Native Plants For National Parks

NPS photo - Canyon de Chelly National Monument

NPS photo - Blue grama for ROMO

FY 2009 Plant Materials Project Summary Reports

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service
Plant Materials Program

FY 2009

Plant Materials Project Summary Reports

from the

Natural Resources Conservation Service

to the

National Park Service

May 2010

Compiled by

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INTRODUCTION

This is the 2009 Natural Resources Conservation Service Plant Materials Centers Annual Progress Report on cooperative project agreements between the National Park Service (NPS) and the Natural Resources Conservation Service (NRCS). These projects relate to development of native plant materials for revegetation of park roads and restoration projects. The NPS and NRCS have been cooperating in testing and increasing native plants under a Memorandum of Understanding and Interagency Agreement since 1989.

The cooperating NRCS Plant Materials Centers have prepared two types of reports. (1) Brief One Page Summary (attached) and (2) a comprehensive Annual Technical Report. The "One Page Summary Report" is sent to parks with current projects, to respective NPS field areas and associated park resource managers and respective NRCS offices. Additional hard copies or CD form of the "one page summary report" are available on request.

This report can be requested from Pat Davey, NRCS National Technical Advisor, National Park Service, Denver Service Center, Transportation Division, PO Box 25287, Lakewood, CO 80225, E-mail: Pat_Davey@nps.gov 303-969-2349.

The comprehensive 2009 Annual Technical Reports are also available at the above address or from respective Plant Material Centers.

If you have any questions or comments to improve the use and distribution of these reports, please contact Pat Davey or Sarah Wynn, NPS National Technical Advisor at 303 969-2292, email: sarah_wynn@nps.gov.

NATIONAL PARK SERVICE
And
NATURAL RESOURCES CONSERVATION SERVICE

INTERAGENCY PLANT MATERIALS PROGRAM

2009 PROGRAM SUMMARY

Technical Assistance

- NRCS NTA (National Technical Advisor) provided assistance to Landscape Architects, Project Specialists and Project Managers at the NPS Denver Service Center relative to revegetation project needs with nine National Parks in addition to those with interagency agreements.

- On site program technical assistance was provided by NRCS NTA at 18 National Parks.

Development and Administration of Interagency Agreements

- Twelve new agreements and three amendments to agreements were developed this year. A total of 38 active interagency agreements were administered and coordinated.

- There were 42 active projects at 23 National Park units in cooperation with 11 Plant Materials Centers.

Native Seed and Plant Production

- 22 National Parks
- 3,693 pounds of seed
- 24,824 container transplants

- 267 park indigenous species (157 grasses, 77 forbs, 33 shrubs)

Native Seed/Plant Deliveries

- 9 National Parks
- 1165 pounds of seed
- 15,682 container transplants

Processing of Park Collected Seed

- 2 National Parks
- 1702 pounds of seed
- 31 species (19 grasses, 9 forbs, 3 shrubs)

Interagency Program Reviews

Reviews were held at:

- **National Park Units:** Rocky Mountain NP, Carlsbad Caverns NP, Badlands NP, Mesa Verde NP, Theodore Roosevelt NP, San Juan Island National Historical Park, Glacier

- **Plant Materials Centers:** Meeker, Colorado; Los Lunas, New Mexico; Bismarck, North Dakota; Aberdeen, Idaho; Fallon, Nevada; Lockeford, California; Tucson, Arizona; Corvallis, Oregon; Bridger, Montana; Beltsville, Maryland

Technology Transfer and Research

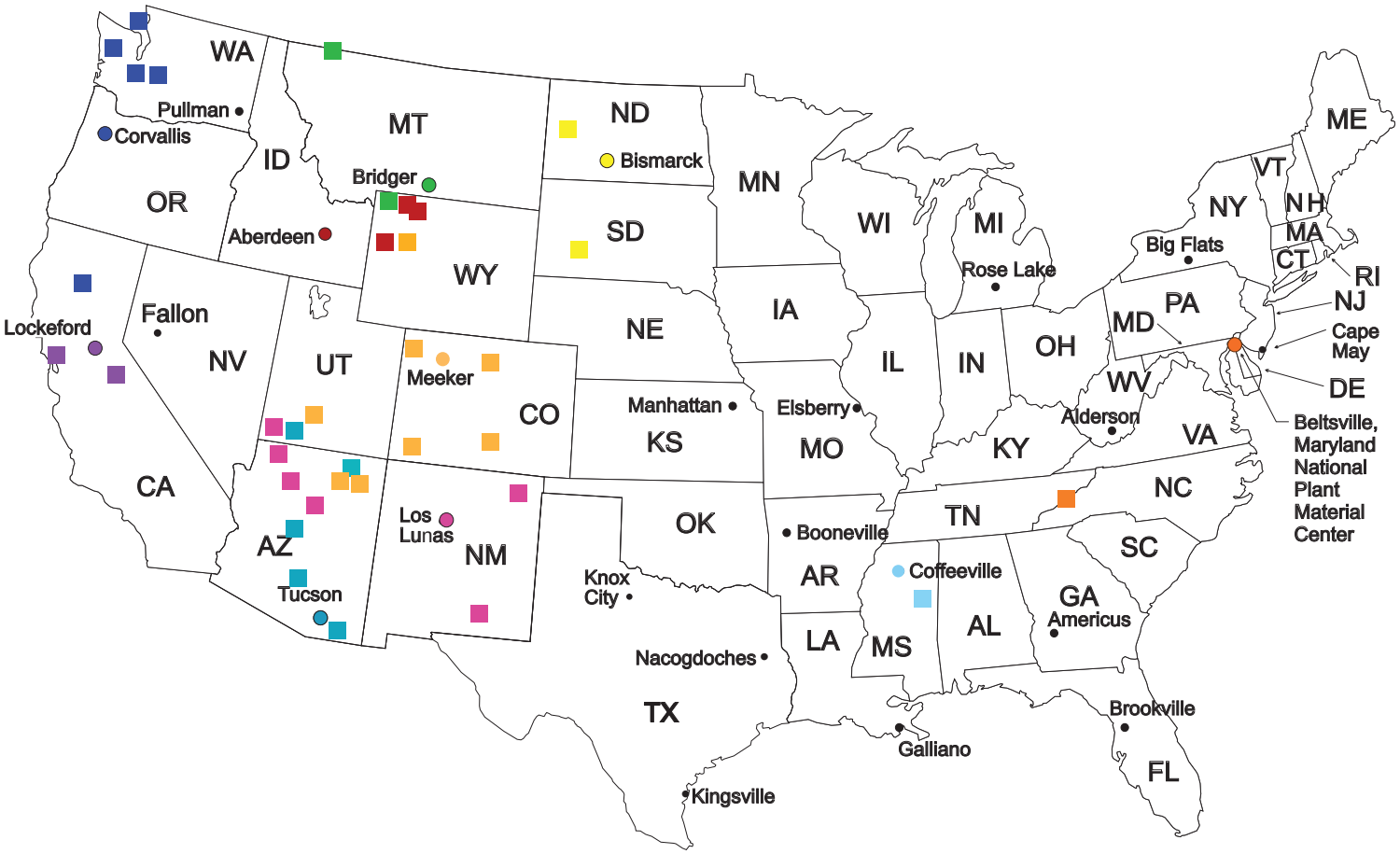
- Information provided includes basic Federal Lands Highway Program (FLHP)guidelines, examples of revegetation specifications, tools (seed collection, storage, plant salvage, propagation, cost estimating, monitoring etc.) Links to the NRCS PM and Plant Propagation Protocols websites and much more.

- NRCS NTA assisted in preparation of the meeting and made a presentation at a Revegetation Workshop for NPS Southeast Region Parks, Gatlinburg,TN. Also assisted 21 satff members at Rocky Mountain National Park on seed collection training.

- Consulted with selected parks to further define protocols to be used to monitor FLHP revegetation projects.

- NRCS NTA and program staff prepared and distributed to cooperating Parks/PMCs and key NPS and NRCS personnel, the FY2008 annual Interagency Program Summary Report.

NPS/NRCS Interagency Plant Materials Centers



Plant Materials Center		In cooperation with these National Parks	
●	Aberdeen, ID	■	Grand Teton, Yellowstone
●	Beltsville, MD	■	Great Smoky
●	Bismark, ND	■	Badlands, Theodore Roosevelt
●	Bridger, MT	■	Glacier, Yellowstone
●	Coffeeville, MS	■	Natchez Trace
●	Corvallis, OR	■	Lassen Volcanic, Mount Rainier, Olympic, San Juan Island
●	Lockeford, CA	■	Golden Gate, Yosemite
●	Los Lunas, NM	■	Carlsbad Caverns, Capulin Volcano, Grand Cayon, Pipe Spring, Wupatki, Zion
●	Meeker, CO	■	Bryce Canyon, Canyon de Chelly, Dinosaur, Grand Teton, Great Sand Dunes, Mesa Verde, Rocky Mountain
●	Tucson, AZ	■	Canyon de Chelly, Coronado, Montezuma Castle, Saguaro, Zion

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Pacific West Region

Southeast Region

BRYCE CANYON NATIONAL PARK

FY2009 Annual Summary Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
MEEKER, COLORADO

INTRODUCTION

On July 15, 2008, an agreement with Bryce Canyon National Park, Inter-Agency number 1211-08-010 was signed. This agreement called for the establishment of a 0.5 acre field of Bromus anomalus, nodding brome, to be produced through 2011.

Bryce Canyon's 0.5 acre field of nodding brome.

ACCOMPLISHMENTS

On August 21, 2008, 16 rows were direct seeded to establish a 0.5 acre field of Bryce Canyon nodding brome. The seed had been pre-treated with Difenoconazole (Dividend) to help protect against smut. With above average spring precipitation, the nodding brome did well. On July 29,

2009, the nodding brome field was harvested and 25 pounds of seed were produced. The seed will be sent to the lab for testing. Analysis results will be included in the park's full report. The nodding brome field was chemically treated for a variety of weeds, and was later swathed as a harvest method. Additionally, 54 shrubs of various species are available for delivery at the park's request in 2010. The production and delivery of these shrubs completes all components of a previous agreement.

TECHNOLOGY DEVELOPMENT

Germination trials were conducted on 2009 nodding brome seed. Both non-treated seed and seed treated with the herbicide, Metsulfuron, (Escort) were tested for viability. Those results have not been determined at this time. Specific information about germination trials and test results will be included in the park's full report. Soil preparation, seeding rates, equipment, seedling establishment methods, seed processing or handling techniques is available upon request.

Bryce Canyon material ready for delivery

CANYON de CHELLY NATIONAL MONUMENT

FY2009 Annual Summary Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
TUCSON, ARIZONA

INTRODUCTION

This project involves the production of 50 PLS lbs of Bouteloua gracilis, 35 PLS lbs of Sporobolus cryptandrus, 60 PLS lbs of Sporobolus airoides, and 140 PLS lbs of Aristida purpurea. Seed produced will be used for revegetation of disturbed areas in Canyon de Chelly National Park. The agreement (IA No.: 1211-08-002) was signed the 14th of November, 2007 with the project extending until the 30th of September, 2010. The completion date of this project is dependent upon adequate seed collection from the park.

A back view of the combine harvesting the alkali sacaton fields.

ACCOMPLISHMENTS

In June of 2009, the Arizona Plant Materials Specialist, Bruce Munda, traveled to Canyon de Chelly to meet with park service personnel to discuss seed collection methods for this project. Also discussed during the meeting was the need for an extension of the current contract due to the low seed collection success within the park. Up until this point, the only viable seed received for establishment of production fields was Sporobolus airoides. Two borders of Sporobolus airoides were established in June 2008. At the time of this report, there are approximately 0.36 acres of Sporobolus airoides in production. In total 61 bulk pounds have been harvested since

the field was initiated. The PMC expects to meet the goal of 60 PLS pounds of Sporobolus airoides within the growing season of 2010.
In July of 2009, the PMC received 0.8 lbs of Aristida purpurea from a native seed collector hired by the park. The seed has been germination tested and proved viable. In the spring of 2010, approximately 0.25 acres of Aristida purpurea will be put into production.

