

# Theodore Roosevelt National Park

## 2008 Annual Technical Report Prepared by

Natural Resources Conservation Service  
Plant Materials Center  
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### Introduction

The National Park Service (NPS) has a need to preserve the native plant resources and revegetate disturbed park lands. The NPS requires that restoration of native plants will be accomplished using germplasm from populations as closely related genetically and ecologically as possible to the park populations. Quantities of native seed are needed to revegetate areas disturbed by construction activities for the proposed road rehabilitation project. The NPS has requested assistance from the Bismarck Plant Materials Center (PMC). The PMC has agreed to increase seed of six selected grass species collected at Theodore Roosevelt National Park. Technical assistance for planting, growing and cleaning of seed will also be provided to the park. The interagency agreement was signed in May 2007, and continues through FY 2010.

### Targeted Species and Amounts

Species	Common name	PLS pounds
<i>Nassella viridula</i>	green needlegrass	100
<i>Pascopyrum smithii</i>	western wheatgrass	200
<i>Elymus lanceolatus</i>	thickspike wheatgrass	100
<i>Bouteloua curtipendula</i>	sideoats grama	100
<i>Bouteloua gracilis</i>	blue grama	10
<i>Koeleria macrantha</i>	prairie junegrass	5

### Accomplishments

**2007** - Seed was collected throughout the summer and fall by park staff. On July 26, 2007, Theodore Roosevelt National Park staff along with staff from the Natural Resources Conservation Service spent a day collecting seed at the park. During the seed collection process, thickspike wheatgrass (*Elymus lanceolatus*) was substituted for slender wheatgrass, (*Elymus trachycaulus*). Each of the species collected was assigned an accession number by PMC staff for identification and tracking purposes. Seed was cleaned by staff at the Bismarck PMC and samples were tested for purity and germination by the North Dakota State Seed Testing Laboratory located at Fargo, North Dakota. This seed was used to establish seed production fields at the PMC.

The green needlegrass was dormant planted on November 30, 2007. All other species were seeded in the spring of 2008. Following are details related to seed increase for each grass species. See Figure 1 for the field location map.

**Green needlegrass: accession 9092171**

Collected seed: Dirty weight - 4.4 lbs; bulk after cleaning - 2.8 lbs.

Seed cleaning: Debearder and a two-screen office fanning mill. The debearder speed was 160 rpm for 15 minutes. The office mill screen sizes were #9 round on top and a 1/22 bottom screen, with air ½ open.

Seed quality: Purity - 92%; Germination - 2%; Dormancy - 72%.

Seeding date: November 30, 2007. Due to high seed dormancy, seed was planted in late fall.

Site preparation: The field was cultivated and packed. No pre-plant herbicides were used. Field conditions were good with a firm seedbed. Soil moisture was dry at the surface and frozen below the 3-inch depth. Air temperatures were in the teens at the time of seeding.

Seeding: Seeding rate was approximately 50 seeds (bulk)/linear foot. Fourteen rows, approximately 424 feet long were planted on 42-inch row spacing (0.49 acre). A modified Truax grass drill was used for the planting. The seed was planted at a depth of 1/2 inch. The field received approximately 2 to 3 inches of snow cover a day after planting. The planting is located in panel G-4 on the southwest side.

Maintenance:

**2008:** The field was sprayed for weeds using Buctril™ herbicide at a rate of 2.0 pints per acre on June 19. Sterling™ herbicide at the rate of 1 pint per acre was applied to the field on June 27, and July 11, 2008. The field was hand rogued to remove weeds throughout the summer and irrigation water was applied. The field was fertilized on September 22, using 46-0-0 urea at a rate of 90 pounds of actual N per acre. A fall pre-emergent application of Trust™ herbicide was applied on October 9, at a rate of 1.5 pints per acre. The Trust™ herbicide was incorporated the same day using a 2-row tiller.

Plant Performance:

**2008:** Seedlings were slow to emerge. A fair stand was present by mid-summer. Weed pressure was a problem during the summer and herbicide applications were necessary. Seed continued to germinate and the stand improved by late summer.

Harvest: No seed was harvested in 2008.

