

**National Park Service
Plant Materials
Year 2006 Annual Report**

Prepared by

**USDA Natural Resources Conservation Service
Los Lunas Plant Materials Center
Los Lunas, New Mexico
March 2007**

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Chapter 1

Grand Canyon National Park

I. Background

In July 1990, an agreement among the US Department of Interior (DOI), the National Park Service (NPS), the Grand Canyon National Park (GCNP), and the USDA-NRCS Los Lunas Plant Materials Center (LLPMC) was made for the collection, propagation, and increase of native grasses, forbs, shrubs, and trees.

The agreement states that the LLPMC will produce the plant materials for the GCNP for the purpose of revegetating disturbed areas and native landscaping projects in the park. The agreement includes both the north and south rim areas of the park. Amendment No. 1 of 1999 and Amendment No. 2 of 2001 states that the LLPMC will produce seed of two native species (blue grama and muttongrass), and will grow transplants started from native tree and shrub seed collected at the park. In 2006, the LLPMC agreed to add bottlebrush squirreltail to the list of grass species that are to grown for seed production.

II. Accessions Involved

Table 1-1 lists the accessions involved in the GCNP project.

Table 1-1: Accessions Involved

Common Name	Scientific Name	Plant Symbol	Accession Number	Vegetation Association
Apache plume	<i>Fallugia paradoxa</i>	FAPA	9062865	122.3233
Big sagebrush	<i>Artemisia tridentata</i>	ARTR	9066056	122.3233
Blue grama	<i>Bouteloua gracilis</i>	BOGR	9062875	122.4149
Bottlebrush squirreltail	<i>Elymus elymoides</i>	ELEL	9066659	122.3233
Century plant	<i>Agave utahensis</i>	AGUT	9062874	122.4149
Cliffrose	<i>Purshia mexicana</i>	COME	9062876	122.4149
Curl-leaf mountain mahogany	<i>Cercocarpus ledifolius</i>	CELE	9062867	122.3233
Currant	<i>Ribes spp.</i>	RI SPP.	9066057	122.3233
Datil yucca	<i>Yucca baccata</i>	YUBA	9066058	122.3233
Desert barberry	<i>Berberis fremonti</i>	BEFE	9066059	122.3233
Elderberry	<i>Sambucus spp.</i>	SA SPP.	9066047	122.3233
Fernbush	<i>Chamaebatiaria millifolium</i>	CHMI	9062866	122.3233
Fourwing saltbush	<i>Atriplex canescens</i>	ATCA	9062873	122.4149
Gambels oak	<i>Quercus gambelii</i>	QUGA	9062872	122.3233
Indian ricegrass	<i>Oryzopsis hymenoides</i>	ORHY	9062857	122.3233
Lupine	<i>Lupinus spp.</i>	LU SPP.	9062863	122.3233
Muttongrass	<i>Poa fendleriana</i>	POFE	9062861	122.3233
Needle and thread	<i>Stipa comata</i>	STCO	9062859	122.3233
Penstemon (blue)	<i>Penstemon spp.</i>	PE SPP.	9062862	122.3233
Penstemon (red)	<i>Penstemon spp.</i>	PE SPP.	9066054	122.3233
Pinon pine	<i>Pinus edulis</i>	PIED	9066467	122.3233
Ponderosa pine	<i>Pinus ponderosa</i>	PIPO	9066466	122.3233
Rabbitbrush	<i>Chrysothamnus nauseosus</i>	CHNA	9062877	122.4149
Squirreltail	<i>Sitanion hystrix</i>	SIHY	9062858	122.3233
Utah juniper	<i>Juniperus osteosperma</i>	JUOS	9066055	122.3233
Utah serviceberry	<i>Amelanchier utahensis</i>	AMUT	9062869	122.3233
Western wheatgrass	<i>Agropyron smithii</i>	AGSM	9062860	122.3233
Wolfberry	<i>Lycium spp.</i>	LY SPP.	9062870	122.3233

III. Collection Information

In 2006, seed of bottlebrush squirreltail was collected at GCNP and sent to the LLPMC.

IV. Seed Condition Information

The bottlebrush squirreltail seed received by the LLPMC was in good condition and will be used to grow transplants to establish a seed production field. See previous Grand Canyon Park reports for information on seed received by the LLPMC.

V. Seed Production Establishment

See Table 1-2 for the seed production fields established for the GCNP at the LLPMC.

Table 1-2: 2006 Established Production Fields

Common Name	Scientific Name	Agreement Acreage	2006 LLPMC Acreage
Blue Grama	<i>Bouteloua gracilis</i>	0.50	0.54
Muttongrass	<i>Poa fendleriana</i>	1.00	2.40
Bottlebrush squirreltail	<i>Elymus elymoides</i>	0.50	0.48

VI. Seed Production

A. Field Management

9062875 Blue grama	Field 20N – 0.5 Acre	Date
Fertilization		
75 lbs. Nitrogen		1/5, 5/23, 6/19
80 lbs. Phosphorous		1/5, 6/20
Irrigation		
3" water application		3/15, 4/24, 5/24, 6/7, 7/12, 8/17, 9/7, 11/21
Insecticide		
Orthene @ 1.33 pounds per acre		8/16, 9/5
Cultural Weed Control		
Hand Hoeing		As needed
Harvest		
Combine		9/6
9062875 Blue grama	Field 28S –0.5 Acre	Date
Transplant		
		8/31
Fertilization		
40 lbs. Nitrogen		10/31
Irrigation		
3" water application		8/31, 9/5, 9/11, 9/19, 11/1, 11/20
Cultural Weed Control		
Hand Hoeing		As needed
Cultivate		11/16