TECHNOLOGY DEVELOPMENT
Previous harvesting of the Sporobolus airoides production fields had been conducted with the Woodward Flail vac. In the growing season of 2009, a plot combine, the Massey Ferguson MXP, was used to harvest seed. The plot combine harvest has proved to be more efficient and will be used for all future harvests of this production field.

A close up of the front of the combine showing the cutter bars and tines.
The tines help to move the cut materials through the combine's threshing tables.

CANYON de CHELLY NATIONAL MONUMENT

FY2009 Annual Summary Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
MEEKER, COLORADO

INTRODUCTION

This report is in reference to sub agreement IA No-1211-08-003.
In February of 2008, an interagency agreement was signed between the National Park Service, Canyon de Chelly National Monument (CDCNM) of the U. S. Department of Interior and Upper Colorado Environmental Plant Center (UCEPC). The agreement calls for UCEPC to produce seed of two native species, Indian ricegrass *Achnatherum hymenoides* and western wheatgrass *Pascopyrum smithii*, from seed stock collected at the monument. The agreement stipulates that UCEPC will produce 50 pounds of Pure-Live-Seed (PLS) of Indian ricegrass and 50 PLS-pounds of western wheatgrass. This agreement will remain in effect until September 30, 2010.

Western wheatgrass plugs in the transplanter. Photo by Heather Plumb

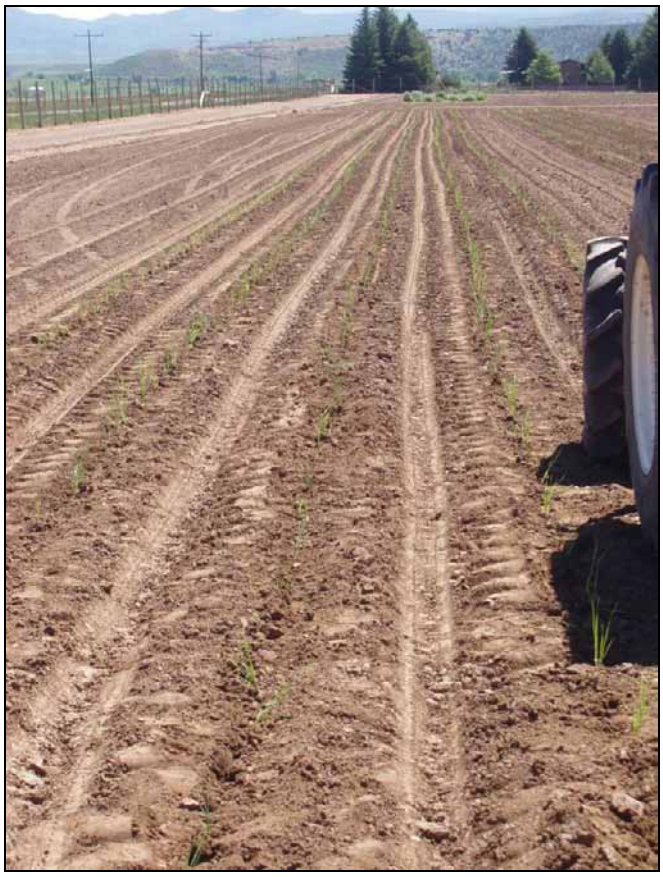
ACCOMPLISHMENTS

In 2009, it was decided to establish a field of Canyon de Chelly western wheatgrass from the limited amount of seed previously collected. A total of 7000 plugs were grown in the UCEPC greenhouse and were transplanted into the field on June 30, 2009. On November 6, 2009, 16 additional rows were directly seeded using a Planet Jr. resulting in a total of 1.27 acres of western wheatgrass. The Indian ricegrass field that was established on October 8, 2008, was reseeded again in October 2009 and 14 additional rows were added to the existing field, resulting in 1.73 acres of production. No seed from the two fields was harvested in 2009.

Additional seed of Indian ricegrass and western wheatgrass was collected by the monument in 2009 and was shipped to UCEPC. The seed was cleaned and used to increase field production for both products for the 2009 growing season.

TECHNOLOGY DEVELOPMENT

Standard planting, cultural practices, harvest, and cleaning protocols will be utilized to handle the Indian ricegrass and western wheatgrass. Plugging procedure for the wheatgrass field will be explained in the CDCNM's full report.



Western wheatgrass rows after it was plugged. Photo by Heather Plumb

CANYON de CHELLY NATIONAL MONUMENT

FY2009 Annual Summary Report
Prepared by

NATURAL RESOURCE CONSERVATION SERVICE
PLANT MATERIALS CENTER
MEEKER, CO

INTRODUCTION

This report is in reference to sub agreement IA No-F739008005.
In June of 2008, an interagency agreement was signed between the National Park Service, Canyon de Chelly National Monument (CDCNM) of the U. S. Department of Interior and the Natural Resources Conservation Service. The agreement calls for Upper Colorado Environmental Plant Center (UCEPC) to produce seed of two native species; Indian ricegrass *Achnatherum hymenoides* and western wheatgrass *Pascopyrum smithii*, from native seed stock collected at the monument. The agreement stipulates that UCEPC will establish two acres of Indian ricegrass and one acre of western wheatgrass. This agreement will remain in effect until September 30, 2011.

Western wheatgrass plugs ready to be transplanted into the field. Photo by Heather Plumb

ACCOMPLISHMENTS

In 2009, a field of western wheatgrass for Canyon de Chelly was established. Seven thousand plugs were grown in the UCEPC greenhouse and were transplanted into the field on June 30, 2009. On November 6, 2009, 16 additional rows were directly seeded of western wheatgrass resulting in

1.27 acres of production. The Indian ricegrass field that was planted in the fall of 2008 had poor establishment. The field was reseeded in October 2009 and 14 rows were added resulting in 1.73 acres of Indian ricegrass. No seed from the Indian ricegrass or western wheatgrass fields was harvested in 2009.

Additional seed of western wheatgrass and Indian ricegrass was collected by Canyon de Chelly in 2009 and was sent to UCEPC. The seed from the collections was cleaned and used to increase field production for both materials for the 2010 growing season.

TECHNOLOGY DEVELOPMENT

Standard planting, cultural practices, harvest, and cleaning protocols will be utilized to handle the Indian ricegrass and western wheatgrass. Plugging procedure for the wheatgrass field will be explained in the CDCNM's full report.

Cleaned Indian ricegrass seed from 2009. Photo by Terri Blanke

CAPULIN VOLCANO NATIONAL MONUMENT

FY 2009 Annual Summary Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
LOS LUNAS, NEW MEXICO

INTRODUCTION

On August 30, 2004, an agreement was made between Capulin Volcano National Monument (CVNM) 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) will produce seed of agreed upon native species for CVNM. See previous LLPMC National Park Service Reports for information on the items in this agreement. Project #: NMPMC-S-0404-RA

Blue grama from Los Lunas Plant Material Center.

ACCOMPLISHMENTS

Seed Production

No seed was produced in 2009. See previous LLPMC National Park Service reports for seed production records.

On June 23, 2009 all of CVNM's seed in storage at the LLPMC was packaged and shipped to CVNM (See the following table).

Accession	Common Name	Scientific Name	Bulk Weight lbs.	PLS Weight lbs.
9066612	Blue grama	*Bouteloua gracilis*	22.3	13.64
9066609	Little bluestem	*Schizachyrium scoparium*	28.7	9.22
9066611	Mountain muhly	*Muhlenbergia montana*	14.06	10.89

Transplant Production
Transplant production was not part of this agreement.

TECHNOLOGY DEVELOPMENT

• Blue grama – On April 30, 2009 several individual plants were removed from the LLPMC seed production field. These plants were picked up by CVNM personnel and will be used for a planting at the monument.

• Little bluestem – On April 30, 2009 several individual plants were removed from the LLPMC seed production field. These plants were picked up by CVNM personnel and will be used for a planting at the monument.

The CVNM agreement was terminated in 2009 and all production fields for CVNM have been removed.

CARLSBAD CAVERNS NATIONAL PARK

FY2009 Annual Summary Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIAL CENTER
LOS LUNAS, NEW MEXICO

INTRODUCTION

On August 23, 2004 an agreement was made between Carlsbad Caverns National Park (CCNP) 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) will produce seed for CCNP for use in revegetation and restoration projects. Project #: NMPMC-S-0403-RA

Green sprangletop mulch bales for Carlsbad Caverns National Park at the Los Lunas Plant Materials Center, Field 24N December 2009.

ACCOMPLISHMENTS

Seed Production

The LLPMC produced the following seed in 2009 for CCNP:

Common Name	Scientific Name	Agreement Acreage	2009 LLPMC Acreage	Clean Seed (Bulk lbs.)
Blue grama	*Bouteloua gracilis*	0.50 acre	0.50 acre	3.54
Green sprangletop	*Leptochloa dubia*	0.50 acre	0.50 acre	33.32
Plains bristlegrass	*Setaria vulpiseta*	0.50 acre	0.90 acre	77.88
Sideoats grama	*Bouteloua curtipendula*	0.50 acre	0.50 acre	19.96

Three-awn	*Aristida purpurea*	0.50 acre	0.50 acre	8.20

Transplant production
No transplants were grown in 2009 for CCNP.

TECHNOLOGY DEVELOPMENT

• Blue grama – Seed was harvested in 2009.

• Green sprangletop – Seed was harvested in 2009.

• Plains bristlegrass – Seed was harvested in 2009.

• Sideoats grama – Seed was harvested in 2009.

• Three-awn – Seed was harvested in 2009.

In December 2009, the LLPMC baled forage from the CCNP fields. The bales will be picked up by CCNP employees and used for mulch on plantings at CCNP.

CORONADO NATIONAL MEMORIAL

FY2009 Annual Summary Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
TUCSON, ARIZONA

INTRODUCTION

This agreement (IA 1211-09-005) was initiated July 17, 2009 and will be completed by September 30, 2013. The Tucson Plant Materials Center (TPMC) will propagate a total of 5000 containerized plants of Agave (*Agave palmieri*) during the course of the contract. 1500-2000 plants will be delivered to the memorial annually in order to meet the amount stipulated in the agreement.

ACCOMPLISHMENTS

In July 2009, seed received from the Memorial was cleaned, soaked in water overnight, and then planted in germination trays until they were ready for transplanting. Germination was excellent and approximately 1600 seedlings were transplanted to 45 in^3 individual containers August 21, 2009. Plants were then placed in the greenhouse. All the seedlings survived the transplanting and are progressing well.

Cleaned Agave palmieri seeds

TECHNOLOGY DEVELOPMENT

Currently, there is limited information available on growth protocols for *Agave palmieri*. TPMC is experimenting with a 1:1 ratio of peat moss to perlite as the growth medium for the plants to be delivered in 2010. In future germination trials, TPMC personnel will use alternative growth medium mixtures. Additionally, the TPMC has initiated studies to track the growth rates and other parameters to learn more about this species.

Agave palmieri seedling ~ 30 days after germination

DINOSAUR NATIONAL MONUMENT

FY2009 Annual Summary Report
Prepared by

UPPER COLORADO ENVIRONMENTAL PLANT CENTER
MEEKER, COLORADO

INTRODUCTION

Upper Colorado Environmental Plant Center (UCEPC) entered into an agreement with Dinosaur National Monument in 1996 and was most recently amended in 2008. The amendment substitutes the production of alkali sacaton with western wheatgrass. In addition to the production of western wheatgrass (Pascopyrum smithii - 9092278), other products being increased include Indian ricegrass (Oryzopsis hymenoides - 9070953), basin wildrye (Leymus cinereus - 9070951), and bluebunch wheatgrass (Pseudoroegneria spicata ssp. spicata - 9070952). The grasses will be used for restoration and to prevent invasion of non-indigenous weedy plants.

