

Seeding Guidelines
Lolo National Forest
2003
[\(Limited Interim Updates 5/2008\)](#)

This guide replaces all previous seed mixes and versions of the seeding guide on the Lolo National Forest.

Objectives

- Provide seeding guidelines in the absence of more site-specific or project specific seeding prescriptions.
- Provide seed mix recommendations to quickly re-vegetate disturbed sites to reduce soil erosion, to reduce noxious weed invasion and provide site protection for native species establishment.
- Maintain flexibility for integration of locally collected grass, shrub and forb species into mixes as local seed banks become established to meet project needs..
- Provide native species and cultivar recommendations that follow current Forest Service policy and direction.

Soil Preparation

- Compacted soil will be scarified prior to reseeded (i.e. landings, road surfaces, skid trails, staging areas etc). Heavily compacted sub-soil will be decompacted using rippers or a winged subsoiler. When ripping maintain a depth of 6 to 12 inches with rippers being no more than 16 inches apart or as specified in contracts. To prevent damage to the soil structure, avoid plowing the areas.
- Salvage topsoil on projects with major site disturbance. Topsoil should be stored in shallow piles or windrowed and seeded with Annual Ryegrass to reduce noxious weed establishment during construction work. To aid in revegetation, consider replacing the topsoil if stored material has poor fertility or is highly infested with noxious weeds.
- Areas to be seeded that have been damaged by erosion, landslides or mass wasting will be restored and stabilized prior to seeding.
- If possible, treat moderate to heavy weed infestations 1-2 years prior to the seeding and revegetation project.
- Soil for broadcast seeding should be left in a roughened condition favorable to the retention and germination of seed. A minimum of one half inch of surface soil shall be in a loose condition, unless otherwise specified. Lightly raking the soil to cover seeds is beneficial.
- Care and protection of the seedbed will be done prior to final acceptance of the revegetation work. Contractors will be responsible for repairing and reseeded areas damaged by construction operations, unless otherwise specified.

Seeding Application

- Seed immediately following disturbance or final seedbed preparation (REGARDLESS OF THE TIME OF YEAR).
- Seeds should be no more than ¼ to ½ inch deep.
- Suspend seed application work during extremely rainy or windy conditions. Broadcast seeding on and over snow is recommended if the ground is snow covered at the planned or desired time of seeding.
- Species and application rates are listed in the four seed mixture tables in terms of Pure Live Seed (PLS) based on site conditions for broadcast seeding. Species characteristics are outlined in Appendix A.
- Typically seed rates range from 20-50 viable seeds per square foot depending on species and site conditions (Goodwin and Sheley, 2002). Increase rates up to 80 seeds per square foot when broadcast seeding over harsh, severely burned or weed infested sites.
- Total seed applied may be greater than listed PLS rates based on variations in seed germination.

Seed Procurement

- Order bulk seed by listed PLS rates outlined in the Lolo seed mixes.
- Have seed suppliers label each bag with the needed pounds of seed per acre to obtain the PLS rates listed in the seed mixes.
- If listed cultivars are not available, refer to Appendix A for substitutions. If a species (or listed cultivars) is not available at the time of seed ordering, consult with the appropriate Forest Watershed Specialist, Silviculturist, Botanist or Range Specialist for a substitution. If in doubt it is best to leave the unavailable species out of the mix and adjust accordingly.
- Prices and availability will vary by mix, supplier and time of year.

Seed Certification

- Certified, blue-tagged seed shall be used where a name variety or cultivar is specified. Blue tags, that are removed to mix or spread the seed will be saved and provided to the forest.
- All seed purchased will be certified free of seeds from weeds listed on the current "All States Noxious Weeds List."
 1. Test results from a certified seed analyst and seed analysis labels attached to the bags will be provided to the Forest Service. Lab testing for noxious weeds will be conducted prior to seed mixing. Only after a finding and documentation in writing of no weeds on the current "All States Noxious Weeds List" will the seed be accepted and used.
 2. To avoid weed contaminated seed, each lot must be tested by a certified seed laboratory against the all State noxious weed lists and documentation of the seed inspection test provided (**FSM 2081 R1 Supp 2000-2001-1 Effective May 14, 2001 approved 4/27/01**).