**Western wheatgrass: accession 9092172**

Collected seed: Dirty weight - 17.68 lbs; bulk after cleaning - 3.25 lbs.

Seed cleaning: Hammermill and a two-screen office fanning mill. The material was hammermilled twice to break the seed from the stem. A ¼-inch screen was used the first run and a 3/16-inch screen was used for the second run. The office mill screen sizes were 1/12 x 1/2 on top and a blank screen on the bottom for the first run. The second run used a 1/14 x 1/4 screen on top and a blank on the bottom. The side plate setting was ¼ open on both runs.

Seed quality: Purity - 92.24%; Germination - 87%; Dormancy - 0%.

Seeding date: May 1, 2008

Site preparation: The seedbed was prepared by cultivating twice with a 6-foot S-tine cultivator and packing twice with a Brillion packer.

Seeding: A seeding rate of 40 PLS per linear foot was used for planting the field. Eight rows, approximately 894 feet long, were planted using a modified Truax grass drill with 42-inch row spacing (.57 acre). The seed was planted at a depth of ½ inch. The field is located in panel G-4 of the PMC.

Maintenance:

**2008:** The field was sprayed for weeds using Buctril™ herbicide at a rate of 1.5 pints per acre on June 10. Sterling™ herbicide at the rate of 1 pint per acre was applied to the field on June 27, and again on July 11. The field was hand rogued to remove weeds throughout the summer and irrigation water was applied. The field was fertilized on September 22, using 46-0-0 urea at a rate of 90 pounds of actual N per acre. A fall pre-emergent application of Trust™ herbicide was applied on October 9, at a rate of 1.5 pints per acre. The field was lightly tilled the same day using a 2-row tiller to incorporate the Trust™ herbicide

Plant performance: The seedlings emerged very well and a good stand was established by mid summer.

Harvest: No seed was harvested in 2008.

**Thickspike wheatgrass: accession 9092175**

Collected seed: Dirty weight - 3.59 lbs; bulk after cleaning - 854 grams.

Seed cleaning: Hammermill and two-screen office fanning mill. The seed was initially hammermilled twice to separate seed from the stems. A ¼-inch screen size and a slow speed were used. The material was fed at full rate. The seed was then run twice through an office mill. The first run used a number 12 screen size for the top screen and a blank screen was used on the bottom. A number 10 screen size was used as the top screen with a blank screen being used on the bottom for the second run. The side plate setting on the office mill was ¼ open for both runs.

Seed quality: Purity – 98.19%; Germination - 89%; Dormancy - 0%.

Seeding date: May 1, 2008

Site preparation: The seedbed was prepared by working twice with a 6-foot S-tine cultivator and packing twice with a Brillion packer.

Seeding: Seed was planted at a rate of 33 PLS per linear foot and a depth of ½ inc. Fourteen rows, approximately 443 feet long, were planted using a modified Truax grass drill with 42-inch row spacing (.50 acre). The field is located in panel G-4 of the PMC.

Maintenance:

**2008:** The field was sprayed for weeds using Buctril™ herbicide at a rate of 1.5 pints per acre on June 10. Sterling™ herbicide at the rate of 1 pint per acre was applied to the field on June 27, and again on July 11. The field was hand rogued to remove weeds throughout the summer and irrigation water was applied. The field was fertilized on September 22, using 46-0-0 urea at a rate of 90 pounds of actual N per acre. A fall pre-emergent application of Trust™ herbicide was applied on October 9, at a rate of 1.5 pints per acre. The Trust™ herbicide was incorporated the same day using a 2-row tiller.

Plant performance: The seedlings emerged very well and a good stand was established by mid summer.

Harvest: No seed was harvested in 2008.

**Blue grama: accession 9092173**

Collected seed: Dirty weight - 1.4 lbs; bulk after cleaning - 188.1 grams

Seed cleaning: Debearder and two-screen office fanning mill. The seed was processed through a debearder for 10 minutes before being run through a small office mill. The top screen was a number 10 and the bottom screen was a blank. The seed was then hand screened to remove the larger sticks. A sample was sent to the seed testing lab for germination and purity results.