Bluebunch wheatgrass production by Upper Colorado Environmental Plant Center for Dinosaur National Monument.

ACCOMPLISHMENTS

In September, a new field (0.30 acre) of western wheatgrass (9092278) was planted at UCEPC and the old field of alkali sacaton was removed as called for in the amendment. A small amount of seed was provided to Dinosaur in 2009 for use in an experiment conducted by park service employee Cindy Heyd, who visited UCEPC for a tour of the seed fields and an overview of the

project. Seed was harvested from the bluebunch wheatgrass, basin wildrye and Indian ricegrass fields in 2009. The seed has been cleaned, but test results are not yet available. Below, the results of this year's harvest are presented.

Seed Harvested			Seed Fields	
Name	Harvest Date	Clean Seed	Name	Size
Basin wildrye	July 31	54.0 lb	Basin wildrye	0.24 acre
Bluebunch wheatgrass	July 20	14.0 lb	Bluebunch wheatgrass	0.18 acre
Indian ricegrass	July 8	39.0 lb	Indian ricegrass	0.24 acre
Western wheatgrass	No harvest		Western wheatgrass	0.30 acre

TECHNOLOGY DEVELOPMENT

Specific information can be requested for each species regarding procedures and methods for seed cleaning etc.

GLACIER NATIONAL PARK

FY 2009 Annual Summary Report
Prepared by

NATURAL RESOURCE CONSERVATION SERVICE
PLANT MATERIALS CENTER
BRIDGER, MONTANA

INTRODUCTION

The Bridger Plant Materials Center has maintained a cooperative agreement with Glacier National Park since FY 1986. This agreement facilitates the collection, increase, and establishment of indigenous plant materials, and the development of technologies for the restoration of disturbances resulting from road construction and other projects within Park boundaries.

ACCOMPLISHMENTS

In 2009, 150 seed lots representing 73 species were delivered to Glacier or used for Bridger Plant Materials Center seed increase. Total weight of seed delivered in 2009 was 24.1 kilograms (53.1 pounds). The 2009 seed distribution included 36 grasses (22 species), 62 forbs (28 species), and 52 woody plants (23 species). No containerized plants were delivered to Glacier Park in 2009. More than 200 wildland seed collections are currently being processed at the Bridger Plant Materials Center and will be reported in the 2009 Glacier Annual Technical Report.

Active and new seed production fields as of December 2009 appear in Table 1. Seed production was consistently low in 2009, and many aging and poorly established fields were removed. Field

seed increase at the Center in 2009 will be reported in the Glacier Park 2009 Annual Technical Report.

Table 1. Glacier Park seed production fields at the Bridger Plant Materials Center, December 2009.

Genus & Species	Accession #	Site	Field	Date Field Planted	Field Size acre	2009 Harvest
Eurybia conspicua	9087433	LM	4	6/21/05	0.05	yes
Symphyotrichum laeve	9081447	LM	4	1998	0.04	yes
Symphyotrichum laeve	9081447	LM	4	6/3&23/04	0.09	yes
Festuca idahoensis	9058298	Ca mas	15N	4/14/2009	0.63	no
Elymus glaucus	9087348	LM	15N	4/14/2009	0.75	no
Elymus glaucus	9087348	LM	15N	4/14/2009	0.52	no

Container plants sown or held at the Bridger Plant Materials Center in 2009 for Glacier Park appear in Table 2.

Table 2. Container plants sown or held in storage for Glacier Park, December 2009.

Species Name	Glacier lot #	Accession #	Collection Location	Date Sown	Number of Units	Size of container in³ cubic inches
Rubus parviflorus	06-044	9078329	Two Medicine	1-30-08	131 plants	10
Rubus parviflorus	06-038	9078268	Lake McDonald	8-10-09	85 plants	10
Rosa woodsii	multiple	9063260	Lake McDonald		262 plants	10
Mahonia repens	07-054	9063248	Saint Mary	2008	~2,000 plants	4
Mahonia repens	07-092	9054489	North Fork	8-10-09	1,000 pots	4
Mahonia repens	07-054	9063248	Saint Mary	8-10-09	600 pots	4
Mahonia repens	03-049	9087360	Goat Haunt	8-10-09	400 pots	4

TECHNOLOGY DEVELOPMENT AND ASSISTANCE

Staff from Glacier Park traveled to the Plant Materials Center on December 1 through 2, 2009, to coordinate activities for the 2009 through 2010 fiscal year. Plant Materials training for Park personnel is scheduled for May or June 2010 and may include the demonstration of a prototype electronic labeling system for wildland seed collection. This system is currently under development by the Natural Resources Conservation Service State Office staff in cooperation with the Plant Materials Center.

GRAND CANYON NATIONAL PARK

2009 Annual Summary Sheet Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
LOS LUNAS, NEW MEXICO

INTRODUCTION

In July 1990, an agreement was made between the Grand Canyon National Park (GCNP) 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) will produce seed and propagate plants for the GCNP. Amendment No. 1 of 1999 and Amendment No. 2 of 2001 provides for seed production of two native grass species, and for growing transplants of 10 native tree and shrub species. Of the 10 native tree and shrub species, the LLPMC agreed to deliver 900 transplants to the GCNP. All transplants will be grown from seed collected from indigenous ecotypes at the GCNP. Project #'s: NMPMC-S-0003-RA, NMPMC-S-0004-WO, NMPMC-S-0403-WO, NMPMC-S-0602-CR, NMPMC-S-0701-CR

LLPMC plant and seed delivery to GCNP September 29, 2009.

ACCOMPLISHMENTS

Seed Production

The LLPMC established seed production fields of blue grama and spike muhly using transplants grown from seed collected at the park. The LLPMC produced the following seed in 2009 for the GCNP:

Accession	Common Name	Scientific Name	Agreement Acreage	2009 LLPMC Acreage	Clean Seed (Bulk lbs.)
9062875	Blue grama	*Bouteloua gracilis*	0.50	0.54	18.76
9066803	Blue grama	*Bouteloua gracilis*	*	0.60	N/A
9062861	Muttongrass	*Poa fendleriana*	2.00	1.50	47.44
9066732	Sideoats grama	*Bouteloua curtipendula*	0.50	0.50	44.50
9066802	Spike muhly	*Muhlenbergia wrightii*	*	0.70	N/A

*****Acreage not finalized.

In September of 2009, the LLPMC delivered the following seed to GCNP:

Common Name	Scientific Name	Pure Live Seed (lbs) Delivered in September 2008
Blue grama	*Bouteloua gracilis*	94.32
Muttongrass	*Poa fendleriana*	59.71
Bottlebrush squirreltail	*Elymus elymoides*	7.46

Transplant Production

In September of 2009, the LLPMC delivered 7,542 transplants of five grass species and 2,775 wildflower and shrub transplants to the GCNP. These transplants were grown from seed produced from the GCNP seed production fields at the LLPMC.

TECHNOLOGY DEVELOPMENT

• Blue grama – Seed was harvested in 2009.

• Muttongrass – Seed was harvested in 2009.

• Sideoats grama – Seed was harvested in 2009.

• Bottlebrush squirreltail - The squirreltail production field was removed in early 2009. Most of the plants in the production field had died, and the remaining plants were in poor condition.

GRAND TETON NATIONAL PARK

FY2009 Annual Summary Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
ABERDEEN, IDAHO

INTRODUCTION

The Aberdeen Plant Materials Center (PMC) entered into an interagency agreement with Grand Teton National Park (GTNP) in 2006 to produce seed of four native grasses for use in revegetation of disturbed areas following road construction. Seed fields of slender wheatgrass (*Elymus trachycaulus*), sandberg bluegrass (*Poa secunda*), blue wildrye (*Elymus glaucus*) and mountain brome (*Bromus marginatus*) were planted in 2006 and seed was harvested in 2007 and 2008. New fields of Idaho fescue (*Festuca idahonensis*) and bluebunch wheatgrass (*Pseudoroegneria spicata*) were planted in May, 2008. Seed from these fields were harvested in 2009 and will be harvested again in 2010. GTNP requested that seed production continue in 2009 from the slender wheatgrass and Sandberg bluegrass fields that were established in 2006.

Grand Teton National Park Bluebunch wheatgrass seed increase field. July 2009

ACCOMPLISHMENTS - Idaho fescue (0.3 acres) and bluebunch wheatgrass (0.17 acres) were planted May 23, 2008 and are located in Field 21, Fish and Game Farm. Soil at the Fish and Game Farm is Declo silt loam with pH of 7.4 to 8.4. Average annual precipitation is 9.39 inches and seed fields are sprinkler irrigated to supplement natural precipitation to approximate 16 to 24 inches of total annual moisture. Weeds were controlled as needed during the growing season. The Idaho fescue and bluebunch wheatgrass fields had fair establishment. Substantial effort continued to rogue Kentucky bluegrass (*Poa pratensis*) out of the Sandberg bluegrass field.

The following table lists the species, field acreage and seed yields from 2009 harvest and seed shipped to GTNP in 2009:

Species	Scientific Name	Acres	Clean seed (lbs)	lbs Shipped
Idaho fescue	*Festuca idahonensis*	0.3	11.0	
Bluebunch wheatgrass	*Pseudoroegneria spicata*	0.17	0.5	
Slender wheatgrass	*Elymus trachycaulus*	1.0	450.0	45
Sandberg bluegrass	*Poa secunda*	0.25	6.5	9
Blue wildrye	*Elymus glaucus*			200
Mountain brome	*Bromus marginatus*			163

Seed samples from each lot were submitted to the Idaho State Seed Laboratory for purity and viability testing (results pending).

DIGITAL PHOTOS

Grand Teton National Park Idaho fescue seed increase field. Aberdeen PMC. April, 2009

Grand Teton National Park Idaho fescue seed increase field. Aberdeen PMC. July, 2009

GRAND TETON NATIONAL PARK

FY2009 Annual Summary Report
Prepared by

UPPER COLORADO ENVIRONMENTAL PLANT CENTER
MEEKER, COLORADO

INTRODUCTION

An agreement between Grand Teton National Park and Upper Colorado Environmental Plant Center was formally approved April 2007 and amended April 2009. The amendment called for the continued production of slender wheatgrass through 2009.

Grand Teton slender wheatgrass

ACCOMPLISHMENTS

A one-acre field of slender wheatgrass planted August 2005 produced 164 clean pounds of seed in 2009. Seed test results are not available at this time.

On July 30, 2009, seed was delivered to Grand Teton National Park in Moose, Wyoming. In all, 896 pounds of seed were delivered for revegetation projects within the park.

TECHNOLOGY DEVELOPMENT

Any specific seed cleaning, testing, or planting methods are available upon request.

GREAT SAND DUNES NATIONAL PARK AND PRESERVE

FY2009 Annual Summary Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
ENVIRONMENTAL PLANT CENTER
MEEKER, COLORADO

INTRODUCTION

In March of 2009, an interagency agreement was signed between Great Sand Dunes National Park and Preserve (GSD) and Upper Colorado Environmental Plant Center (UCEPC) to produce seed of two species, one half acre of Indian ricegrass Achnatherum hymenoides and two-tenths of an acre field of ring muhly Muhlenbergia torreyi. This agreement was signed into effect in April of 2009 and will remain effective until September 30, 2011.