9062861 Muttongrass	Field 20N – 0.5 Acre	Date
Transplant		4/20
Fertilization		
70 lbs. Nitrogen		5/23, 10/31
Irrigation		
3” water application		4/20, 4/24, 4/27, 5/1, 5/10, 5/18, 5/24, 5/30, 6/2, 6/6, 6/19, 7/12, 7/24, 8/8, 8/10, 8/17, 8/31, 9/12, 9/26, 10/19, 11/21
Cultural Weed Control		
Hand Hoeing		As needed
Mechanical Cultivation		6/26

9062861 Muttongrass	Field 25S – 0.9 Acre	Date
Fertilization		
155 lbs. Nitrogen		2/10, 3/14, 6/19, 8/10, 10/31
80 lbs. Phosphorous		2/10, 6/20
Irrigation		
3” water application		1/6, 2/7, 3/17, 4/7, 4/24, 5/18, 6/6, 6/22, 7/13, 8/11, 9/1, 9/19, 10/5, 10/19, 11/1, 11/21
Herbicide Application		
2,4-D		3/15, 7/7
Cultural Weed Control		
Hand Hoeing		As needed
Mechanical cultivation		5/16, 7/5, 8/17
Harvest		
Combine		

9062861 Muttongrass	Field 28S – 1.0 Acre	Date
Transplant		9/6, 9/26
Fertilization		
40 lbs. Nitrogen		10/31
Irrigation		
3” water application		9/6, 9/11, 9/19, 9/26, 10/2, 10/19, 10/31, 11/20
Cultural Weed Control		
Hand Hoeing		As needed
Mechanical cultivation		11/16

B. Seed Produced

Table 1-3 describes the seed production for the year 2006.

Table 1-3: 2006 Seed Production

Common Name	Scientific Name	Pounds Cleaned
Blue grama	<i>Bouteloua gracilis</i>	35.46
Muttongrass	<i>Poa fendleriana</i>	No harvest

C. Climatological Data

See Appendix A for the climatological data for 2006 at the Los Lunas Plant Materials Center.

VII. Transplant Production

No transplants were delivered to GCNP in 2006.

VIII. Specialized Treatments

See previous Grand Canyon National Park reports for information on specialized treatments.

IX. Observations

The blue grama and muttongrass fields showed vigorous growth during the 2006 growing season. The production of a good, viable seed crop from these fields continues to be the goal of the LLPMC. The use of increased irrigation applications along with higher rates of fertilizer has led to improved amounts of both forage and seed production of both species since installing the plantings. Increasing the irrigation applications on the muttongrass has allowed the plants to produce abundant forage and has kept the plants from being damaged during the warmest time of the season.

The blue grama field will continue to have insecticide applications to control insects that can lower seed yields. In 2006 the blue grama field also received increased irrigation and high levels of nutrients to promote good seed production. The blue grama field responded to the higher levels of water and nutrients producing the highest amount of seed ever for this planting.

The muttongrass seed fields also produced a good amount of forage and seed for 2006, but just prior to harvest the LLPMC experienced several days of high winds that caused the majority of the seed to be lost. The seed was shattered by the high winds and no harvest was completed on any of the muttongrass fields.



Figure 1-1 Field 25S – Grand Canyon Muttongrass Seed Production Field



Figure 1-2: Field 20N – Grand Canyon Blue Grama Production Field

Chapter 2 Pipe Spring National Monument

I. Background

On September 12, 2002, an agreement among the US Department of Interior (DOI), the National Park Service (NPS), the Pipe Spring National Monument (PSNM), and the USDA-NRCS Los Lunas Plant Materials Center (LLPMC) was made for propagating and harvesting native seed collected from the PSNM for the purpose of revegetation projects.

II. Accessions Involved

Table 2-1 lists the accessions involved in the PSNM agreement.

Table 2-1: Accessions Involved

Common Name	Scientific Name	Plant Symbol	Accession Number
Blue Grama	<i>Bouteloua gracilis</i>	BOGR	9066558
Bottlebrush squirreltail	<i>Elymus elymoides</i>	ELEL	9066587
Galleta	<i>Pleuraphis jamesii</i>	PLJA	9066559
Indian ricegrass	<i>Achnatherum hymenoides</i>	ACHY	9066587

III. Collection Information

See previous PSNM reports for collection information.

IV. Seed Condition Information

See the previous PSNM for seed condition information collected from the PSNM.

V. Seed Production Establishment

- Blue grama—No blue grama seed was available in 2006 to establish a seed production field.
- Indian ricegrass— The indian ricegrass that was direct seeded into Field 13 on December 21, 2005 was not successful. No new seeding has been scheduled for 2007.
- Galleta—Seed harvested from the LLPMC production field in 2005 was used to start transplants in 2006. The transplants were planted into Field 16 at the LLPMC on 5/25/2006.

See Table 2-2 for the established production fields for the PSNM at the LLPMC.

