. 1994. Rangeland Ecology and Management. Westview Press. Boulder, Colorado.

TABLE 1. Guide for Rating Soils According to Their Relative Suitability for Range Plantings in Nevada

SOIL PROPERTY	WELL SUITED	MODERATELY SUITED	SOMEWHAT SUITED	NOT SUITED
Soil moisture regime	Aquic, Xeric, Udic, Ustic	Aridic and Torric bordering on Xeric or Ustic.	Typic Aridic and Torric.	Typic Aridic and Torric
Soil Order				Vertisols
Average Annual Precipitation	>13 inches	10 to 13 inches	8 to 10 inches	<8 inches
Available Water Capacity (total in layer)	Surface 7 inches >1.0 inches Soil profile >5 inches	Surface 7 inches – 0.75 to 1.0 in. Soil profile – 3.75 to 5 inches	Surface 7 inches 0.75 to .50 in. Soil profile 2.0-3.75 inches	Surface 7 inches <.50 Soil profile < 2.0 inches
Surface Texture	L, SIL, SICL, CL, SCL	C, SIC, COSL, SL, LVFS, VFSL, FSL	LFS, LS	COS, S, FS, VFS, LCOS
Rock Fragments in Surface 7 inches (Wt. ave)	Total rock fragments <15%; ST <2%.	Total rock fragments 15-35%; ST 2 – 5%.	Total rock fragments 35-60%; ST 5-25%.	Total rock fragments > 60% ST > 25%
Depth to Abrupt A-B Texture Boundary	>20 inches	10 to 20 inches	4 to 10 inches	<4 inches
Depth to Bedrock or Hardpan	>40 inches	20 to 40 inches	20 to 40 inches	<20 inches
pH – in upper 20 inches	5.6 – 7.3	7.4-8.5	<5.5 and > 8.5	<5.5 and > 8.5
Electrical Conductivity	<2 mmhos/cm in upper 20 inches	2-4 mmhos/cm in upper 10 inches and 4-8 mmhos/cm in 10–20 inches	4-8 mmhos/cm in upper 10 inches and/or 8-16 mmhos/cm in 10–20 inches	>8 mmhos/cm in upper 10 inches and/or >16 mmhos/cm in 10–20 inches
Sodium Adsorption-Ratio	<4 in upper 20 inches	4 - 12 in upper 20 inches	13 - 21 in upper 20 inches	>21 in upper 20 inches
$K \times \text{Percent Slope } (\%)^{1/}$	<2	2-4	5-8	>8
$I \times C^{2/}$	<60	<60	>60	>60
<p>^{1/} Sheet and rill erosion hazard (K = soil ridge roughness factor)</p> <p>^{2/} Wind erosion hazard (I = soil erodibility factor; C = climatic factor); Determine C using Nevada Annual Wind Erosion C-factor Map, SCS 1984</p>				