- The origin of Wildland native seeds is verified by a certification of the Source Identified Class with an attached yellow tag.
- When using commercially purchased seed check with the supplier for the seed source point of origin. Point of origin should be as close to the revegetation project as possible. Seeding elevations should be within 1000 feet below or 500 feet above the seed origin elevation. Goodwin and Sheley (2002) suggest that seed origin be within a 500-mile radius of the revegetation site. Use listed “preferred cultivars”

Fertilizer Application

- Do not fertilize at the time of seeding, especially if noxious weeds are present. Fertilizer should only be applied after vegetation establishment.
- Generally, native late-seral grasses have minimal nitrogen requirements (Goodwin and Sheley 2002). Grass species do not utilize fertilizer very effectively in the first year (Holdworth, 2003). Fertilizer should only be applied at the time of seeding on sites with poor fertility or granitic soils (**determined by a soil test**).
- If fertilizer is applied based on the above guidelines, use 16-0-0 nitrogen fertilizer for grass but if native or desirable forbs are present on site a 10-16-10 or 16-16-16 fertilizer is recommended (Comfort 2003,2008). Fertilize at a rate of 100-200 pounds per acre depending on site conditions and fertility. A time released fertilizer may have benefits depending on site conditions.

Mulch Application

- Vegetative mulch should be applied to all seeding areas where feasible. Uniformly apply mulch after seeding. **Mulch material will be certified weed free (tagged twine)**.
- Wood cellulose fiber or paper mulch may be applied by hydraulic equipment with water as the carrying agent. Continuous agitation of the mulch will be maintained to provide uniform suspension and distribution of the material. Application on slopes should work downward from the top to the toe of the slope. Application rate should be 2,000 pounds/acre.
- Commercially available tackifiers can be used as mulch binders. Application should be evenly distributed over the revegetation site. Refer to manufactures product guidelines for recommended uses, application methods and rates.

Monitoring

- Monitoring seed distribution at time of seeding can be done with a 1 foot square container to count #of seeds/ft²
- Monitoring frequency will need to be determined by site conditions. Initial monitoring should occur shortly after seed germination. Project plans should outline monitoring methods and requirements. Document monitoring results in project files unless otherwise specified.
- Revegetation monitoring requirements are listed in the **Lolo National Forest Plan Table V.1, Northern Region 2200/2470 memo, Use of Vegetative Materials on National Forests dated June 8, 1993** and in **FSM 2081, R1 Supplement 2000-2001-1 Effective May 14, 2001**

- Monitoring methods can vary from visual methods or photo points to plot sampling for species and composition.
- Sites with poor germination or low application rates should be reseeded (overseeded/interseeded) to provide the desired soil protection and meet site revegetation objectives. When interseeding it will help to rake, harrow or scuff up the soil prior to seeding.
- *Note any noxious weed invasions, weed reestablishment and any new invaders. Map and document the extent of weeds within the seeded area during monitoring.*

Lolo N.F. Seeding Guidelines (2008 Limited Revision)

Seed Mixes

| Seed Mix A: Dry warm and relatively dry cool sites (Native and introduced species) | |
|---|----------------------------|
| Low to mid elevation sites with a high susceptibility to noxious weed invasion. All aspects at low to mid-elevations and south and west-facing aspects at higher elevations. Moisture and temperature conditions may vary by aspect but are subjected to dry or droughty periods. Generally, Douglas Fir and Ponderosa Pine habitat types with a bunchgrass understory component. <i>Most competitive Lolo mix for weedy, dry and or harsh sites.</i> | |
| <i>Species</i> | <i>Pounds PLS per Acre</i> |
| Annual Ryegrass (I) <i>Lolium multiflorum</i> | 4 |
| Mountain Brome (N) <i>Bromus marginatis (Bromar)</i> | 4 |
| Sheep Fescue (I) <i>Festuca ovina (Covar)</i> | 6 |
| Thickspike Wheatgrass (N) <i>Elymus lanceolatus (Critana)</i> | 4 |
| Pubsecent Wheatgrass (I) <i>Agropyron intermedium (Manska, Luna)</i> | 5 |
| Slender Wheatgrass (N) <i>Elymus trachycaulus (Pryor)</i> | 9 |
| Total | 32* |