Table 2-2: 2006 Established Production Fields

Common name	Scientific name	Agreement Acreage	2006 LLPMC Acreage
Galleta	<i>Pleuraphis jamesii</i>	0.50	0.58
Indian ricegrass	<i>Achnatherum hymenoides</i>	0.50	0.42
Bottlebrush squirreltail	<i>Elymus elymoides</i>	0.50	0.22

VI. Seed Production

A. Field Management

9066559 Galleta	Field 26S – 0.10 Acre	Date
Fertilization		
35 lbs. Nitrogen		1/27, 8/10
40 lbs. Phosphorous		1/27
Irrigation		
3” water application		2/7, 4/7, 4/24, 5/16, 6/9, 6/21, 7/13, 9/7, 10/26
Cultural Weed Control		
Hand Hoeing		As needed
Mechanical cultivation		6/6, 7/5
Harvest		
Flail-vac		10/3, 11/1
9066559 Galleta	Field 16 – 0.50 Acre	Date
Transplant		
		5/25
Fertilization		
30 lbs. Nitrogen		8/10
Irrigation		
3” water application		5/25, 5/30, 6/2, 6/6, 6/16, 7/13, 7/24, 9/11, 10/5
Cultural Weed Control		
Hand Hoeing		As needed
Mechanical cultivation		6/15, 8/25
9066587 Indian ricegrass	Field 8 – 0.25 Acre	Date
Fertilization		
70 lbs. Nitrogen		1/10, 3/14, 8/10
40 lbs. Phosphorous		1/10
Irrigation		
3” water application		1/12, 3/17, 4/11, 5/1, 5/19, 6/13, 7/14, 9/13, 10/30
Cultural Weed Control		
Hand Hoeing		As needed
Mechanical cultivation		6/6, 8/9
9066590 Bottlebrush squirreltail	Field 23N – 0.22 Acre	Date
Fertilization		
135 lbs. Nitrogen		1/27, 4/21, 5/23, 8/10, 10/31
40 lbs. Phosphorous		1/27
Irrigation		
3” water application		¼, 2/14, 3/14, 4/7, 4/24, 5/10, 5/9, 6/23, 7/14, 8/10, 9/1, 9/9, 10/5, 10/19, 11/2, 11/21
Herbicide application		
2,4-D		3/3, 7/7

Cultural Weed Control

Hand hoeing

As needed

Mechanical cultivation

3/14, 5/16, 7/5, 8/30

B. Seed Produced

Table 2-3 describes the seed production for the year 2006.

Table 2-3: Seed Production in 2006

Common name	Scientific name	Pounds Cleaned
Galleta	<i>Pleuraphis jamesii</i>	3.08
Indian ricegrass	<i>Acnatherum hymenoides</i>	40.96
Bottlebrush	<i>Elymus elymoides</i>	None

C. Climatological Data

See Appendix A for the climatological data for 2006 at the Los Lunas Plant Materials Center.

VII. Transplant Production

Transplant production is not part of this agreement.

VIII. Specialized Treatments

See the previous Pipe Spring National Monument report for information on specialized treatments.

IX. Observations

On May 5, 2006 a ½-acre field of PSNM galleta was transplanted into Field 16 at the LLPMC. The transplants were grown using seed produced from the small seed production block in Field 26S in 2005. A small quantity of seed was produced in 2006 from the galleta, and it will be harvested in 2007. The PSNM bottlebrush squirreltail field produced only a very small amount of seed in 2006. Seed will be harvested from the squirreltail in 2007. The PSNM indian ricegrass field did produce a good crop of seed in 2006, and it should produce as much or more seed in 2007.



Figure 2-1: Field 8 – Pipe Springs Indian Ricegrass Production Field



Figure 2-2: Field 26S – Pipe Springs Galleta Production Field



Figure 2-3: Pipe Spring Field 16 – Galleta Production Field



Figure 2-4: Pipe Springs Field 23N – Bottlebrush Squirreltail Production Field

Chapter 3 Zion National Park

I. Background

On September 12, 2002, an agreement among the US Department of Interior (DOI), the National Park Service (NPS), Zion National Park (ZNP), and the USDA-NRCS Los Lunas Plant Materials Center (LLPMC) was made for the collection of native seed from the ZNP, the propagation of those seeds at the LLPMC, and the increase of native grass species.

The agreement states that ZNP will use the plant materials produced by the LLPMC to revegetate disturbed areas at the park. The seed will be collected by the park staff and sent to the LLPMC for conditioning. The seed then will be used to establish production fields to satisfy the agreement.

II. Accessions Involved

Table 3-1 lists the accessions involved in the ZNP project.

Table 3-1: Accessions Involved

Common Name	Scientific Name	Plant Symbol	Accession Number
Blue grama	<i>Bouteloua gracilis</i>	BOGR	9066530
Bottlebrush squirreltail	<i>Elymus elymoides</i>	ELEL5	9066532
Cane bluestem	<i>Bothriochloa barbinodis</i>	BOBA	9066543
Galleta	<i>Pleuraphis jamesii</i>	PLJA	9066586
Indian ricegrass	<i>Acnatherum hymenoides</i>	ACHY	9066528
Muttongrass	<i>Poa fendleriana</i>	POFE	9066531
Sand bluestem	<i>Andropogon hallii</i>	ANHA	9066529

III. Collection Information

See previous ZNP reports for collection information prior to 2006.

IV. Seed Condition Information

See previous Zion National Park reports for the seed condition information prior to 2006.

V. Seed Production Establishment

The LLPMC established the following seed production fields:

- Bottlebrush squirreltail– On May 9, 2006, ZNP bottlebrush squirreltail seedling transplants that were started and grown at the LLPMC were planted in Field 19, increasing the production field size from 0.58 to 0.59 acres.
- Galleta– On June 16, 2006, ZNP galleta seedling transplants that were started and grown at the LLPMC were planted in Field 24S, increasing the production field size from 0.35 to 0.60 acres.

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See Table 3-2 for the seed production fields established for ZNP at the LLPMC.