Seed quality: Purity – 35.72%; Germination - 78%; Dormancy - 1%.

Seeding date: June 10, 2008

Site preparation: The seedbed was prepared by working twice with a 6-foot S-tine cultivator and packing twice with a Brillion packer.

Seeding: Seed was planted at a rate of 40 PLS per linear foot and a depth of ½ inch. Due to the limited seed amount of blue grama, a plot drill was used to plant a 6-foot x 158-foot bed (0.02 acres) in panel G-4 of the PMC. The seed was planted at a depth of ½ inch.

Maintenance:

**2008:** Sterling™ herbicide at the rate of 1 pint per acre was applied to the field on June 27. The field was hand rogued to remove weeds throughout the summer and irrigation water was applied. The field was not fertilized in 2008.

Plant performance: The seedlings were slow to establish and a fair stand was observed by the end of the summer.

Harvest: A few plants produced mature seed and were hand stripped by PMC staff. Three pounds of dirty seed were harvested amounting to 1.5 pounds after cleaning.

#### **Sideoats grama: accession 9092174**

Collected seed: Dirty weight - 3.6 lbs; bulk after cleaning - 2.8 lbs

Seed cleaning: Two-screen office fanning mill. The top screen was a number 20 screen size and the bottom screen was a blank. The side plate air setting ¼ open. A sample of the seed was tested for purity and germination.

Seed quality: Purity – 61.62%; Germination - 5%; Dormancy - 24%.

Seeding date: June 10, 2008

Site preparation: The seedbed was prepared by working twice with a 6-foot S-tine cultivator and packing twice with a Brillion packer.

Seeding: Seed was planted at a rate of 30 PLS per linear foot and a depth of ½ inch. Due to the limited seed amount of sideoats grama, a plot drill was used to plant a 6-foot x 189-foot bed (0.03 acres) in panel G-4 of the PMC.

Maintenance:

**2008:** Sterling™ herbicide was applied on June 27, at the rate of 1 pint per acre. The field was hand rogued to remove weeds throughout the summer and irrigation water was applied. The field was not fertilized in 2008.

Plant performance: The seedlings were slow to establish and a fair stand was observed by the end of the summer. A few of the plants produced seed by the end of the growing season.

Harvest: Seed was hand stripped from the plants and produced 4.5 pounds of dirty seed. The seed has been cleaned and 3 pounds of clean seed resulted.

#### **Prairie junegrass: accession 9092176**

Collected seed: Dirty weight - 0.98 lbs; bulk after cleaning - 56.6 grams.

Seed cleaning: Hammermill and two screen office fanning mill. The materials was hammermilled twice using a 3/32 screen size for both runs and a slow speed at full rate of feed. The seed was run through a two-screen office mill twice using a 1/12 top screen and a blank bottom screen for both runs. The air speed (rpm) was slow and the side plate setting was closed.

Seed quality: No seed tests were done due to the limited amount of seed.

Seeding date: Seedlings were transplanted into the field on May 22, 2008.

Site preparation: The bed was prepared by working twice with a 6-foot S-tine cultivator and packing twice with a Brillion packer. A specialized tool bar with two chisel shovels spaced 42 inches apart was used to make 2 rows for transplanting.

Seeding: Seed was very limited so seed was started in flats in the greenhouse on February 14. Plantlets were transplanted from the flats into containers when they were approximately ½ inch tall. The plants were allowed to grow in the greenhouse until May 12, when they were moved to the lathhouse to harden off for transplanting into the field. Approximately 700 plants were transplanted into two 348-foot long rows in panel G-4 of the PMC.

Maintenance:

**2008:** Sterling™ herbicide was applied on June 27 at the rate of 1 pint per acre. The field was hand rogued to remove weeds throughout the summer. Irrigation water was applied on May 23, the day after planting, to water in the transplants and increase the survival. Irrigation water continued to be applied during the growing season. No fertilizer was applied in 2008.

Plant performance: Survival of the junegrass plants was excellent.

Harvest: No seed was harvested in 2008.

**Figure 1**

Theodore Roosevelt National Park Plantings  
located in Panel G-4