Field of ring muhly in summer 2009

ACCOMPLISHMENTS

The blue grama Bouteloua gracilis field from prior agreements with GSD was discontinued this growing season; however a small section was saved for the park for the purpose of transplanting some plants (sod) at the new park visitor center. Personnel from the park collected the sod on May 15, 2009. The fields of Indian ricegrass and ring muhly were maintained as in previous years and were harvested during the summer of 2009. Ring muhly cleaned seed weight was 3.4 pounds. Indian ricegrass clean seed weight was 32 pounds. At this time, 2009 seed has not been sent to the seed testing lab so pure live seed is unknown, but test results will be in the final report.

Additional Indian ricegrass collections were made by the park during the summer of 2009. The collections were hand delivered by park personnel and were cleaned by UCEPC staff resulting in 6.2 lbs of cleaned seed.

TECHNOLOGY DEVELOPMENT

Standard planting, cultural practices, harvest and cleaning protocols were utilized to handle the Indian ricegrass, and ring muhly. To harvest the blue grama, a UCEPC plant lifter was used to extract the sod clumps from the field. The plant lifter has a rigid blade that undercuts the roots of the plant at the desired depth below the soil surface allowing the plants to be easily removed from their beds. The vibrating motion of the lifter helps loosen any remaining soil around the root balls of the plant. After being loaded into the truck and trailer the plants were watered and covered with burlap bags to prevent them from drying out on the journey back to the preserve.

Trailer filled with blue grama sod. Photo by Manuel Rosales

Removing excess soil from the sod clumps. Photo by Terri Blanke

MESA VERDE NATIONAL PARK

FY2009 Annual Summary Report
Prepared by

UPPER COLORADO ENVIRONMENTAL PLANT CENTER
MEEKER, COLORADO

INTRODUCTION

On August 27, 2007, Upper Colorado Environmental Plant Center (UCEPC) and Mesa Verde National Park signed a new agreement, Inter-agency number 1211-07-006. The three year agreement called for UCEPC to produce approximately 415 PLS pounds of native seed mix from the following species; muttongrass Poa fendleriana, slender wheatgrass Elymus trachycaulus, western wheatgrass Pascopyrum smithii, salina wildrye Leymus salinus, Indian ricegrass Achnatherum hymenoides, needle and thread Hesperostipa comata, yarrow Achillea millefolium, and Louisiana sage Artemisia ludoviciana. This agreement was amended in June of 2009.

Mesa Verde material available for 2010 delivery.

ACCOMPLISHMENTS

The amendment revised targeted species and PLS seed amounts. Due to insufficient seed collections of Indian ricegrass, Achnatherum hymenoides, and needle and thread, Hesperostipa comata, it was agreed to substitute a one-acre planting of UCEPC source, salina wildrye, Leymus salinus. The one-acre field of Salina wildrye was established in August. Five previously established fields, Poa fendleriana, Elymus trachycaulus, Pascopyrum smithii, Achillea millefolium, and Artemisia ludoviciana, produced seed. The 0.02 acre fields of yarrow, Achillea millefolium and Louisiana sage, Artemisia ludoviciana, were both inner-seeded, increasing field establishment to 100%. Irrigation and weed control were applied as needed. As cleaning progresses, individual seed yield and laboratory analysis results will be provided in the park's

full report. Several species of shrubs including antelope bitterbrush, Purshia tridentata, woods rose, Rosa woodsii, Pinyon pine, Pinus edulis, and needle and thread, Stipa comata, continue to be propagated at UCEPC in order to complete Inter-agency agreement number 1211-00-003.

TECHNOLOGY DEVELOPMENT

The germination test that was conducted in 2007, showed Mesa Verde's 2000 slender wheatgrass to be only 3% viable. Three pounds of seed was used to plant the 0.5 acre field. The slender wheatgrass field established well and has produced over 119 pounds of seed. Specific information about germination trials, soil preparation, seeding rates, chemical application rates, equipment, or other seeding establishment methods are available upon request.

Mesa Verde western wheatgrass 2009

Mesa Verde slender wheatgrass

MONTEZUMA CASTLE NATIONAL MONUMENT

FY2009 Annual Summary Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
TUCSON, ARIZONA

INTRODUCTION

This project involves the production of approximately 1600 containerized trees and shrubs (see table below) and the seeding of six acres of pasture at Montezuma Well in the summer of 2010. The ultimate goal of the project is to restore and re-connect two riparian habitats within the park. The project began in May 2009, and should be completed by the 30th of September 2011, according to the stipulation of agreement IA No.:1211-09-005.

Image was taken August 12.

ACCOMPLISHMENTS

In April 2009, PMC personnel drove to Tuzigoot National Monument to pick up the seed for this project from park personnel. A complete inventory of seed picked up was emailed to park personnel in May 2009. Also in early May, seed of the following species was germinated in the Tucson PMC greenhouse: Yucca elata, Atriplex canescens, Chilopsis linearis, Encelia frutescens, Baccharis pteroniodes, Lycium pallidum, Purshia mexicana, and Celtis reticulata. All species had excellent germination except for the Lycium, Purshia, Celtis, and Baccharis. Propagated plants will be delivered to the park in early 2010. For a complete list and total of species grown in 2009, please see the table below:

Shrub Species	Number of plants requested	Jan 2010-Delivery	Jan 2011-Delivery	2009 total plants	Notes on plants
Atriplex canescens	295	X		295	57 extra grown
Baccharis pteronioides	95	X		35	63 still needed-germination & growth are very slow
Mahonia haematocarpa	106		X		Germ/stratification planned winter2010
Encelia frutescens	84	X		84	60 extra grown
Ephedra nevadensis	84		X		Germ/stratification planned winter 2010
Lycium pallidum	167		X		Germ/stratification planned winter 2010
Purshia mexicana	128	X			Germ/stratification planned winter 2010
Rhus trilobata	128		X		Germ/stratification planned winter 2010
Ribes aureum	106		X		Germ/stratification planned winter 2010
Yucca elata	84		X	84	108 extra grown
Sub-Totals	1277			498	
Tree Species	Number of plants requested	Jan 2010-Delivery	Jan 2011-Delivery	2009 total plants	Notes on plants
Celtis reticulata	16		X		Germ/stratification planned winter 2010
Chilopsis linearis	184	X		184	40 extra grown
Frangula californica	94		X		Germ/stratification planned winter 2010
Fraxinus veluntina	25	X			Germ/stratification planned winter 2010
Totals	319			184	
Total Shrub/Trees	1596	811	785	682	

PIPE SPRING NATIONAL MONUMENT

FY2009 Annual Summary Sheet Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIAL CENTER
LOS LUNAS, NEW MEXICO

INTRODUCTION

On September 12, 2002, an agreement was made between Pipe Spring National Monument (PSNM) 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) will produce seed for PSNM. Project #: NMPMC-S-0402-WO

Indian Ricegrass from Los Lunas Plant Material Center.

ACCOMPLISHMENTS

Seed Production

The LLPMC produced the following seed in 2009 for PSNM:

Common Name	Scientific Name	Agreement Acreage	2009 LLPMC Acreage	Clean Seed (Bulk lbs.)
Galleta	Pleuraphis jamesii	0.50	0.00	None
Indian ricegrass	Achnatherum hymenoides	0.50	0.25	41.08

ROCKY MOUNTAIN NATIONAL PARK

FY2009 Annual Summary Report
Prepared by

UPPER COLORADO ENVIRONMENTAL PLANT CENTER
MEEKER, COLORADO

INTRODUCTION

Upper Colorado Environmental Plant Center (UCEPC), Rocky Mountain National Park (ROMO), and the USDA Natural Resources Conservation Service (NRCS) signed a cooperative plant materials agreement (IA Project No. 1211-08-001) in May 2008 that extends through 2009. This agreement involves seed production of five forbs and five grass species for revegetation of the Bear Lake Road Project. UCEPC and ROMO have two additional agreements for seed production for restoration work on the west side of the park where a new underground powerline will be installed, and the east side of the park for restoration of cheatgrass infested sites.

ROMO Oxytropis

ACCOMPLISHMENTS

This year, two species were established for the Bear Lake Road Project from container produced materials. Over 8000 plugs were used to establish a bottlebrush squirreltail field of 0.73 acre and 500 plugs were used to establish a plot of rose pussytoes. The planting efforts this year bring the total number of seed increase products for ROMO, Bear Lake Road to ten. Each of the eight established Bear Lake Road Project materials were harvested in 2009. Golden banner seed production continues to be problematic, providing less than 2 pounds of clean seed, and the blue grama only produced 9.4 pounds. Respectable amounts of seed were harvested from mountain

muhly (17 lb), needle-and-thread, which is not yet cleaned, prairie Junegrass (3 lb), purple locoweed (15.5 lb), fringed sage (10 lb), and hairy goldenaster which has not yet been cleaned either.

On August 4, Steve Parr and Pat Davey provided a Seed Collection Training Workshop for 20 park employees at Rocky Mountain National Park. The following week, Lindsay Springer, Scott Esser, and Bryce Lloyd from ROMO traveled to UCEPC in Meeker to review the production fields for the Colorado River Power Line Revegetation Project and the Bear Lake Road Project. After a field session, a review of species being produced, and those having promise for seed increase for additional projects, and estimates of seed collection efforts and size of production fields, were discussed. The revegetation needs were identified for the Colorado River Power Line Project as well as the future revegetation needs for the East Side and West Side disturbances. No seed was shipped to the Park in 2009.

TECHNOLOGY DEVELOPMENTS

Seed germination, stratification and results of other seed treatments are available upon request.

ROMO Oxytropis field at UCEPC

ROCKY MOUNTAIN NATIONAL PARK

FY2009 Annual Summary Report
Prepared by

UPPER COLORADO ENVIRONMENTAL PLANT CENTER
MEEKER, COLORADO

INTRODUCTION

Upper Colorado Environmental Plant Center (UCEPC), Rocky Mountain National Park (ROMO), and the USDA Natural Resources Conservation Service (NRCS), signed a cooperative plant materials agreement (IA Project No. 1211-07-009) in August 2008. The agreement calls for the production of native plant materials indigenous to the west side of Rocky Mountain National Park for a restoration project. The project will provide materials to revegetate disturbances resulting from the removal of an overhead powerline and the subsequent installation of an underground power transmission line.

Seed collection training/workshop in ROMO

Colorado River District Powerline Project

Common Name	Scientific Name	Symbol
Grasses		
Blue wildrye	Elymus glaucus	ELGL
Nodding brome	Bromus anomalus	BRAN
Forbs/Legumes		

Beauty cinquefoil	Potentilla pulcherrima	POPU

ACCOMPLISHMENTS

Clean seed was used to establish two of three fields of the species listed below in 2008 while the beauty cinquefoil was established from plugs. Seed production was realized in 2009 for each of the three species.

Increase Species	Planted Acreage	Clean Seed Amount
Bromus anomalus	1.2 acres	106 lb
Elymus glaucus	0.26 acre	1.60 lb
Potentilla pulcherrima	0.17 acre	1.69 lb

Poor field production of blue wildrye in 2009 prompted the request to increase the field of nodding brome to 1.5 acres. This situation was acknowledged and an additional 0.33 acre was added on August 24, 2009. The clean seed amount represents a little over one half of the targeted amount of 210 pounds.

TECHNOLOGY DEVELOPMENTS

The nodding brome seed that was planted in 2008 was treated with the fungicide, Dividend, for head smut control. In 2009, there was no head smut noted in the production field.

ROCKY MOUNTAIN NATIONAL PARK

FY2009 Annual Summary Report
Prepared by

UPPER COLORADO ENVIRONMENTAL PLANT CENTER
MEEKER, COLORADO

INTRODUCTION

Upper Colorado Environmental Plant Center (UCEPC), Rocky Mountain National Park (ROMO), and the USDA Natural Resources Conservation Service (NRCS), signed an interagency plant materials agreement (IA Project No. 1211-09-003) in July 2009. This agreement extends through 2013. The agreement calls for the production of three native plant materials indigenous to the east side of ROMO for general restoration projects. The primary focus of plant material selection for this agreement is based on those species that naturally occur on the east side of the park that have attributes that will enable successful competition with cheatgrass.