Table 3-2: 2006 Established Production Fields

Common name	Scientific name	Agreement Acreage	2006 LLPMC Acreage
Sand bluestem	<i>Andropogon hallii</i>	0.50	0.50
Cane bluestem	<i>Bothriochloa barbinodis</i>	0.50	0.50
Bottlebrush squirreltail	<i>Elymus elymoides</i>	0.50	0.59
Galleta	<i>Pleuraphis jamesii</i>	0.33	0.55
Muttongrass	<i>Poa fendleriana</i>	0.50	0.50
Indian ricegrass	<i>Acnatherum hymenoides</i>	0.50	0.42

VI. Seed Production

A. Field Management

9066543 Cane Bluestem	Field 21S – 1.1 Acre	Date
Fertilization		
115 lbs Nitrogen		1/5, 6/19, 8/10, 11/21
80 lbs. Phosphorous		1/5, 6/20
Irrigation		
3” water application		4/25, 5/18, 6/2, 6/21, 7/10, 8/25, 9/11
Cultural Weed Control		
Hand Hoeing		As needed
Mechanical Cultivation		5/15, 9/15
Harvest		
Flail-Vac		7/21, 10/25
9066529 Sand Bluestem	Field 25S, 27N – 0.50 Acre	Date
Fertilization		
120 lbs. Nitrogen		1/23, 6/28, 11/21
110 lbs. Phosphorus		1/23, 6/26
Irrigation		
3” water application		1/4, 2/3, 3/14, 4/4, 4/19, 4/27, 5/1, 5/9, 5/23, 6/2, 6/9, 6/15, 6/29, 7/13, 8/10, 9/5, 9/21, 10/19, 11/27
Cultural Weed Control		
Hand Hoeing		As needed
Mechanical Cultivation		4/24, 5/23
Harvest		
Flail-Vac		9/14
9066532 Bottlebrush Squirreltail	Field 19 – 0.59 Acre	Date
Transplanted 0.1 acre		5/9
Fertilization		
120 lbs. Nitrogen		2/27, 4/27, 6/29, 10/24
40 lbs. Phosphorous		2/27
Irrigation		
3” water application		1/6, 2/28, 3/20, 4/12, 4/28, 5/9, 5/12,

9066532 Bottlebrush Squirreltail	Field 19 – 0.59 Acre	Date
		5/24, 6/16, 7/20, 9/25, 11/20
Herbicide Application 2,4-D		4/12, 6/30, 9/1
Cultural Weed Control Hand Hoeing Mechanical Cultivation		As needed 2/28, 4/27, 7/5, 8/18
Harvest Flail-vac		6/1, 6/9

9066528 Galleta	Field 35N – 0.10 Acre	Date
Fertilization 35 lbs. Nitrogen 40 lbs. Phosphorus		1/11, 4/21/6, 4/21, 8/10 1/11
Irrigation 3" water application		2/17, 4/7, 4/24, 5/18, 6/9, 6/30, 7/25, 8/17, 9/5, 10/19
Herbicide Application Cultural Weed Control Hand Hoeing Mechanical Cultivation		As needed 5/10, 6/6, 7/5, 8/17
Harvest Flail-vac harvester		6/1, 10/4

9066586 Galleta	Field 24S – 0.50 Acre	Date
Transplanted		6/15
Fertilization 65 lbs Nitrogen 40 lbs. Phosphorous		1/6, 4/21, 8/10 1/6
Irrigation 3" water application		2/14, 4/12, 4/21, 5/12, 5/24, 6/7, 6/15, 6/22, 6/30, 7/12, 7/25, 9/5, 11/22
Herbicide Application 2,4-D		3/3, 7/7
Cultural Weed Control Hand Hoeing Mechanical Cultivation		As needed 5/10, 6/6, 7/5, 8/17
Harvest Flail-vac Harvester		6/1, 10/4

9066531 Muttongrass	Field 35S – 0.50 Acre	Date
Fertilization 150 lbs Nitrogen 40 lbs. Phosphorous		1/23, 3/14, 4/21, 6/19, 10/31 1/23
Irrigation 3" water application		1/4, 2/17, 3/17, 4/7, 4/24, 5/10, 5/9, 6/23, 7/14, 8/10, 9/1, 9/9, 10/5, 10/19, 11/2, 11/21

9066531 Muttongrass	Field 35S – 0.50 Acre	Date
Herbicide Application		
2,4-D		3/15, 7/7
Cultural Weed Control		
Hand Hoeing		As needed
Mechanical Cultivation		5/16
Harvest		
Flail-vac harvester		6/22
9066528 Indian ricegrass	Field 35N – 0.41 Acre	Date
Fertilization		
40 lbs. Nitrogen		1/23, 3/14
40 lbs. Phosphorus		1/23
Irrigation		
3” water application		2/17, 3/17, 4/7, 4/24, 5/10, 5/22, 6/13, 7/19, 9/12, 10/20
Herbicide Application		
2,4-D		3/15, 5/22
Cultural Weed Control		
Hand Hoeing		As needed
Mechanical Cultivation		6/6, 8/23
Harvest		
Flail-vac harvester		5/19, 5/22, 6/8

B. Seed Produced

Table 3-3 describes the seed production for the year 2006.

Table 3-3: 2006 Seed Production

Common name	Scientific name	Pounds bulk
Bottlebrush squirreltail	<i>Elymus elymoides</i>	28.72
Cane bluestem	<i>Bothriochloa barbinodis</i>	2.14
Galleta	<i>Pleuraphis jamesii</i>	1.76
Indian ricegrass	<i>Acnatherum hymenoides</i>	53.10
Muttongrass	<i>Poa fendleriana</i>	1.84
Sand bluestem	<i>Andropogon hallii</i>	14.06

C. Climatological Data

See Appendix A for the climatological data for 2006 at the Los Lunas Plant Materials Center.

VII. Transplant Production

Transplants are not part of this agreement.

