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FOREST SERVICE, ROCKY MOUNTAIN RESEARCH STATION
FORT COLLINS, COLORADO

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT, BOISE, IDAHO

UTAH STATE UNIVERSITY, AGRICULTURAL EXPERIMENT STATION
LOGAN, UTAH

UNIVERSITY OF IDAHO, AGRICULTURAL EXPERIMENT STATION
MOSCOW, IDAHO

UNITED STATES AIR FORCE, MOUNTAIN HOME AIR FORCE BASE,
IDAHO

**NOTICE OF RELEASE OF
MOUNTAIN HOME GERmplasm SANDBERG BLUEGRASS
(SELECTED GERmplasm, NATURAL TRACK)**

The United States Department of Agriculture, Forest Service, Rocky Mountain Research Station; United States Department of the Interior, Bureau of Land Management, Idaho State Office; Utah State University, Agricultural Experiment Station; and the United States Air Force, Mountain Home Air Force Base announce the release of Mountain Home Germplasm Sandberg Bluegrass (*Poa secunda* J. Presl. subsp. *secunda*) for restoration of disturbed sites in the Intermountain West.

Mountain Home germplasm Sandberg bluegrass is a small, densely tufted short-lived perennial bunchgrass adapted to low elevation, semi-arid sites with long, hot growing seasons. Mountain Home's drought tolerance, competitive nature, and ease of establishment make it an excellent choice for post-fire restoration of cheatgrass (*Bromus tectorum* L.) dominated landscapes and for conversion of introduced perennial grasslands to native plant communities. The selected germplasm (natural track) release will be named Mountain Home Germplasm Sandberg bluegrass for the original collection site.

Scientific Name: *Poa secunda* J. Presl. subsp. *secunda*.

Synonyms include *Poa canbyi* (Scribn.) T.J. Howell, *Poa gracillima* Vasey, *Poa incurva* Scribn. & Williams, *Poa sandbergii* Vasey, *Poa scabrella* (Thurb.) Benth. ex Vasey, *Poa secunda* J. Presl. subsp. *secunda* J. Presl. (superfluous synonym), and *Poa secunda* J. Presl. var. *incurva* (Scribn. & Williams) Beetle.

Common Name: Sandberg bluegrass

Pre-varietal Selected Germplasm Name: Mountain Home

Identification Number: US Forest Service: B53; W6 39684; PI No.: PI660255

Origin: Steve Monsen, USDA Forest Service Rocky Mountain Research Station (retired), collected the Mountain Home Sandberg bluegrass accession in 1997 about 45 km south-southeast of Mountain Home in Owyhee County, Idaho (42.75° N, 115.60° W) at an elevation of 900 m. The site is approximately 11 km east of the Bruneau River Canyon, near the center of the U.S. Air Force Saylor Creek Range. The collection site is classified as Purdam silt loam by the USDA NRCS (USDA NRCS 2006), Intermountain Semi-desert Province 342 (Bailey 1995), and EPA Level III Ecoregion 12, Snake River Plain and transition to Ecoregion 80, Northern Basin and Range (US EPA 2000). Ecological site is Loamy 8-12 ARTRW/PSSPS-ACTH7 (USDA NRCS WSS 2011).

The Purdam soil series occurs on plains and valleys at elevations from 600 m to 1500 m (USDA Natural Resources Conservation Service, 2006). Slopes are commonly less than 8 percent, but range up to 30 percent. Soils are well-drained and moderately deep to a duripan. The soil series formed in silty alluvium from loess and weathered volcanic ash over medium or moderately coarse-textured alluvium from igneous materials. Permeability is moderately slow with depth to the hardpan 50 to 105 cm. Surface layers are typically light brownish gray to dark grayish brown when moist. Percent clay particle sizes range from 20 to 32 percent and gravel from 0 to 5 percent. From the surface to 10-cm depth, soils have a weak, fine granular structure with few very fine and fine roots; many very fine vesicular pores, and a neutral to moderately alkaline pH. Depth to bedrock is more than 150 cm. Purdam silt loam subsoil has a clay content of 12 to 32 percent and 0 to 10 percent gravel. Depth to a calcium carbonate layer is 30 to 70 cm. The average annual precipitation is 200 to 300 mm (including up to 600 mm of snow) and the average annual air temperature is about 9° C.