General Eastside Restoration

Training on use of hoop collectors in ROMO

ACCOMPLISHMENTS

Each planting was established from seed collected from park personnel in 2008. All fields were directly seeded, and emergence and establishment was noted for all. Below, the species and acreage planted are listed.

Species	Acreage	Planting Date
Bottlebrush squirreltail	2.0	8/6/2009
Canada wildrye	1.5	8/5/2009
Scratch grass	0.5	8/12/2009

Steve Parr and Pat Davey also conducted a Seed Collection Training for 20 employees of ROMO on August 4, 2009. Some of the seed collected from the training as well as subsequent collections will be utilized for new projects and to supplement agreements that are currently in place.

TECHNOLOGY DEVELOPMENTS

Collection methods and equipment used during the training that were new to park employees, were demonstrated. The use of hoop collectors for shrub seed collection, and forceps and clippers to check for seed fill were all new applications.

SAGUARO NATIONAL PARK

FY2009 Annual Summary Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
TUCSON, ARIZONA

INTRODUCTION

This project involves the production of 690 containerized plants to be used for the revegetation of two disturbed areas of Saguaro National Park, in Tucson, Arizona: Hope Camp and Scenic Drive. The last signature on the agreement was the 17th of May, 2009, with the project extending until the 30th of September, 2010. Plant Materials personnel provided expertise on growing methods for a number of species of plants, as well as the maintenance, inputs and space for the growing plants between the end of July until the end of December 2009.

Menadora scabra and Porophyllum gracile seedlings
in thegreenhouse, four days after planting.

ACCOMPLISHMENTS

Plant materials personnel provided assistance to park personnel in the selection and purchase of growing mediums and containers in early July 2009. Saguaro National Park personnel and volunteers arrived at the Plant Materials Center (PMC) in late July to begin work on the propagation of the forb and grass species listed in table one. In September, park personnel returned to the PMC to propagate the tree and shrub species listed in table two. In both instances, seed was placed in trays, allowed to germinate, and transplanted into pots when at the appropriate growth stage. At the time of this report, all plants targeted for the Hope Camp area of the park have been picked up from the PMC by park personnel. Species targeted for the

Scenic Drive area of the park will remain at the PMC until mid-February 2010. Some of the species propagated by park personnel exhibited very low germination success rates. Those species included cane beardgrass, creosote bush, odora, paperflower, and Desert globemallow. To compensate for the lower germination rates, park personnel increased the transplanted numbers of some of the other species. Additionally, in mid-August, park personnel propagated two additional species, Digitaria californica and Dyssodia tenuloba, to ensure enough plants were available for revegetation.

Table 1. Species started in July 2009

Common name	Scientific name	Number needed
Purple threeawn	Aristida purpurea	30
Cane beardgrass	Bothriochloa barbinodis	30
Creosote bush	Larrea tridentata	80
Menadora	Menadora scabra	80
Odora	Porophyllum gracile	80
Paperflower	Psilostrophe cooperi	80
Desert senna	Senna covesii	30
Desert globemallow	Sphaeralcea ambigua	80
Totals		490

Table 2. Species started in September 2009

Common name	Scientific name	Number
Whitethorn acacia	Acacia constricta	30
Catclaw acacia	Acacia greggii	40
Fairy duster	Calliandra eriophylla	10
Foothills paloverde	Cercidium microphyllum	50
Ocotillo	Fouquieria splendens	20
Mesquite	Prosopis velutina	50
Totals		200

Prosopis velutina transplants in the greenhouse, approximately one month old.

WUPATKI NATIONAL MONUMENT

2009 Annual Summary Sheet Report
Prepared by

NATURAL RESOURCE CONSERVATION SERVICE
PLANT MATERIAL CENTER
LOS LUNAS, NEW MEXICO

INTRODUCTION

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) will produce seed for the WNM. Project #: NMPMC-S-0601-CR

Wupatki Galleta

ACCOMPLISHMENTS

Seed Production
See previous LLPMC National Park Service reports on WNM seed production.

Transplant Production
Transplant production is not part of this agreement.

TECHNOLOGY DEVELOPMENT

See previous LLPMC National Park Service reports for information on Project # NMPMC-S-0601-CR with WNM.

The WNM agreement was terminated in 2009.

YELLOWSTONE NATIONAL PARK

FY2009 Annual Summary Report
Prepared by

NATURAL RESOURCE CONSERVATION SERVICE
BRIDGER, MONTANA

INTRODUCTION

The agreements facilitate the collection, increase, and reestablishment of indigenous plant material for restoration of disturbances resulting from road construction and other improvement projects within Park boundaries. The Bridger PMC has maintained cooperative agreements with Yellowstone National Park since FY 1986.

In 2009, 10 allocations of 138 seed lots from 47 species were distributed to Yellowstone, Yellowstone-contracted growers, or to the PMC totaling 186 pounds (84 kg). This included 56 grass lots (14 species) weighing 171 pounds (78 kg); 79 forb lots (31 species) weighing 15 pounds (7 kg); and three woody lots weighing 0.14 pound (0.06 kg). The distribution included 10 grass lots (five species) and one tree species to the BPMC for planting seed increase fields and container production.

NPS Subagreement No. 1211-09-001.
NRCS Subagreement No. 67-0325-09-001.
Project Title: Development of plant materials for revegetation of disturbed areas related to Federal Land Highway Projects (FLHP).
NPS Agreement No. F1574090101.
NRCS Subagreement No. 67-0325-09-037.

Project Title: Collecting, evaluating, growing, and increasing plant materials for use in non-FLIP disturbed areas.

ACCOMPLISHMENTS

Yellowstone National Park has identified future road projects allowing collection and production efforts to begin at least 3 years in advance of each project.

Wildland seed collections are made by Yellowstone and BPMC crews, dried, and either delivered to the Bridger PMC, or picked up by PMC personnel. In 2009, 67 collections were made from 29 species: 44 grasses (15 species) at 51 pounds (23 kg), 23 forbs (14 species) at three pounds (1.3 kg). The wildland seed collections totaled 54 pounds (25 kg).

Records are maintained by the PMC of person-hours to collect each seed lot, from which the approximate cost of collecting native seed can be estimated. In 2009, Yellowstone and BPMC personnel spent more than 329 person-hours in the activity of seed collection on 15 different sites. There were 283 hours (approximately 6.4 hours per collection) dedicated to collecting grass seed on 15 sites and 46 hours (approximately 2 hours per collection) for forbs on eight sites.

There were seven grass increase blocks planted at the PMC on 1.23 acres (0.5 ha) in 2009. Seed increase blocks of two grasses on 0.52 acres (0.2 ha) were removed due to natural decline in production, project completion, or poor establishment. Currently there are 1.87 acres (0.76 ha) planted with 10 accessions of eight grass species in seed increase blocks at the Bridger PMC.

During the past growing season, five grass species were harvested on 1.5 acres (0.6 ha). The total amount of seed produced was 78 pounds (35 kg), with the best grass stand yielding 174 lb/acre (195 kg/ha).

Purity analysis and tetrazolium viability tests are being conducted on PMC seed increase production for two grass accessions. All samples were cleaned to exceed purity standards set forth for foundation seed class as established by the Association of Official Seed Certifying Agencies. The samples are expected to average greater than 90% viability and purity.

The wildland collection and seed increase inventory contains 482 lots (89 species) totaling 1,509 pounds (684 kg). It is comprised of 250 grass lots (30 species) at 1,456 pounds (660 kg), 227 forb lots (55 species) at 53 pounds (24 kg), and five woody lots (four species) weighing 0.5 pound (0.3kg). There are approximately 1,600 lodgepole pine seedlings in the vegetative inventory.

TECHNOLOGY DEVELOPMENT

All plant material collections are assigned accession numbers and inventoried in a database. The lot identification numbers have been upgraded to include identification by individual construction projects. Extensive assistance was provided in seed collection, study site selection, and planting of cereal grains to revegetate the Northern Boundary.

YELLOWSTONE NATIONAL PARK

FY2009 Annual Summary Report
Prepared by

NATURAL RESOURCE CONSERVATION SERVICE
BRIDGER, MONTANA

INTRODUCTION

Effective in fiscal year 2009, a new Yellowstone National Park agreement was developed to address issues associated with enhancing critical wildlife habitat along the northern boundary in the Gardiner Basin. The 3-year project facilitates seed production of two native grasses at the BPMC, along with establishment of restoration test plots on historically abandoned cropland in the Park. The plots will be evaluated on the effectiveness of different weed control methods, seeding techniques, and plant performance. The Bridger PMC has maintained cooperative agreements with Yellowstone National Park since FY 1986.

NPS Subagreement No. 1211-08-007
NRCS Subagreement No. 67-0325-08-012.
Project Title: Restoration of Gardiner Basin agriculture fields to native species.

ACCOMPLISHMENTS

The BPMC was instrumental in securing a mechanical seed harvest permit from the Bureau of Land Management to assist Yellowstone National Park with seed collection efforts at the Carbella Site over several years. The permit also sanctions a cooperative soil microbial study with Dr. Bill Hamilton of Washington and Lee University in Lexington, Virginia. The BPMC orchestrated scheduling and use of the Native Seedster™, a new, innovative seed-stripping machine. On July 23, it was transported from Billings, Montana, for a 1-day performance and efficiency test in wildland collecting of bluebunch wheatgrass at the Carbella site along the

Yellowstone River, 15 miles north of the Park. In addition, Yellowstone National Park personnel spent more than 118 hours hand-collecting seed of four grasses at the same site.

On April 13, 2009, the BPMC planted a 0.51-acre bluebunch wheatgrass seed-increase field and a 0.38-acre field of needle and thread grass. The two areas were periodically irrigated, sprayed with herbicides to control weeds, and cultivated over the course of the growing season. Despite all the agronomic effort, seedling establishment was extremely variable. On August 21, two more seed-increase fields were planted and kept moist with constant irrigation until the seedlings emerged and grew to at least a three- to four-leaf stage and appeared large enough to withstand freezing temperatures.

The 2008 and 2009 wildland seed collections from the Carbella site were processed and inventoried at the BPMC. There are seven lots of four grasses with more than 35 pounds (16 kg) of seed

TECHNOLOGY DEVELOPMENT

On May 7, the BPMC attended a seminar and on-site review by Dr. Hamilton on the results of soil sampling for microbes in different plant communities in the Park. The BPMC provided Dr. Hamilton with seed of several native species for laboratory testing and examination of plant interactions with soil microbes indigenous to Yellowstone National Park. The field studies will generate data on microbial community dynamics related to exotic and native plants and nitrogen cycling in the soil. The data will be analyzed and used to enhance the success rate of native revegetation efforts in Yellowstone National Park.

On September 17, the PMC assisted with training Yellowstone personnel in the calibration and operation of a newly-purchased Truax Rough Rider rangeland drill. The Yellowstone crew successfully planted 'Willow Creek' winter wheat in a 22-acre fenced area near Stephens Creek, previously spring-seeded to barley. The cereal grains are being planted to improve organic matter, and herbicides are being applied to reduce the amount of the weedy desert alyssum and eliminate a minor population of crested wheatgrass. The site will continue to be treated until the restoration test plots are established in the fall of 2011.

YELLOWSTONE NATIONAL PARK

FY2009 Annual Summary Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
ABERDEEN, IDAHO

INTRODUCTION

In 2008, the Natural Resources Conservation Service (NRCS), Plant Materials Center (PMC), Aberdeen, Idaho entered into an interagency agreement with the National Park Service (NPS), Yellowstone National Park (YELL) to produce seed of Sandberg bluegrass (Poa secunda), bluebunch wheatgrass (Pseudoroegneria spicata), and needleandthread (Hesperostipa comata ssp. comata) for use on restoration sites at YELL. Seed will be harvested from these fields in 2010 and 2011 with possible extension to 2012.