VIII. Specialized Treatments

See previous Zion National Park reports for information on specialized treatments.

IX. Observations

During the 2006 season, the following observations were made for the ZNP agreement:

- Blue grama – There is not any blue grama production blocks established at the LLPMC.
- Sand bluestem – In 2006, seed was harvested from the LLPMC production field.

- Bottlebrush squirreltail – Seed was harvested in 2006 from Field 19 at the LLPMC. Seed produced in 2005 at the LLPMC was used to start and grow seedling transplants at the LLPMC to increase the seed production block from 0.58 to 0.59 acres.
- Galleta – In 2006, seed produced in Field 35N at the LLPMC was used to start and grow seedling transplants to increase the seed production from .33 to 0.50 acres.
- Indian ricegrass – In 2006 seed was harvested from the production field at the LLPMC.
- Muttongrass – In 2006, only a small amount of seed was harvested from the production field at the LLPMC. Most of the seed was sheltered during several days of high winds just prior to harvesting.



Figure 3-1: Field 19 – Bottlebrush Squirreltail Production Field



Figure 3-2: Field 21S – Cane Bluestem Production Field



Figure 3-3: Field 27N – Sand Bluestem Production Field



Figure 3-4: Field 25S – Sand Bluestem Production Field



Figure 3-5: Field 35N – Indian Ricegrass Production Field



Figure 3-6: Field 35N – Galleta Production Field



Figure 3-8: Field 24S – Galleta Production Field



Figure 3-9: Field 24S – Galleta Production Field 2006 Transplanting

Chapter 4

Hubbell Trading Post National Historic Site

I. Background

On August, 13, 2002 an agreement among the US Department of Interior (DOI), the National Park Services (NPS), the Hubbell Trading Post National Historic Site (HTPNHS), and the USDA-NRCS Los Lunas Plant Materials Center (LLPMC) was made to produce plants and cuttings of native species for the HTPNHS.

II. Accessions Involved

Table 4-1 lists the accessions involved in the HTPNHS project.

Table 4-1: Accessions Involved

Common Name	Scientific Name	Plant Symbol	Accession Number
Banana yucca	<i>Yucca baccata</i>	YUBA	9066409
Boxelder	<i>Acer negundo</i>	ACNE2	9066468
Desert false indigo	<i>Amorpha fruticosa</i>	AMFR	9066114
Fourwing saltbush	<i>Atriplex canescens</i>	ATCA2	478838
Fremont cottonwood	<i>Populus fremontii</i>	POFR2	9066457
Fremont mahonia	<i>Mahonia fremontii</i>	MAFR3	9066439
Golden currant	<i>Ribes aureum</i>	RIAU	9066545
New Mexico Locust	<i>Robinia neomexicana</i>	RONE	9066428
Prairie sagewort	<i>Artemisia frigida</i>	ARFR4	9066234
	<i>Quercus pauciloba</i>	QUPA4	9066437
Sacahuista	<i>Nolina microcarpa</i>	NOMI	9066469
Skunkbush sumac	<i>Rhus trilobata</i>	RHTR	483445
Squawapple	<i>Peraphyllum ramosissimum</i>	PERA4	9066549
Squawthorn	<i>Lycium torreyi</i>	LYTO	9066430
Stretchberry	<i>Forestiera pubescens</i>	FOPUP	9004570
Utah agave	<i>Agave utahensis</i>	AGUT	9066408
Utah serviceberry	<i>Amelanchier utahensis</i>	ANTUT	9066397
Winterfat	<i>Krascheninnikovia lanata</i>	KRLA2	9066471
Woods' rose	<i>Rosa woodsii</i>	ROWO	9066421

III. Collection Information

In 2006, no seed was received from the HTPNHS. Seed received in previous years was in fair-to-good condition, and it was used to start transplants as per the agreement.

IV. Seed Condition Information

No 2006 seed condition information to report.

V. Seed Production Establishment

Seed production is not part of this agreement.

VI. Seed Production

Seed production is not part of this agreement.

A. Climatological Data

See Appendix A for the climatological data for 2006 at the Los Lunas Plant Materials Center.

VII. Transplant Production

Table 4-2 describes the transplant production and delivery to HTPNHS in 2006.

Table 4-2: 2006 Transplant Production and Delivery

Common Name	2006 Delivery
Chokecherry	10
Redosier dogwood	10
Stretchberry	10
Banana yucca	7
Plains false willow	10
New Mexico locust	10
Squawthorn	5
<i>Quercus pauciloba</i>	20
Sacahuista	10
Silver buffaloberry	10
Total	120 treepots

VIII. Specialized Treatments

No specialized treatments are reported for 2006.

IX. Observations

Native plant species collected as seed on the HTPNHS were started and grown as transplants at the LLPMC and were shipped to HTPNHS as per the 2002 agreement.

This agreement has expired.

Chapter 5

Capulin Volcano National Monument

I. Background

On August 30, 2004 an agreement among the US Department of Interior (DOI), the National Park Service (NPS), the Capulin Volcano National Monument (CVNM), and the USDA-NRCS Los Lunas Plant Materials Center (LLPMC) was made to propagate and increase native grass species found on CVNM. CVNM will be responsible for the collection of native seed. The LLPMC will propagate the seed for the purpose of establishing seed production fields.

II. Accessions Involved

Table 5-1 lists the accessions involved in the CVNM project.