| Seed Mix B: Moist cooler to cold sites (Native and introduced species) | |
|--|----------------------------|
| Mid to high elevation slopes that tend to be non-droughty. North and east facing slopes on mid-elevation sites and all aspects at higher elevations. Grand Fir, Sub-Alpine Fir, Western Cedar and Western Hemlock habitat types. | |
| <i>Species</i> | <i>Pounds PLS per Acre</i> |
| Annual Ryegrass (I) <i>Lolium multiflorum</i> | 6 |
| Mountain Brome (N) <i>Bromus marginatis (Bromar)</i> | 5 |
| Sheep Fescue (I) <i>Festuca ovina (Covar)</i> | 5 |
| Redtop (N) <i>Agrostic alba (Streaker)</i> | 2 |
| Tufted Hairgrass (N) <i>Deschampsia caespitosa (Nortran)</i> | 2 |
| Big Bluegrass (N) <i>Poa ampla (Sherman)</i> | 5 |
| Total | 25* |

*Minimum seeding rates: When broadcast seeding on crusted soils, harsh sites or in competition with noxious weeds, higher seeding rates (80+ seeds/ ft²) are recommended.

Lolo N.F. Seeding Guidelines (2008 Limited Revision)

Seed Mix C: Dry warm Sites ((NATIVE with short –lived, quick establishing introduced nurse species)

Typically lower elevation sites with winter range potential, south and west aspects that have longer growing seasons. Sites have a high potential for noxious weed invasion and tend to be somewhat to very droughty.

| <i>Species</i> | <i>Pounds PLS per Acre</i> |
|---|----------------------------|
| Annual Ryegrass (I) <i>Lolium multiflorum</i> | 4 |
| Mountain Brome (N) <i>Bromus marginatis (Bromar)</i> | 4 |
| Bluebunch Wheatgrass (N) <i>Pseudoroegneria spicata (Secar)</i> | 5 |
| Rough Fescue (N) <i>Festuca scabrella</i> | 3 |
| Idaho Fescue (N) <i>Festuca idahoensis (Joseph)</i> | 3 |
| Slender Wheatgrass (N) <i>Elymus trachycaulus (Pryor)</i> | 5 |
| Prairie Junegrass (N) <i>Koeleria macrantha (crastad)</i> | 1 |
| Total | 25* |

Seed Mix D: Relatively dry-moist to cool sites and cool-cold moist sites (NATIVE with short –lived, quick establishing introduced nurse species)

Mid to Higher elevation sites that have a wide range of moisture and temperature conditions with shorter growing seasons.

| <i>Species</i> | <i>Pounds PLS per Acre</i> |
|--|----------------------------|
| Annual Ryegrass (I) <i>Lolium multiflorum</i> | 4 |
| Mountain Brome (N) <i>Bromus marginatis (Bromar)</i> | 5 |
| Blue Wildrye (N) <i>Elymus glaucus</i> | 4 |
| Tufted Hairgrass (N) <i>Deschampsia caespitosa (Nortran)</i> | 2 |
| Big Bluegrass (N) <i>Poa ampla (Sherman)</i> | 5 |
| Slender Wheatgrass (N) <i>Elymus trachycaulus (Pryor)</i> | 5 |
| Total | 25* |

*Minimum seeding rates: When broadcast seeding on crusted soils, harsh sites or in competition with noxious weeds, higher seeding rates (80+ seeds/ ft²) are recommended.