GRASS SEED PRODUCTION

Yellowstone National Park bluebunch wheatgrass seed increase field,Aberdeen PMC – September, 2009

ACCOMPLISHMENTS

The needleandthread and bluebunch wheatgrass fields were planted on June 9, 2009 and the Sandberg bluegrass field was planted on June 26, 2009. The seeding rate to plant these seed production fields were 4.3, 4.5 and 2.5 pounds respectively. The late planting of Sandberg bluegrass was due to heavy rains during the month of June which prevented earlier planting.

Sandberg bluegrass was planted in field 2E at the PMC Home Farm and the bluebunch wheatgrass and needleandthread were planted in field 410E at the University of Idaho Brewington Farm. Each field is approximately 1 acre.

Soils at the PMC Home Farm are Declo silt loam with pH of 7.4 to 8.4. Soils at the Brewington Farm are classified as Declo loam but these soils have a high percentage of sand.

Yellowstone National Park needleandthread seed increase field, Aberdeen PMC - September, 2009

Average annual precipitation is 9.39 inches and seed fields are sprinkler irrigated to supplement natural precipitation to approximate 16 to 24 inches total annual precipitation.

Standard cultural practices for stand establishment for seed production were used and weeds were controlled as needed during the growing season. Establishment of the seed production fields are rated fair to good, considering that the stock seed is from wildland collections with no history of performance.

DIGITAL PHOTOS

Yellowstone National Park Sandberg bluegrass seed increase field, Aberdeen PMC - September, 2009

YELLOWSTONE NATIONAL PARK

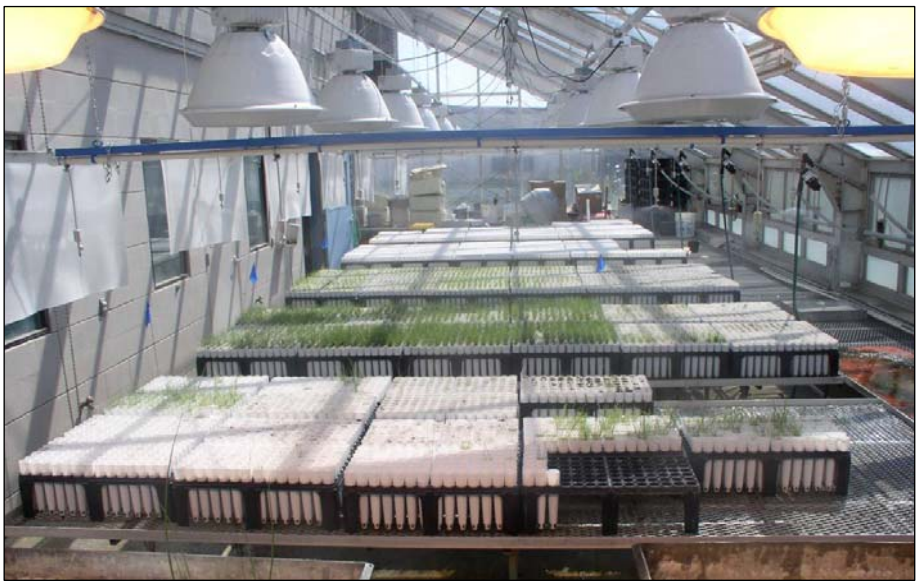
FY2009 Annual Summary Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
ABERDEEN, IDAHO

INTRODUCTION

In 2008, the Natural Resources Conservation Service (NRCS), Plant Materials Center (PMC) entered into an interagency agreement with the National Park Service (NPS), Yellowstone National Park (YELL) to propagate and deliver approximately 35,000 wetland plants in 10 cubic inch conetainers. Delivery is to take place over a three year period (approximately 12,000 plants per year) beginning in the fall of 2009. Species to be grown include Carex aquatilis, C. microptera, C. rostrata, C. utriculata, Juncus ensifolius, and Deschampsia caespitosa. Seed for propagation was provided from Yellowstone collections stored at the Bridger, Montana PMC.

WETLAND PLANT PROPAGATION



Yellowstone plants in Aberdeen PMC Greenhouse July, 2009.

ACCOMPLISHMENTS

Due to delays in road construction, the number of plants requested was lowered to 5000 for the first delivery of plants in 2009. The following table outlines the species, greenhouse planting date, survival and final numbers delivered to Yellowstone:

Species	# Requested	# Planted	Planting Date	# Alive	% Survival	# Delivered
Deschampsia caespitosa	1000	1568	5/27/09	1334	85	1334
Carex aquatilis	1000	392	6/22/09	227	58	227
Juncus mertensianus 1	2000	2352	5/26/09	2300	98	1026
Carex utriculata	1000	1568	6/23/09	1456	93	1456
Carex rostrata 2		1176	6/23/09	468	40	468
Total	5000			5785		4511

1 Species identity is questionable.
2 Carex rostrata was substituted for Carex aquatilis because of lack of seed to propagate desired amounts.
1,274 Juncus plants are being held over at the PMC for delivery in the spring of 2010.

TECHNOLOGY DEVELOPMENT

Deschampsia caeaspitosa was direct seeded into conetainers with no pre-treatment of the seed. The Juncus and Carex seed was stratified in a "sphagnum moss tea" under a constant temperature of 5º C for 14 days and 40 days respectively prior to planting. All seed was surface planted, covered with a thin layer of perlite, and pressed to maximize seed to soil contact. Irrigation was by overhead spray with water applied 3 minutes every hour from 8 am to 6 pm daily with a weekly application of 45 minutes to help flush any salt buildup out of the conetainers. Supplemental lighting was provided from 8 pm to 8 am each day. Plants were fertilized with liquid Miracle Grow® once weekly from July 24 – September 11. Heating temperature in the greenhouse was 80º F and cooling temperature was 100º F. Greenhouse heating temperature was lowered to 40º F approximately 4 weeks before delivery (October 7) to allow the plants to harden for field transplant.

DIGITAL PHOTOS

Carex aquatilis August, 2009

Carex utriculata August, 2009

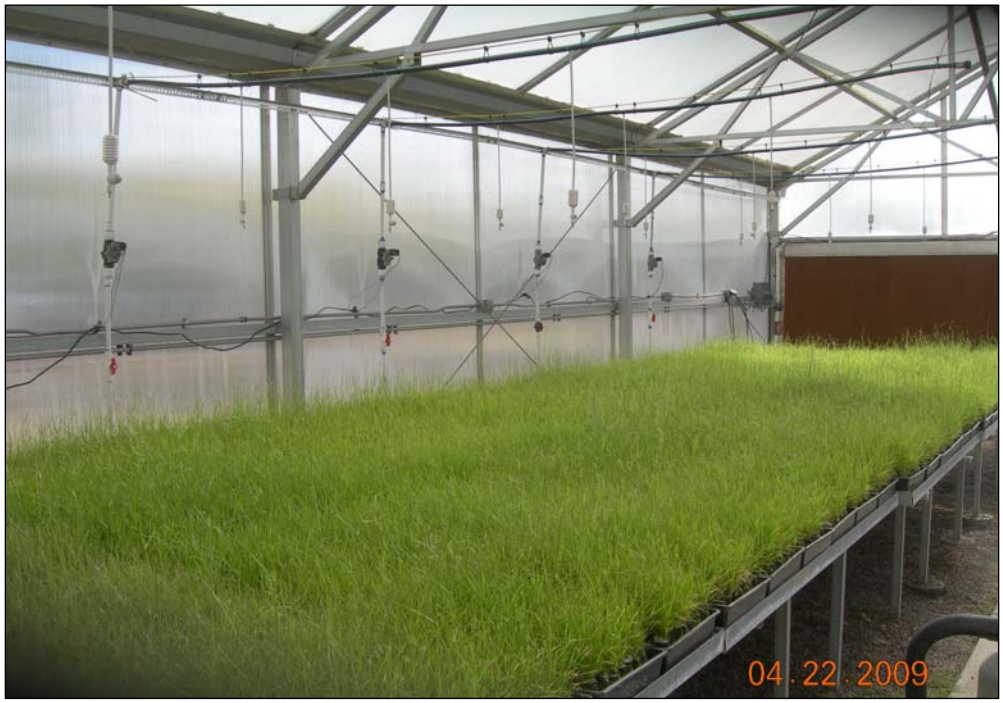
ZION NATIONAL PARK

FY2009 Annual Summary Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
TUCSON, ARIZONA

INTRODUCTION

This project involves the production of 900 PLS lbs of Sporobolus cryptandrus to be used for revegetation of disturbed areas in Zion National Park. The last signature on the agreement was the 8th of January, 2007, with the project originally extending until the 30th of September, 2009. In August of 2009, a modification was completed which extended the agreement until December 31, 2011.



16,000 Sporobolus cryptandrus plants in the greenhouse prior to outplanting

ACCOMPLISHMENTS

In October of 2007, 1.68 acres of land was planted with Sporobolus cryptandrus at the center. Due to watering difficulties, and thus poor production of several of the planted acres, and the large amounts needed for the contract, the acreage was increased to 5.25 in March of 2009. For the increase, approximately 16,000 Sporobolus cryptandrus plants were grown in our greenhouse from the seed originally sent to the center in November 2006.

At the end of April 2009, these plants were transplanted to our fields. In total, there were three harvests conducted during the growing season of 2009. The total bulk harvest total was 440 pounds. In August of 2009, 170 pounds of bulk seed (154 PLS pounds) was sent via Fed Ex ground to Great Basin Seed, Ephraim, Utah, as requested by park personnel. With the increase in total acreage dedicated to this project, the center plans to reach production goals by the end of the growing season 2011.

TECHNOLOGY DEVELOPMENT

For the majority of the harvests conducted in 2009, a Massy Ferguson MXP plot combine was used. The use of the combine has significantly increased the amount of seed collected during each harvest. Conversely, the combine has significantly decreased the amount of time needed to clean harvested seed as the combine's internal threshers remove the majority of stems and trash from the harvested product.

The center has also invested in a new seed cleaner, Seedburo's Clipper Eclipse Model 324, which is larger than the one originally used to increase seed cleaning efficiency. Prior to the purchase, the time necessary to clean a 100 pound combine harvest exceeded 40 man hours. With the new cleaner, a 100 pound harvest can be cleaned within 12 man hours.

Sporobolus cryptandrus plantings: new in the foreground, old in the background

ZION NATIONAL PARK

FY2009 Annual Summary Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIAL CENTER
LOS LUNAS, NEW MEXICO

INTRODUCTION

On September 12, 2002, an agreement was made between the Zion National Park (ZNP) 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) will produce seed for the ZNP. Project #: NMPMC-S-0301-WO

Bottlebrush squirreltail seed production field for Zion National Park:
Los Lunas Plant Materials Center, Field 26N as of May, 2009.

ACCOMPLISHMENTS

Seed Production

In 2009, the LLPMC grew bottlebrush squirreltail transplants to increase the seed production to 1.29 acres. The LLPMC produced the following seed in 2009 for ZNP:

Common Name	Scientific Name	Agreement Acreage	2009 LLPMC Acreage	Clean Seed (Bulk lbs.)
Bottlebrush squirreltail	Elymus elymoides	0.50	1.29	98.62
Galleta	Pleuraphis jamesii	0.50	0.00	None
Indian ricegrass	Achnatherum hymenoides	0.50	0.42	79.04
Muttongrass	Poa fendleriana	0.50	0.00	None
Sand bluestem	Andropogon hallii	0.50	0.50	44.52

Transplant Production
Transplant production is not part of this agreement.

TECHNOLOGY DEVELOPMENT

• Bottlebrush squirreltail – Seed was harvested in 2009. Transplants were produced from the harvested seed and used to increase the seed production field to 1.29 acres.