Table 5-1: Accessions Involved

Common Name	Scientific Name	Plant Symbol	Accession Number
Blue grama	<i>Bouteloua gracilis</i>	BOGR	9066609
Little bluestem	<i>Schizacharium scoparium</i>	SCSC	9066612
Mountain muhly	<i>Muhlenbergia montana</i>	MUMO	9066611
Western wheatgrass	<i>Pascopyrum smithii</i>	PASM	9066610

III. Collection Information

No seed was received by the LLPMC from CVNM in 2006.

IV. Seed Condition Information

See previous CVNM reports for seed condition information.

V. Seed Production Establishment

Table 5-2: 2006 Established Production Fields

Common Name	Agreement Acreage	2006 LLPMC Acreage	Accession Number
Blue grama	0.50	0.50	9066609
Little bluestem	0.50	0.50	9066612
Mountain muhly	0.50	0.50	9066611
Western wheatgrass	0.50	0.14	9066610

VI. Seed Production

A. Field Management

9066609 Blue grama	Field 23S-0.50 acre	Date
Fertilization		
115 lbs. Nitrogen		1/27, 5/23, 6/19, 10/2
80 lbs. Phosphorous		1/27, 10/2
Irrigation		
3" Water Application		1/4, 4/11, 5/1, 5/31, 6/19, 7/19, 9/6, 10/5, 11/27
Herbicide Application		
2,4-D		3/3, 7/7

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9066609 Blue grama	Field 23S-0.50 acre	Date
Pesticide Application		
Orthene		6/8, 6/30, 8/10, 9/5, 9/13
Cultural Weed Control		
Hand Hoeing		As needed
Mechanical Cultivation		5/10, 7/5, 8/17
9066612 Little bluestem	Field 23S-0.50 acre	Date
Fertilization		
105 lbs. Nitrogen		1/27, 5/23, 6/19, 8/10
40 lbs. Phosphorous		1/27
Irrigation		
3" Water Application		1/4, 4/20, 5/12, 5/31, 6/19, 7/19, 9/6, 10/5, 11/27
Herbicide Application		
2,4-D		3/3, 7/7
Pesticide Application		
Orthene		6/30, 7/13, 8/10, 9/5
Cultural Weed Control		
Hand Hoeing		As needed
Mechanical Cultivation		5/23, 6/13, 7/5
9066611 Mountain Muhly	Field 27N-0.50 acre	Date
Fertilization		
145 lbs. Nitrogen		1/23, 4/27, 5/23, 6/28, 11/21
110 lbs. Phosphorous		1/23, 5/23, 6/26
Irrigation		
3" Water Application		1/4, 2/3, 3/14, 4/4, 4/19, 4/27, 5/1, 5/9, 5/23, 6/2, 6/9, 6/15, 6/29, 7/13, 8/10, 9/5, 9/21, 10/19, 11/27
Hand Hoeing		As needed
Mechanical Cultivation		4/24, 6/1, 7/20, 8/9, 8/17
9066610 Western Wheatgrass	Field 14-0.14 acre	Date
Fertilization		
140 lbs. Nitrogen		4/27, 5/23, 6/19, 8/10, 10/24
40 lbs. Phosphorous		6/20
Irrigation		
3" Water Application		1/4, 2/14, 3/20, 4/6, 4/27, 5/12, 5/24, 6/7, 7/10, 8/18, 10/2, 10/30
Herbicide Application		
2,4-D		4/12, 5/12, 6/30, 9/1
Cultural Weed Control		
Hand Hoeing		As needed
Mechanical Cultivation		5/23, 6/19, 7/24

B. Seed Produced

Table 5-3 describes the seed production for the year 2006.

Table 5-3: 2006 Seed Production

Common name	Scientific name	Pounds Cleaned
Blue grama	<i>Bouteloua gracilis</i>	13.26
Little bluestem	<i>Schizacharium scoparium</i>	23.80

Table 5-3: 2006 Seed Production

Common name	Scientific name	Pounds Cleaned
Mountain muhly	<i>Muhlenbergia montana</i>	14.06
Western wheatgrass	<i>Pascopyvum smithii</i>	None

C. Climatological Data

See Appendix A for the climatological data for 2006 at the Los Lunas Plant Materials Center.

VII. Transplant Production

Transplant production is not part of this agreement.

VIII. Specialized Treatments

There was no specialized treatment in 2006.

IX. Observations

The western wheatgrass field did not produce seed in 2006. No seed was collected at CVNM in 2006, and as a result, this species may be dropped from the contract in 2007. The little bluestem, blue grama and mountain muhly fields are established and produced seed in 2006. Sideoats grama seed was not collected in 2006 at CVNM, and no seed field has been established at the LLPMC.



Figure 5-1: Field 27 – Mountain Muhly Production Field



Figure 5-2: Field 23S – Blue Grama Production Field



Figure 5-3: Field 23S – Little Bluestem Production Field

Chapter 6

Carlsbad Caverns National Park

I. Background

On August 23, 2004, an agreement among the US Department of Interior (DOI), the National Park Service (NPS), Carlsbad Caverns National Park (CCNP), and the USDA-NRCS Los Lunas Plant Materials Center (LLPMC) was made for the collection, propagation, and increase of native grass species.

II. Accessions Involved

Table 6-1 lists the accessions involved in the CCNP project.

Table 6-1: Accessions Involved

Common Name	Scientific Name	Plant Symbol	Accession Number
Blue grama	<i>Bouteloua gracilis</i>	BOGR	9066604
Curlyleaf muhly	<i>Muhlenbergia setifolia</i>	MUSE	9066608
Plains bristlegrass	<i>Setaria vulpiseta</i>	SEVU2	9066606
Purple threeawn	<i>Aristida purpurea</i>	ARPU9	9066607
Sideoats grama	<i>Bouteloua curtipendula</i>	BOCU	9066605
Green sprangletop	<i>Leptochloa dubia</i>	LEDU	9066658

III. Collection Information

See previous CCNP reports for seed collection information.