In addition to Sandberg bluegrass, other common plant species at the collection site are squirreltail (*Elymus elymoides* [Raf.] Swezey), cheatgrass, tumble-mustard (*Sisymbrium altissimum* L.), gray rabbitbrush (*Ericameria nauseosa* [Pallas ex Pursh] Nesom & Baird), and hoary aster (*Machaeranthera canescens* [Pursh] Gray). Prior to burning and other disturbances, additional plant associates would have included Wyoming big sagebrush (*A. tridentata* Nutt. subsp. *wyomingensis* Beetle & Young), bluebunch wheatgrass (*Pseudoroegneria spicata* [Pursh] A. Love), Thurber needlegrass (*Achnatherum thurberianum* [Piper] Barkworth), needle and thread (*Hesperostipa comata* [Trin. & Rupr.] Barkworth), and long-leaf phlox (*Phlox longifolia* Nutt.).

Average annual precipitation at the U.S. Air Force Saylor Creek Range during the period 1937 through 1997 was 199 mm. Most precipitation falls from November to June, with July and August generally the driest months. The average annual temperature ranges from 7° C to 12° C. The average daily maximum temperature for the entire year is 19.2° C; maximum daily temperatures equal or exceed 30° C from June through August. From November through February, average minimal monthly temperatures are -1° C to -5° C. The frost-free period ranges from 100 to 160 days.

Description: Mountain Home is an early season, small-statured perennial bunchgrass that produces small tufts of basal leaves. The fibrous roots aid in soil stabilization. The mature seed

head is typically up to 40 cm tall and leaf blades are generally 5 to 15 cm in length. The Mountain Home plants are diploid, the chromosome number, $n=11$, or $2n=22$ (Stewart Sanderson, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station research botanist [retired], personal communication 2010). Specimens are on file at the U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station Herbarium (BOIS), Boise, ID.

Mountain Home germplasm Sandberg bluegrass belongs to a *Poa secunda* subsp. *secunda* complex (Anderton and Barkworth 2009; Soreng 2007). Five variants in this complex that have been recognized as separate species at various times are *P. canbyi*, *P. gracillima*, *P. incurva*, *P. sandbergii*, and *P. scabrella* (Cronquist et al. 1977; Hitchcock 1950; Hitchcock et al. 1969; Kellogg 1985, Anderton and Barkworth 2009).

The USDA NRCS (2011) currently includes Sandberg bluegrass in a broader *Poa secunda* complex with eight or more species, including *P. nevadensis* Vasey ex Scribn. and *P. juncifolia* Scribn. Kellogg (1987) found that these are not discrete entities and should regard as elements of a single polymorphic species. USDA NRCS (2011) currently recognizes *P. curtifolia* Scribn. endemic to serpentine areas of the Wenatchee Mountains, as a distinct species. Muttongrass (*Poa fendleriana* [Steud.] Vasey), another widespread western native species, is also recognized as morphologically distinct (Larson et al. 2001). Like other *Poa* complexes, the *Poa secunda* complex is characterized by facultative apomixes (Kellogg 1987). Along with chromosome number, the percentage of ovules that are apomictic varies widely. Apomixis has the effect of slowing gene flow by cross-fertilization, as seeds develop without fertilization and are essentially clones of each other (Kellogg 1987).