Appendix A. Grass Species characteristics and cultivars of the Lolo N.F. Seed Mixes (Derived from Goodwin and Sheley, 2002)

| Species | Cultivar | Native | Growth Form | Minimum Precipitation | Preferred Soil Type | Drought Tolerant | Erosion Control | Comments |
|-----------------------|--|--------|---------------------|-----------------------|------------------------|------------------|-----------------|--|
| Annual Ryegrass | Gulf | No | Tall-annual | 10 inches | Silty-loamy | No | Very good | Easy establishment |
| Mountain Brome | Bromar | Yes | Med-tall bunchgrass | 16 inches | Silty-loamy to clayey | Moderate | Very good | Rapid establishment, short-lived |
| Sheep Fescue | Covar | No | Short bunchgrass | 10 inches | Sandy to Clayey | Yes | Very good | Slower establishment |
| Rough Fescue | n/a | Yes | Short bunchgrass | 16 inches | Silty-loamy | No | Good | Slow establishment, moderate lifespan |
| Idaho Fescue | Joseph | Yes | Short bunchgrass | 10 inches | Silty-loamy to clayey | Moderate | Good | Slow establishment, poor seeding vigor, long-lived |
| Slender Wheatgrass | Pryor ¹ Revenue | Yes | Tall bunchgrass | 16 inches | Sandy to clayey | Moderate | Very good | Rapid establishment |
| Tufted Hairgrass | Nortran | Yes | Medium bunchgrass | 20 inches | Silty-loamy to clayey | Moderate | Good | Low maintenance ground cover |
| Bluebunch Wheatgrass | Secar ¹ , Goldar | Yes | Med-tall bunchgrass | 10 inches | Silty-loamy to clayey | Yes | Good | Moderate establishment |
| Big Bluegrass | Sherman | Yes | Tall bunchgrass | 8 inches | Silty-loamy to clayey | Moderate | Good | Easy establishment |
| Prairie Junegrass | n/a | Yes | Med-bunchgrass | 12 inches | Sandy | Yes | Good | Easy establishment |
| Blue Wildrye | n/a | Yes | Tall bunchgrass | 12 inches | Sandy to silty-loam | Moderate | Moderate | Rapid establishment, short-moderate lifespan |
| Pubescent Wheatgrass | Manska ¹ ,Luna ¹ , Topar Mandan, Greenleaf | No | Tall-rhizomatous | 12 inches | Sandy to loamy | Moderate | Very good | Not winter hardy, suited for slightly saline soils, long-lived |
| Thickspike Wheatgrass | Bannock, Critana ¹ | Yes | Tall-rhizomatous | 8 inches | Sandy to loamy | Yes | Excellent | Fair establishment, long-lived |
| Redtop | Streaker | Yes | Tall-rhizomatous | 20 inches | Sandy –loamy to clayey | Moderate | Excellent | Tolerates acidic and nutrient poor soils |

¹ Preferred Cultivars

REFERENCES

- Barndt, W and J. Greenlee. 1993. Lolo National Forest Native Seed Mixes and Seeding Guide.
- Comfort, T. 2003 and 2008. Personal communication. Missoula Conservation District, USDA Natural Resource Conservation Service, Missoula, MT.
- Forest Service Manual, 2008. FSM 2070-Vegetation Ecology, Amendment-2000-2008-1. USDA Forest Service.
- Goodwin, K. and R. Sheley. 2002. Revegetation Guidelines for Western Montana. Dept. of Land Resources and Environmental Sciences, Montana State University.
- Goodwin, K. and R. Sheley. 2000. Integrated Noxious Weed Management after Wildfire. Dept. of Land Resources and Environmental Sciences, Montana State University.
- Holzworth, L.K. 2003. Personal communication. USDA Natural Resource Conservation Service. Bozeman, MT.
- Lolo National Forest Plan, 1986. USDA, Forest Service.
- Montana Department of Agriculture. 2003. Noxious weed and grass seed website. (<http://agr.state.mt.us>). Helena, MT.
- Montana Seed Growers Association, 2008. MSGA Sources of Certified Seed. (www.ag.montana.edu/msga/). Montana, USA.
- USDA Natural Resources Conservation Service. 2003. Bridger Plant Materials Center (<http://plant-materials.nrcs.usda.gov>). Bridger, MT USA.
- USDA Natural Resources Conservation Service. 2002. The PLANTS Database version 3.5 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.
- Westland Seed Inc. 2003. Seed Availability and Price Estimates. Fax Transmittal. Ronan, MT.