

CRATERS OF THE MOON NATIONAL MONUMENT
 2004 Annual Report
 Prepared by
 NATURAL RESOURCES CONSERVATION SERVICE
 ABERDEEN, IDAHO PLANT MATERIALS CENTER

INTRODUCTION

In 2004, the Aberdeen Plant Materials Center (PMC) entered into an agreement with Craters of the Moon National Monument and Preserve (CRMO) to produce transplants and/or cleaned seed of thirteen native plant species for use in revegetation of disturbed areas following road construction. The National Park Service requires that restoration of native plants be accomplished using germplasm from populations as closely related genetically and ecologically as possible to park populations. Many of the proposed species are poorly understood or require special attention for adequate germination and survival. The PMC was chosen for its personnel, expertise and equipment to assist in seed collection, cleaning collected seed, development of establishment protocols and production of greenhouse propagated materials for transplanting at CRMO.

Two sites will be revegetated at CRMO and Table 1 lists the seed mixtures that will be broadcast planted. The “Soil Base” site is approximately 28,380 sq. feet (0.65 acres) and is to be reseeded with a grass mix consisting of equal parts of Thurber’s needlegrass (*Achnatherum thurberianum*), Indian ricegrass (*Achnatherum hymenoides*) and Sandberg bluegrass (*Poa secunda*). The “Cinder Garden” site is approximately 18,780 sq. feet (0.43 acres) and will be seeded with a forb mix consisting of 30 % dwarf buckwheat (*Eriogonum ovalifolium* var. *depressum*), 30 % dusty maiden (*Chaenactis douglasii*), 30 % scorpion weed (*Phacelia hastata*) and 10 % dwarf monkey flower (*Mimulus nanus*). Greenhouse propagated materials will be transplanted into both sites as deemed suitable by the CRMO ecologist.

Table 1. Seed mixes

| Site | Species | % mix | Full rate lb/ac (PLS) | Mix rate/0.66 ac. (PLS) | Broadcast rate (2x) PLS |
|--|-----------------------|-------|-----------------------|-------------------------|-------------------------|
| Soil Base Site (28,380 ft ²) | Thurber’s needlegrass | 33 | 6 | 1.3 | 2.6 |
| | Indian ricegrass | 33 | 6 | 1.3 | 2.6 |
| | Sandberg bluegrass | 33 | 2 | 0.4 | 0.8 |
| Cinder Garden Site (18,780 ft ²) | Dusty maiden | 30 | 3.18 | 0.42 | 0.84 |
| | Dwarf buckwheat | 30 | 0.38 | 0.05 | 0.10 |
| | Scorpion weed | 30 | 2.42 | 0.32 | 0.64 |
| | Dwarf monkey flower | 10 | 0.11 | 0.01 | 0.02 |

ACCOMPLISHMENTS

Based on the area to be revegetated and number of transplants desired of each species, the PMC estimated amounts of seed required (see Table 2). The PMC then advised CRMO personnel in seed collecting time periods, techniques and storage. During the summer of 2004, CRMO staff hand collected seed for each species at numerous sites throughout the monument with technical assistance from PMC personnel. Seed collections were dried and bagged at CRMO and delivered to the PMC in early fall.

CRMO technicians also made opportunistic collections of the following species: Nelson's needlegrass (*Achnatherum nelsonii*), cushion buckwheat (*Eriogonum ovalifolium* var. *ovalifolium*), western needlegrass (*Achnatherum occidentale*) and fern bush (*Chamaebatiaria millefolium*). Table 3 provides a summary of collections made during 2004 with cleanout information. Table 4 shows the duration of seed harvest for each species collected and Table 5 shows actual collecting dates and provides hourly totals for time spent making collections.

In December 2004 and January 2005, PMC technicians cleaned the seed using the small-lot-seed-cleaning equipment at Aberdeen. No viability, purity or germination tests have been completed to date. Table 2 shows the amounts of clean seed for each accession collected.

A portion of the seed was to be planted in 40 cubic inch containers at the PMC greenhouse during the winter of 2005; however, because of delays in road construction transplant propagation will be postponed until the winter of 2005-2006.

Additional seed collections of dwarf buckwheat, Thurber's needlegrass, Indian ricegrass, and scorpionweed will need to be made in 2005 along with sagebrush seed to meet the amounts required for the revegetation projects.

Table 2. CRMO Seed Requirements

| Species | Accession # | Transplants | Broadcast Seed (lb PLS) | Total Required Cleaned Seed | Actual Cleaned Seed (lb) |
|-------------------------|---------------------|--------------------|--------------------------------|------------------------------------|---------------------------------|
| Antelope bitterbrush | 9076477 | 600 | n/a | 0.31 | 0.82 |
| Rabbitbrush | 9076478 | 300 | n/a | 0.03 | 0.22 |
| Sagebrush | -- | 200 | n/a | 0.04 | Not collected |
| Limber Pine | 9076480 | 75 | n/a | 0.68 | 1.58 |
| Sulphurflower buckwheat | 9076479/ 9076514 | 200 | n/a | 0.02 | 0.54/ 0.46 |
| Hotrock penstemon | 9076481 | 25 | n/a | 0.003 | 0.34 |
| Dwarf buckwheat | 9076482 | 150 | 0.2 | 0.21 | 0.12 |
| Thurber's needlegrass | 9076483 | 200 | 3.7 | 3.8 | 0.5 |
| Indian ricegrass | 9076484 | 200 | 3.7 | 3.8 | 1.4 |
| Sandberg bluegrass | 9076485 | 200 | 1.1 | 1.2 | 4.68 |
| Dusty maiden | 9076486 | n/a | 1.68 | 1.68 | 1.84 |
| Scorpion weed | 9076487 | n/a | 1.28 | 1.28 | 0.7 |
| Dwarf monkey flower | 9076488 | n/a | 0.04 | 0.04 | 0.11 |