• Galleta – Seed production field was removed in 2009.

• Indian ricegrass – Seed was harvested in 2009.

• Muttongrass – Seed production field was removed in 2009.

• Sand bluestem – Seed was harvested in 2009.

BADLANDS NATIONAL PARK

FY 2009 Annual Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
BISMARCK, NORTH DAKOTA

INTRODUCTION

The Bismarck Plant Materials Center (PMC) entered into a cooperative agreement in May 2007 to provide seed and technical information needed for revegetation of areas disturbed by construction activities of FLHP PMIS 78257, Rehab Loop Road Phase III and IV in the Badlands National Park in South Dakota. The agreement is between the National Park Service, Badlands National Park of the U.S. Department of Interior, and the USDA Natural Resources Conservation Service. This agreement is in effect from FY 2007 through FY 2010. The Bismarck Plant Materials Center (PMC) has agreed to produce native grass seed of five species collected in the Park by Park personnel and PMC staff. The seed produced at the PMC will be distributed to the Park for their revegetation work. The following are targeted species being increased for this project: green needlegrass (Nassella viridula), western wheatgrass (Pascopyrum smithii), slender wheatgrass (Elymus trachycaulus), blue grama (Bouteloua gracilis), and sand dropseed (Sporobolus cryptandrus).

Harvesting green needlegrass

ACCOMPLISHMENTS

This was the second growing season for the seed increase fields at the PMC. Grass stands were well established on all fields by the end of the growing season. The cool-season grasses did extremely well and produced large amounts of biomass. The western wheatgrass and slender wheatgrass fields were lodged by the end of the summer making seed harvest difficult. All the fields were straight combined when seed reached the hard dough stage. Seed production was average on all species. The seed is being cleaned by the PMC and will be sent to the North Dakota State Seed Department for purity and germination tests.

TECHNOLOGY DEVELOPMENT:
Seed harvest information will be documented including seed maturity dates and combine settings. Seed cleaning methods will also be documented for each species.

Blue grama field prior to seed harvest

THEODORE ROOSEVELT NATIONAL PARK

FY2009 Annual Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
BISMARCK, NORTH DAKOTA

INTRODUCTION

The Bismarck Plant Materials Center (PMC) entered into a cooperative agreement in May 2007 to provide seed and technical information needed for revegetation of areas disturbed by construction activities in the North Unit Scenic Route 10 of the Theodore Roosevelt National Park in western North Dakota. The agreement is between the National Park Service, Theodore Roosevelt National Park of the U.S. Department of Interior, and the USDA Natural Resources Conservation Service. This agreement is in effect from FY 2007 through FY 2010. The Bismarck Plant Materials Center (PMC) has agreed to produce native grass seed of six species collected in the Park by Park personnel and PMC staff. The seed produced at the PMC will be distributed to the Park for their revegetation work. The following are targeted species being increased for this project: western wheatgrass (*Pascopyrum smithii*), green needlegrass (*Nassella viridula*), thickspike wheatgrass (*Elymus lanceolatus*), sideoats grama (*Bouteloua curtipendula*), blue grama *(Bouteloua gracilis*), and prairie junegrass (*Koeleria macrantha*). During the collection process, thickspike wheatgrass was substituted for slender wheatgrass.

Green needlegrass field showing new seedling growth (front of photo)
from dormant seed that germinated during the second year after initial seeding

2007 ACCOMPLISHMENTS

Seed of the six targeted species was collected by Park and PMC staff. Each of the species collected was assigned an accession number by PMC staff for identification and tracking

purposes. This seed was cleaned by staff at the Bismarck PMC. Seed samples of were taken and sent to the NDSU Seed Testing Laboratory located at Fargo, North Dakota, for purity and germination tests. A 0.49-acre field of green needlegrass was planted as a dormant seeding on November 30, 2007, in panel G-4 at the PMC. The seedbed was prepared using a small 6-foot S-tined cultivator and spring tooth harrow. The field was firmly packed with a Brillion packer and seeded in 42-inch rows with a modified Truax grass drill.

2008 ACCOMPLISHMENTS

Fields were prepared the same for western wheatgrass and thickspike wheatgrass by using a 6-foot S-tined field cultivator and a spring tooth harrow. The fields were firmly packed with a Brillon packer and seeded in 42-inch rows with a modified Truax grass drill. A 0.57-acre field of western wheatgrass and a 0.5-acre field of thickspike wheatgrass were seeded on May 1, 2008, in panel G-4 of the PMC. Due to the limited seed amounts of sideoats grama and blue grama, a plot drill was used to plant a 6- x 189-foot bed (0.03 acres) of sideoats grama and a 6- x 158-foot bed (0.02 acres) of blue grama on June 10, 2008, in panel G-4 of the PMC. Seed amounts of prairie junegrass were also limited. It was decided to grow plants in the greenhouse for establishing a field. The plants were grown in the greenhouse and were moved to the lathhouse May 12, 2008, to harden off for transplanting into the field. A field in panel G-4 was tilled May 22, 2008, and a specialized chisel bar with two chisel shovels spaced 42 inches apart was used to make two rows. Approximately 700 plants were transplanted into these rows on May 22, 2008. Survival of the junegrass plants was excellent. The western wheatgrass and thickspike wheat-grass fields established well, by the end of the summer. The sideoats grama and blue grama beds were slower to establish and a fair stand was noted by the end of the summer.

2009 ACCOMPLISHMENTS

Cool moist conditions resulted in large herbage production and fair seed production for the cool-season species. It was especially evident in the western wheatgrass and thickspike wheatgrass fields which produced large amounts of biomass and were generally lodged by the end of the summer. The prairie junegrass put on excellent growth and produced 5.5 pounds of clean seed from the 700 plants. The sideoats grama and blue grama fields had good growth and seed production was good despite the small field size. All fields were straight combined at seed maturity. The seed is being cleaned at the Plant Materials Center. Seed samples from each lot will be sent to the North Dakota State Seed Lab for purity and germination tests.

TECHNOLOGY DEVELOPMENT

Propagation techniques and seed cleaning protocols are being documented for each species.

GOLDEN GATE NATIONAL RECREATION AREA

2009 Annual Summary Report
Prepared by Amy Bartow

NATURAL RESOURCES CONSERVATION SERVICE
CORVALLIS PLANT MATERIALS CENTER
CORVALLIS, OREGON

INTRODUCTION

In 2009, The Corvallis Plant Materials Center (PMC) entered into a new agreement with GoldenGate National Park to provide native plant materials for ecological restoration following road construction in the Marin Headlands. The PMC has agreed to produce 250 lbs of two grasses. Marin Headlands Revegetation Project

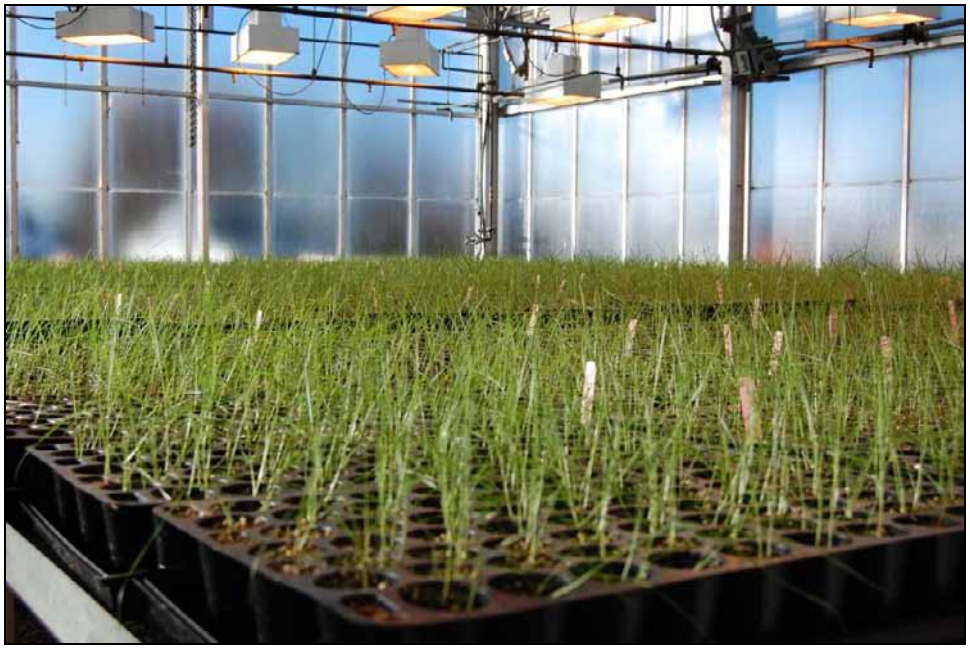


Figure 1. Foothills needlegrass (Nassella lepida) seedlings in the PMC greenhouse, December 30, 2009.

ACCOMPLISHMENTS

The Park had collected some seed in 2009, but it was not enough to directly sow the acreage that the Park desired. PMC staff used the seed to produce plugs which could then be transplanted into a seed increase field. This method is far more labor intensive, but can make a much larger field with the small amount of wild seed that the Park had provided. Seed was sown into containers in early December. Approximately 22, 5000 containers were sown. They will be transplanted out into a seed increase field at the PMC in early spring of 2010.

TECHNOLOGY DEVELOPMENTS

Foothills needlegrass (Nassella lepida) is a new species to the PMC staff. Informal germination trials showed that the seeds germinated best in cool temperatures and that they were not considered dormant.

LASSEN VOLCANIC NATIONAL PARK

2009 Annual Summary Report
Prepared by Amy Bartow

NATURAL RESOURCES CONSERVATION SERVICE
CORVALLIS PLANT MATERIALS CENTER
CORVALLIS, OREGON

INTRODUCTION

The Corvallis Plant Materials Center (PMC) entered into a new agreement with Lassen Volcanic National Park in 2009 to provide additional native plant materials for planting around the new Visitors' Center and restoring historically disturbed lands in the park. It was agreed that the PMC would produce a minimum of 16,875 container plants including: 1000 grass plugs, 3700 sedge and rush plugs, 4100 trees, and 7575 shrubs. Three small deliveries of plants will occur in 2009, 2010 and 2011 to spread out the labor of planting nearly17,000 containers. The optimal transplanting conditions at the Park exist in late September and early October. With this limited time to transplant, staggering the deliveries over three years will make the project more managable. Activities in 2009 included the collection and vegetative propagation of one shrub species and production (by seed) of one tree and three other shrub species. Visitors' Center Landscape Project

Figure 1. Plants produced by the PMC in 2009 that were delivered to the new Visitors' Center.

ACCOMPLISHMENTS

In 2009, the PMC produced and delivered over a third of the plants required for this three year project. On September 4, 2009, PMC staff traveled to the park to deliver the plants. The

manzanita, alders and ceanothus were unloaded near the planting site at the Visitors' Center and the pines were delivered to the Manzanita Lake area.

Table 1. Plants Delivered to Lassen Volcanic National Park, September 4, 2009, for the Visitors' Center agreement.