IV. Seed Condition Information

The seed collected in 2005 of green sprangletop and plains bristlegrass from CCNP was used to grow transplants in order to establish seed production fields at the LLPMC. See previous CCNP reports for seed condition information.

V. Seed Production Establishment

Table 6-3 describes the 2006 seed production fields established at the LLPMC.

Table 6-3: Established Production Fields

Common name	Scientific name	Agreement Acreage	2006 LLPMC Acreage
Blue grama	<i>Bouteloua gracilis</i>	0.50 acre	0.50 acre
Purple three-awn	<i>Aristida purpurea</i>	0.50 acre	0.50 acre
Sideoats grama	<i>Bouteloua curtipendula</i>	0.50 acre	0.50 acre
Green sprangletop	<i>Leptochloa dubia</i>	0.50 acre	0.50 acre
Plains bristlegrass	<i>Setaria vulpiseta</i>	0.50 acre	0.10 acre

VI. Seed Production

A. Field Management

9066604 Blue grama– Field 13–0.50 acre	Date
Fertilization	
75 lbs. Nitrogen	1/9, 8/10, 10/31
40 lbs. Phosphorous	1/9
Irrigation	
3” Water Application	2/9, 4/19, 5/15, 6/7, 7/10, 9/5, 11/1
Herbicide Application	
2,4-D	3/3, 6/26
Pesticide Application	
Orthene	8/16, 9/5
Cultural Weed Control	
Hand Hoeing	As needed
Mechanical Cultivation	5/4, 6/5, 8/25
Harvest	
Combine	10/25

9066605 Sideoats grama– Field 23N–0.50 acre	Date
Transplanted	6/29
Fertilization	
185 lbs. Nitrogen	1/5, 5/23, 6/28, 8/10, 10/2, 11/21
120 lbs. Phosphorous	1/5, 6/26, 10/2
Irrigation	
3” Water Application	5/31, 6/16, 6/29, 7/3, 7/12, 7/25, 9/5, 11/27
Herbicide Application	
2,4-D	7/7
Cultural Weed Control	
Hand Hoeing	As needed
Mechanical Cultivation	5/15, 7/10, 7/20,
Harvest	
Combine	9/28
Forage Harvester	11/7

9066606 Plains bristlegrass– Field 20S–0.10 acre	Date
Transplanted	7/20
Fertilization	
40 lbs. Nitrogen	10/31
Irrigation	
3” Water Application	7/20, 7/24, 8/17, 9/7, 9/26, 11/3
Cultural Weed Control	
Hand Hoeing	As needed
Mechanical Cultivation	8/17
Harvest	
Flail-vac harvester	10/18
Forage Harvester	10/27

9066658 Green Sprangletop– Field 24N–0.50 acre	Date
Transplanted	7/11
Fertilization	
40 lbs. Nitrogen	11/21

9066658 Green Sprangletop– Field 24N–0.50 acre	Date
Irrigation	
3” Water Application	7/11, 7/14, 7/18, 7/24, 8/17, 9/5, 9/25, 11/22
Cultural Weed Control	
Hand Hoeing	As needed
Mechanical Cultivation	7/24, 9/1
Harvest	
Combine	11/2

9066607 Threawn–Field 24S – 0.50 acre	Date
Transplanted	6/22
Fertilization	
135 lbs. Nitrogen	1/6, 4/21, 5/23, 8/10, 11/21
40 lbs. Phosphorous	1/6
Irrigation	
3”Water Application	2/17, 4/4, 4/24, 5/10, 5/24, 6/7, 6/22, 6/30, 7/12, 7/24, 8/24, 8/31, 9/5, 9/10, 11/22
Herbicide Application	
2,4-D	7/7
Cultural Weed Control	
Hand Hoeing	As needed
Mechanical Cultivation	5/10, 6/6, 7/5
Harvest	
Flail-vac harvester	7/11, 9/25, 10/18
Forage harvester	11/16, 11/17

B. Seed Produced

Table 6-3 describes the seed production for the year 2006.

Table 6-3: 2006 Seed Production

Common name	Scientific name	Pounds cleaned
Blue grama	<i>Bouteloua gracilis</i>	88.48
Sideoats grama	<i>Bouteloua curtipendula</i>	84.12
Threawn	<i>Aristida purpurpea</i>	11.78
Green sprangletop	<i>Leptochloa dubia</i>	62.52
Plains bristlegrass	<i>Setaria vulpiseta</i>	2.22

C. Climatological Data

See Appendix A for the climatological data for 2006 at the Los Lunas Plant Materials Center.

VII. Transplant Production

Transplant production is not part of this agreement.

VIII. Specialized Treatments

There was no specialized treatment in 2006.

IX. Observations

- Green sprangletop – Although green sprangletop was not specified in the original agreement, it was added by CCNP in 2006. Sprangletop seed collected in 2005 from CCNP was used to grow transplants

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to establish a 0.50 acre seed production field at the LLPMC. The field was established, and a seed crop was harvested in the fall of 2006.

- Plains bristlegrass – Seedling transplants of bristlegrass were grown by the LLPMC in 2006 and a 0.10 acre seed production was established in Field 20S. The seed field was established and a small quantity of seed was produced in 2006. This 2006 seed will be used to expand the seed field to a full ½ acre in 2007.