Method of Development: Mountain Home germplasm Sandberg bluegrass was selected based on a series of comparative field trials at the Orchard Research Site near Boise, Idaho and the Utah Agricultural Experiment Station site near Nephi, Utah. The Orchard Research Site is located in Ada County, Idaho, 24 km southeast of Boise at an elevation of 975 m. It is administered by the Boise District office of the U.S. Department of the Interior, Bureau of Land Management. The Orchard Research Site receives an average of 270 mm of annual precipitation and is characterized by basin big sagebrush (*Artemisia tridentata* Nutt. subsp. *tridentata*) - Wyoming big sagebrush/bluebunch wheatgrass-Thurber needlegrass vegetation. The Nephi Site (Levan Ridge) is located about 5 miles north of Levan, Juab County, Utah, and is administered by Utah State University. Elevation is 1585 m and annual precipitation 380 mm. Native vegetation is basin big sagebrush, mountain big sagebrush (*Artemisia tridentata* Nutt. subsp. *vaseyana* [Rydb.] Beetle), antelope bitterbrush (*Purshia tridentata* [Pursh] DC.), and bluebunch wheatgrass (*Pseudoroegneria spicata* [Pursh] A. Löve).

These field trials involved collections from five western states: Idaho, eastern Oregon, northern Nevada, Utah, and Washington. The field trials were conducted by U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Three of the collections (Crow's Nest, Grasmere, and Three Creek Well Road) from Owyhee County, ID were similar in percent survival, vigor, leaf height, stalk height, and crown diameter with each other, and were typical of the *P. s. ssp. secunda* entries in the trials. The Mountain Home site in Owyhee County (U.S. Air Force Saylor Creek Range) is encompassed by a geographic area including the three Owyhee

County accessions in the trials; Sandberg bluegrass in this area is typical in habit and growth form for collections of *P. s.* subsp. *secunda* from the Snake River Plain and Northern Basin and Range Ecoregions. The Mountain Home site, which lends its name to the germplasm release, was chosen for stock seed harvest as it includes an extensive stand of the species that is protected from livestock grazing.

Disease Problems: No highly detrimental diseases have been observed in Mountain Home Germplasm Sandberg bluegrass plantings. Seed yields can be reduced by late spring frosts due to the early phenology of this source. Majerus (personal communication 2007) recommended that Sandberg bluegrass seed production not be attempted in areas with a high probability of a killing frost after May 15th.

Environmental Considerations and Evaluation: This release is a population of a native species that is widely distributed throughout the western United States. As described by Cronquist et al. (1977), "Sandberg bluegrass is by far the most common bluegrass of our area." It occurs on "relatively dry habitats in sagebrush valley and foothills and into wooded areas at middle elevations," from Alaska to British Columbia and Saskatchewan, and south to California, Nevada, northern Arizona, New Mexico, and Nebraska (Cronquist et al. 1977). This widespread distribution and the complex taxonomy of what has been referred to as the *Poa secunda* complex has resulted in a number of previous releases. 'Sherman' big bluegrass (originally identified as *P. ampla* Merrill) is a Pullman Plant Materials Center release from northern Oregon (USDA SCS 1945). Sherman initiates growth in early spring and has an erect growth form, reaching heights of 95 cm, much taller than typical *P. secunda*. 'Canbar' Canby bluegrass, previously *P. canbyi* Scribn., was released in 1979 for use in the vicinity of the Blue Mountains of eastern Washington and Oregon (Alderson and Sharp 1994) where this variant is most common. 'Service' big bluegrass (*P. ampla*) originated from a source in the Yukon Territory, Canada, released as a cultivar in 1989 (Wright 1989); Service has performed well in Alaska, but has not been seeded in the Intermountain West. High Plains is a selected germplasm release of *P. secunda* from Wyoming (Majerus and Holzworth 2000) recommended for use on adapted sites in Montana and Wyoming. Reliable Sandberg bluegrass was released in 2004 as a selected germplasm (natural tract, pooled) (Waldron et al. 2006). Seed was collected from 28 locations representing seven different ecological sites at the U.S. Army Yakima Training Center near Yakima, Washington. DNA fingerprinting elucidated a high degree of variation within but little divergence between Reliable and Mountain Home, although they were collected nearly 600 km apart (Larson et al. 2001).