Table 3. Collection data

| Common Name | Species | Min. req. seed (lb) | Est. % cleanout | Est. min dry material (lb) | Collected fresh material (lb) | Collected dry material (lb) | % dry matter | Actual clean seed (lb) | Actual % cleanout (seed/dry) |
|-------------------------|--|---------------------|-----------------|----------------------------|-------------------------------|-----------------------------|--------------|------------------------|------------------------------|
| Antelope bitterbrush | <i>Purshia tridentata</i> | 0.31 | 55 | 0.6 | 8.93 | 5.1 | 57 | 0.82 | 84 |
| Rabbitbrush | <i>Ericameria nauseosa</i> | 0.03 | 95 | 0.6 | 3.44 | 2.2 | 64 | 0.22 | 90 |
| Sagebrush | <i>Artemisia tridentata</i> var. <i>vasseyana</i> | 0.04 | 95 | 0.88 | 0 | 0 | 0 | 0 | 0 |
| Limber Pine | <i>Pinus flexilis</i> | 0.68 | -- | 2.7 | 23.12 | 13.2 | 57 | 1.58 | 88 |
| Sulphurflower buckwheat | <i>Eriogonum umbellatum</i> | 0.02 | 95 | 0.5 | 5.4 | 3.4 | 63 | 1.00 | 71 |
| Hotrock penstemon | <i>Penstemon deustus</i> var. <i>deustus</i> | 0.003 | 95 | 0.06 | 3.1 | 2.1 | 68 | 0.34 | 84 |
| Dwarf buckwheat | <i>Eriogonum ovalifolium</i> var. <i>depressum</i> | 0.21 | 95 | 4.14 | 1.73 | 0.51 | 29 | 0.12 | 76 |
| Thurber's needlegrass | <i>Achnatherum thurberianum</i> | 3.8 | 85 | 25.04 | 1.95 | 1.68 | 86 | 0.50 | 70 |
| Indian ricegrass | <i>Achnatherum hymenoides</i> | 3.8 | 85 | 25.04 | 29.85 | 25.1 | 84 | 1.40 | 94 |
| Sandberg bluegrass | <i>Poa secunda</i> | 1.2 | 85 | 8.03 | 8.9 | 8.0 | 90 | 4.68 | 42 |
| Dusty maiden | <i>Chaenactis douglasii</i> | 1.68 | 95 | 33.6 | 20.9 | 9.1 | 44 | 1.84 | 80 |
| Scorpion weed | <i>Phacelia hastata</i> | 1.28 | 95 | 25.6 | 25.2 | 12.1 | 48 | 0.70 | 94 |
| Dwarf monkey flower | <i>Mimulus nanus</i> | 0.04 | 95 | 0.8 | 4.93 | 1.60 | 32 | 0.11 | 93 |
| Nelson's needlegrass | <i>Achnatherum nelsonii</i> | n/a | n/a | n/a | 16.86 | 11.63 | 69 | 0.96 | 92 |
| Cushion buckwheat | <i>Eriogonum ovalifolium</i> var. <i>ovalifolium</i> | n/a | n/a | n/a | 4.91 | 3.27 | 67 | 0.36 | 89 |
| Western needlegrass | <i>Achnatherum occidentale</i> | n/a | n/a | n/a | 4.21 | 2.92 | 69 | 0.26 | 91 |
| Fern bush | <i>Chamaebatiaria millefolium</i> | n/a | n/a | n/a | 2.85 | 2.23 | 78 | 0.88 | 61 |

Table 5. Seed collection dates

| Species | First collection | Last collection | Hours collecting | Total seed collected (lb) | Lb seed/hr |
|-------------------------|-------------------------|------------------------|-------------------------|----------------------------------|-------------------|
| Antelope bitterbrush | 7/15/04 | 7/26/04 | 11.6 | 0.82 | 0.07 |
| Rabbitbrush | 8/10/04 | 8/30/04 | 1.92 | 0.22 | 0.11 |
| Sagebrush | | | | 0 | |
| Limber Pine | 8/19/04 | 8/24/04 | 3.17 | 1.58 | 0.50 |
| Sulphurflower buckwheat | 7/21/04 | 8/2/04 | 12.92 | 1.00 | 0.08 |
| Hotrock penstemon | 7/21/04 | 7/21/04 | 6.00 | 0.34 | 0.06 |
| Dwarf buckwheat | 6/16/04 | 7/13/04 | 8.17 | 0.12 | 0.01 |
| Thurber's needlegrass | 7/1/04 | 7/28/04 | 17.0 | 0.50 | 0.03 |
| Indian ricegrass | 7/7/04 | 8/13/04 | 57.5 | 1.40 | 0.02 |
| Sandberg bluegrass | 6/15/04 | 7/1/04 | 29.6 | 4.68 | 0.16 |
| Dusty maiden | 6/30/04 | 7/20/04 | 27.7 | 1.84 | 0.07 |
| Scorpion weed | 6/22/04 | 8/11/04 | 16.8 | 0.70 | 0.04 |
| Dwarf monkey flower | 6/16/04 | 7/28/04 | 9.5 | 0.11 | 0.01 |
| Nelson's needlegrass | 7/16/04 | 7/23/04 | 19.7 | 0.96 | 0.05 |
| Cushion buckwheat | 7/23/04 | 8/4/04 | 7.4 | 0.36 | 0.05 |
| Western needlegrass | 7/19/04 | 7/28/04 | 6.0 | 0.26 | 0.04 |
| Fern bush | 8/11/04 | 8/18/04 | 2.0 | 0.88 | 0.4 |