Figure 6-1: Field 23N – Sideoats Grama Production Field



Figure 6-2: Field 23N – Sideoats Grama Production Field 2006 Planting



Figure 6-3: Field 24S – Threeawn Production Field



Figure 6-4: Field 13 – Carlsbad Caverns Blue Grama Production Field



Figure 6-5: Carlsbad Caverns Plains Bristlegrass Production Field



Figure 6-6: Carlsbad Caverns Green Sprangletop Production Field

Chapter 7 Wupatki National Monument

I. Background

On May 16, 2006, an agreement was made between the Wupatki National Monument (WNM) of the U. S. Department of Interior (USDI) and the Natural Resources Conservation Service (NRCS) of New Mexico. This agreement declares that the Los Lunas Plant Materials Center (LLPMC) of the NRCS will produce seed for the WNM.

II. Accessions Involved

Table 7-1 lists the accessions involved in the CCNP project.

Table 7-1: Accessions Involved

Common Name	Scientific Name	Plant Symbol	Accession Number
Bottlebrush squirreltail	<i>Elymus elymoides</i>	ELEL	9066656
Needleandthread	<i>Hesperostipa comata</i>	HECO	9066655
Galleta	<i>Pleuraphis jamesii</i>	PLJA	9066657

III. Collection Information

Seed from bottlebrush squirreltail, needleandthread and galleta was received from Wupatki National Monument in 2006. The seed was used to start transplants to establish seed fields at the LLPMC.

IV. Seed Condition Information

Table 7-2: CCNP 2006 Seed Collection Condition

Common Name	Scientific Name	Plant Symbol	Seed Fill Condition
Bottlebrush squirreltail	<i>Elymus elymoides</i>	ELEL	Good
Needleandthread	<i>Hesperostipa comata</i>	HECO	Good
Galleta	<i>Pleuraphis jamesii</i>	PLJA	Good

V. Seed Production Establishment

See Table 7-3 for the seed production fields that were established in 2006 using seedling transplants started and grown by the LLPMC.

Table 7-3: Established Production Fields

Common name	Scientific name	Agreement Acreage	2006 LLPMC Acreage
Bottlebrush squirreltail	<i>Elymus elymoides</i>	1.00	N/A
Needleandthread	<i>Hesperostipa comata</i>	1.00	0.24
Galleta	<i>Pleuraphis jamesii</i>	2.00	0.32

VI. Seed Production

A. Field Management 2006

9066655 Needleandthread-Field 34S-0.24 acre	Date
Transplanted	5/8
Fertilization	
40 lbs. Nitrogen	11/21
Irrigation	
3" Water Application	5/8, 5/10, 5/12, 5/18, 5/24, 5/30, 6/9, 6/19, 7/10, 7/24, 9/1, 9/21, 10/26, 11/22
Cultural Weed Control	
Hand Hoeing	As needed
<hr/>	
9066657 Galleta-Field 20S-0.32 acre	Date
Transplanted	6/16
Fertilization	
70 lbs. Nitrogen	8/10, 10/31
Irrigation	
3" Water Application	6/16, 6/19, 6/23, 6/30, 7/12, 7/24, 8/17, 9/6, 9/25, 11/2
Cultural Weed Control	
Hand Hoeing	As needed
Harvest	
Flail-vac harvester	10/3, 10/20

B. Seed Produced

Table 7-3 describes the seed production for the year 2006.

Table 7-3: 2006 Seed Production

Common name	Scientific name	Pounds Clean seed
Needleandthread	<i>Hesperostipa comata</i>	None
Galleta	<i>Pleuraphis jamesii</i>	2.18

C. Climatological Data

See Appendix A for the climatological data for 2006 at the Los Lunas Plant Materials Center.

VII. Transplant Production

Transplant production is not part of this agreement.

VIII. Specialized Treatments

There was no specialized treatment in 2005.

IX. Observations

The bottlebrush squirreltail seed received from WNM in 2006 was used to start transplants to establish a seed production field. The transplanted were planted on May 8, 2006 into Field 34S at the LLPMC. The plants were irrigated and growth of the transplants was excellent. Once the plants had started to produce seedheads, it was very noticeable it was not the bottlebrush squirreltail species. The plants were identified as a weed species. The WNM and Russ Haas were notified of the situation and all parties agreed to remove

the field before seed was produced. The WNM will harvest seed of bottlebrush squirreltail in 2007, and a seed production field will be established once the seed has been provided to the LLPMC.

The galleta field was established on May 16, 2006 with transplants grown by the LLPMC. The field produced seed in 2006, and this seed will be used to grow transplants in 2007 to complete the 2-acres needed to complete the agreement.

The needleandthread field did not produce seed in 2006. Seed will be harvested in 2007 from this field, and it will be used to grow transplants to complete the 1-acre needed for the agreement acreage.



Figure 7-1: Field 20S – Wupatki National Monument Galleta Production Field



Figure 7-2: Field 34S – Wupatki National Monument Needleandthread Production Field

Appendix A Climatological Data

2006 Climatological Data – Los Lunas Plant Materials Center

Month	Average Temperatures Fahrenheit			Monthly Precipitation/Inches
	High	Low	Monthly Average	
January	57.1	15.9	36.5	0.03
February	62.5	20.1	41.3	0.00
March	65.9	28.8	47.4	0.28
April	79.0	38.9	59.0	0.05
May	88.5	48.0	68.3	0.00
June	96.0	56.2	76.1	0.86
July	95.1	63.0	79.1	2.53
August	88.0	60.3	74.2	2.84
September	81.5	46.7	64.1	0.51
October	81.5	46.7	64.1	0.51
November	67.2	24.9	46.1	0.10
December	49.5	16.0	32.8	0.93
	Avg. High 75.3	Avg. Low 38.0	Mean Temp. 56.6	Yearly Total 9.72