Area of Adaptation: Mountain Home germplasm Sandberg bluegrass is adapted to the Snake River drainage and southern Idaho. Mountain Home has been seeded and successfully established in at least 12 BLM fire rehabilitation seedings in this area and in northern Nevada, southeastern Oregon, and northern Utah since 2002. It is recommended for sites that receive at least 200 mm (8 inches) of annual precipitation, and it is adapted to a broad range of sites occupied by big sagebrush. Mountain Home Sandberg bluegrass can be planted on sites supporting mountain big sagebrush, basin big sagebrush or Wyoming big sagebrush. It can also be seeded on low sagebrush (*Artemisia* spp.) sites with rocky, shallow, and well-drained soils, and on salt desert shrub sites dominated by shadscale (*Atriplex confertifolia* [Torrey & Frémont])

S. Wats.), four-wing saltbush (*A. canescens* [Pursh] Nutt.), bud sage (*Artemisia spinescens* D.C. Eat.), spiny hopsage (*Grayia spinosa* [Hook.] Moq.), or mixtures of these species.

Anticipated Use: Mountain Home Germplasm Sandberg bluegrass can be used to restore extensive areas in the Snake River Plain Ecoregion, as well as the Northern Basin and Range Ecoregion, on sites once dominated by big sagebrush/bluebunch wheatgrass communities. It is particularly valuable for seeding semi-arid regions supporting only remnant populations of this species. It has been especially useful in conjunction with other native plants in fire rehabilitation and wildlife habitat seedings to re-establish natural communities in areas presently occupied by exotic annuals.

Increase and Distribution: Mountain Home Sandberg bluegrass seed was initially provided to seed growers for increase in 2002. Approximately 5 kg of Mountain Home germplasm Sandberg bluegrass was hand collected on the U.S. Air Force Saylor Creek Range on 25-26 May 2006, with assistance from Mountain Home Air Force Base personnel and volunteers. Seed was dried and cleaned at the U.S. Department of Agriculture, Forest Service, Lucky Peak Nursery. On 9 June 2010, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station personnel harvested an additional 76 kg of seed on the U.S. Air Force Saylor Creek Range. The Utah Crop Improvement Association will maintain and distribute this and future collections of stock seed for increase fields. Growers may produce certified generations of seed through G4. The USDA Agricultural Research Service, Western Regional Plant Introduction Station at Pullman, Washington will manage long-term storage and distribution of a small amount of the original seed collection for research purposes.

Private seed production fields varying in size from 0.5 to 10 ha have been established in Idaho and Washington. Seed yield ranges from 110 to 450 kg/ha for dryland production and 450 to 670 kg/ha for irrigated production. Mountain Home may have a slower establishment period in the field than some other Sandberg bluegrass sources, particularly if planted late. It has been suggested that Sandberg bluegrass will not produce seed the first (establishment) year (Majerus, personal communication 2007), but at least one grower reported a 170 kg/ha yield the first year, with higher production in subsequent years.

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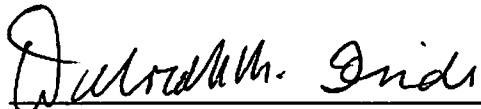
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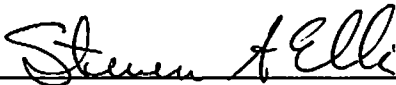
MOUNTAIN HOME GERMPLOSM SANDBERG BLUEGRASS
Poa secunda J. Presl. subsp. *secunda*



GSD Program Manager
USDA Forest Service
Rocky Mountain Research Station
Fort Collins, Colorado

12/12/11

Date



Idaho State Director
USDI Bureau of Land Management
Idaho State Office
Boise, Idaho

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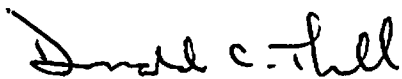
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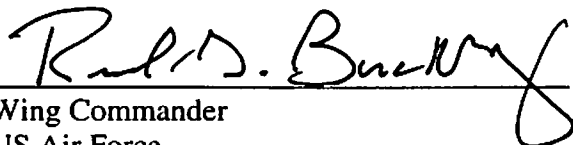
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Station Director
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