Species	Code	Accession #	Size	Number delivered
Ceanothus cordulatus	CECO	9079553	D-40	362
Ceanothus cordulatus	CECO	9079553	stubby cones	830
Arctostaphylos nevadensis	ARNE	9079554	D-40	1414
Alnus incana	ALIN	9079603	D-40	160
Alnus incana	ALIN	9079603	stubby cones	25
Pinus jeffreyi	PIJE	9079583	D-40	2880
			total	5671

TECHNOLOGY DEVELOPMENT

The PMC is to provide 1000 containers of Ceanothus cordulatus for this agreement. This species has been propagated previously at the PMC and severe mold issues occur on the seed while it is in stratification. This year, trials using Zero-tol (concentrated hydrogen dioxide) were conducted in different concentrations and at various times during the stratification process. Seed of all treatments was cleaned and placed in hot water (180°F) and left to cool/soak for 24 hours. Before going into stratification, seeds were rinsed with a 1% dilute solution of Zero-tol, a concentrate solution, or water (treatment 1).Seeds were then spread out on moistened germination paper in plastic germination boxes and placed in a walk-in cooler. Seeds were monitored weekly for germination; no germination was observed. After 60 days in the cooler, seeds were rinsed again (treatment 2) and then transferred back into germination boxes. The boxes were moved to a growth chamber set at 70° (F) days/ 50° (F) nights and 12 hours of day light. Within a few days, seeds began to germinate. Seedlings were counted and transplanted into 7" stubby cells. Washing with the dilute solution used (treatment 1) followed by a water or soap wash (treatment 2) seemed to produce the highest germination. Mold was still present in most boxes, except for the boxes that were treated with concentrate both times. See the full report for details.

MOUNT RAINIER NATIONAL PARK

2009 Annual Summary Report
Prepared by Amy Bartow

NATURAL RESOURCES CONSERVATION SERVICE
CORVALLIS PLANT MATERIALS CENTER
CORVALLIS, OREGON

INTRODUCTION

The Corvallis Plant Materials Center (PMC) entered into a new agreement with the National Park Service (NPS) in 2007 to provide native plant materials for ecological restoration along Steven's Canyon Road following road construction. It was agreed that the PMC would establish and maintain seed increase fields of three grasses (five accessions). The PMC will deliver 195 lbs pure live seed (PLS) of upper elevation grasses and 135 lbs (PLS) of lower elevation grasses. The road construction project was expected to be complete in 2009, but now has been delayed until 2011. Seed will be held at the PMC until it is requested by the Park. Activities in 2009 included maintenance and harvest of five seed increase fields of high and low elevation ecotypes of three grasses.

Steven's Canyon Road Revegetation Project

Figure 1. Blue wildrye (Elymus glaucus) seed increase field at the Corvallis Plant Materials Center.

ACCOMPLISHMENTS

All conditions of the contract were exceeded in 2009 except for the high elevation blue wildrye. This field will be continued in 2010 to meet contract goals.

Table1. Seed Harvested for Steven's Canyon Road Revegetation Project at Corvallis Plant Materials Center in 2009.

Species	Accession Number	Field size	Harvest date	Method	Yield
Upper Elevation					
Elymus glaucus	9079518	0.3	July 1	moon rover	14 lbs
Festuca rubra	9079519	0.46	June 22-July 7	swath/combine	134 lbs
Bromus carinatus	9079531	0.17	June 24 – July 7	seed strip swath/combine	142 lbs
Lower Elevation					
Elymus glaucus	9079520	0.2	June 28-July 8	swath/combine	129 lbs
Festuca rubra	9079521	0.37	June 20-June 26	swath/combine	186 lbs

TECHNOLOGY DEVELOPMENTS

The brome field did not mature evenly this year. The seed on the outside rows was shattering while the seed on the inside rows was still very green and soft. The seed stripper was used on the perimeter of the field to collect the early ripening seed. The field was swathed a few days later, and then combined when fully dried. Using this combination of harvest methods maximized genetic diversity and boosted seed yields.

Table 2. Seed in storage for Steven's Canyon Road Revegetation Project at Corvallis Plant Materials Center in 2009.

Species	Code	Seed lot	Amount in storage	Contracted Amount
Lower Elevation				
Elymus glaucus	ELGL	SG1-08-MR520	30 lbs	
	ELGL	SG1-09-MR520	129 lbs	100 lbs
Festuca rubra	FERU	SG1-08-MR521	6 lbs	
	FERU	SG1-09-MR521	186 lbs	35 lbs
Upper Elevation				
Elymus glaucus	ELGL	SG1-09-MR518	14 lbs	60 lbs
Festuca rubra	FERU	SG1-09-MR519	134 lbs	35 lbs
Bromus carinatus	BRCA5	SG2-09-MR531	142 lbs	100 lbs

MOUNT RAINIER NATIONAL PARK

2009 Annual Summary Report
Prepared by Amy Bartow

NATURAL RESOURCES CONSERVATION SERVICE
CORVALLIS PLANT MATERIALS CENTER
CORVALLIS, OREGON

INTRODUCTION

The Corvallis Plant Materials Center (PMC) entered into a new agreement with Mount Rainier National Park in 2008 to provide native plant materials for the ecological restoration of the Nisqually Entrance Road construction area. It was agreed that the PMC would produce a minimum of 120 lbs pure live seed (PLS) of Elymus glaucus, 200 lbs (PLS) of Bromus carinatus, and 35 lbs (PLS) of Festuca rubra. The project is expected to be completed in 2011. Nisqually Entrance Revegetation Project.

Figure 1. California brome (Bromus carinatus) seed increase field at the Corvallis PMC, December 20, 2009.

ACCOMPLISHMENTS

Activities in 2009 included maintenance and harvest of two seed increase fields as well as establishment of a 0.3 acre blue wildrye seed increase field and expansion of the brome field to 0.5 acres. The fescue and brome fields which were sown in the fall of 2008 both flowered in 2009. The brome field flowered profusely and was very vigorous. Even though the field was very small it was swathed and combined. The field was going to reach peak maturity over the 4th of July weekend, so it was swathed to keep the seed from shattering over the long weekend. This

seemed to be a good choice because the very small field (0.01 acres) produced 17.5 lbs! Only about 5% of the plants in the fescue field flowered this year. This is typical, since most plants don't flower until their second year. The fescue field produced about 5 lbs.

All of the seed increase fields are at the size needed to complete the project goals. The seed produced by these fields in 2010 should meet and will probably exceed the needs of the Park.

TECHNOLOGY DEVELOPMENTS

There were no new technology developments for this project in 2009.

Table 4. Seed in storage in 2009 for the Nisqually Entrance Revegetation Project with Corvallis Plant Materials Center.

Species	Seed lot	Amount
Bromus carinatus	SG1-09-MR592	13 lbs
Festuca rubra	SG1-09-MR594	5 lbs

SAN JUAN ISLAND NATIONAL HISTORICAL PARK

FY2009 Annual Summary Report
Prepared by Amy Bartow

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
CORVALLIS, OREGON

INTRODUCTION

The Corvallis Plant Materials Center (PMC) entered into a new agreement with San Juan Islands National Historical Park in 2009 to provide native plant materials for the restoration of the American Camp prairie. It was agreed that the PMC would produce a minimum of 900 lbs pure live seed (PLS) of Elymus glaucus, 900 lbs (PLS) of Bromus sitchensis, and 440 lbs (PLS) of Festuca roemerii. The project is expected to be completed in 2013.

American Camp Prairie Restoration Project

Figure 1. California brome (Bromus carinatus) increase field for the American Camp Prairie Restoration Project with Corvallis Plant Materials Center, December 20, 2009.

ACCOMPLISHMENTS

Activities in 2009 included establishment and maintenance of three spring sown seed increase fields as well as additional expansion of the fescue seed increase field in the fall of 2009. The PMC usually sows seed in the fall rather than in the spring, however, this project came to the PMC too late in the fall to sow the seed into the fields. The PMC decided to spring sow the fields

rather than wait for the fall of 2009. In early April, 2009, the blue wildrye, brome and fescue fields were sown using the PMC's precision cone-seeder.

Table 1. Field establishment in 2009 for the restoration of American Camp Prairie project with the Corvallis Plant Materials Center.

Species	Accession	Date	Seeding rate	Field Size
Elymus glaucus	9079607	April 15	8 lbs/ acre	0.25 ac
Bromus sitchensis	9079606	April 15	8 lbs/ acre	0.62 ac
Festuca roemerii	9079605	April 20	3 lbs/ acre	0.07 ac
Festuca roemerii	9079605	Oct 26	5 lbs/ acre	0.25 ac

TECHNOLOGY DEVELOPMENTS

There were no new technology developments for this project this year. There is no seed in storage at the PMC for this project.

OLYMPIC NATIONAL PARK

2009 Annual Summary Report
Prepared by Amy Bartow

NATURAL RESOURCES CONSERVATION SERVICE
CORVALLIS PLANT MATERIALS CENTER
CORVALLIS, OREGON

INTRODUCTION

The Corvallis Plant Materials Center (PMC) entered into a new agreement with Olympic National Park in 2004 to provide native plant materials for the ecological restoration of Lake Mills and Lake Aldwell following the removal of two high head dams on the Elwha River. Current plans estimate that the dams will be removed in 2012. The PMC has agreed to produce 4355 lbs of four grass species, 450 lbs of two sedge species, and 430 lbs of three forbs.

Elwha River Ecosystem and Fisheries Restoration.

Figure 1. Oregon sunshine (Eriophyllum lanatum) seed increase field at the Corvallis Plant Materials Center, June 30, 2009

ACCOMPLISHMENTS

In 2009, PMC staff collected eight pounds of wild seed from four grasses and one forb. Four seed increase fields were maintained and harvested, yielding 40 lbs of seed.
In the fall of 2009, 4.1 acres of seed increase fields were established using the PMC's precision cone seeder. This was a very slow way to plant such large fields, but the planter is extremely accurate and seed is not wasted. In addition to the two grass fields, the Oregon sunshine field was also expanded.

Table 1. Seed increase field establishment for the Elwha River Ecosystem and Fisheries Restoration Cooperative Agreement at the Corvallis PMC, October 2009

Species	Accession Number	Date seeded	Seeding rate	Field Size (ac)
Elymus glaucus	9079334	2-Oct	10 lbs/ ac	2.2
Bromus complex	9079332	3-Oct	8 lbs/ ac	1.6
Eriophyllum lanatum	9079441	4-Oct	5 lbs/ ac	0.3
				4.1

TECHNOLOGY DEVELOPMENTS

A field of Eriophyllum lanatum was established in February of 2009 using greenhouse grown transplants. The transplants were incredibly vigorous and flowered in the summer. This is uncommon for E. lanatum. The field was directly combined using the PMC's Hege plot combine. This method of harvest was very efficient. In the past, fields have been swathed and combined. The plants from the Elwha population have seed that shatters more readily than other population grown at the PMC. Swathing before combining would shatter a lot of seed.

Table 2. Seed in storage at the PMC for the Elwha River Restoration Project, December 30, 2009.

Scientific name	Common name	Amount in storage
Forbs		
Achillea millefolium	Yarrow	50 lbs
Artemisia suksdorfii	coastal wormwood	5 lbs
Eriophyllum lanatum	oregon sunshine	17 lbs
Grasses, sedge, and rushes		
Agrostis exerata	spiked bentgrass	18 lbs
Bromus complex	brome species	270 lbs
Carex deweyana	Dewey's sedge	3 lbs
Carex pachystachya	thick-headed sedge	100
Deschampsia elongata	slender hairgrass	131 lbs
Elymus glaucus	blue wildrye	194 lbs

YOSEMITE NATIONAL PARK

FY2009 Annual Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
LOCKEFORD, CALIFORNIA

INTRODUCTION

In 2006 the Lockeford California Plant Materials Center (PMC) entered into an agreement with Yosemite National Park (YNP) to produce seed of two grasses, Sandberg bluegrass (Poa secunda) and California brome (Bromus carinatus), and two forb species, Sierra lupine (Lupinus grayi) and big deer vetch (Lotus crassifolius). 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. The PMC was chosen due to its ability to clean, propagate and produce the desired amounts of high quality seed within the required time frame. The PMC is also able to conduct studies to determine adaptation and cultural requirements for establishment and seed production.

Figure 1 California brome, Bromus carinatus, production field

Target amounts of pure live seed (PLS) for each species were: 100 lbs brome, 10 lbs bluegrass, 20 lbs lupine and 10 lbs deer vetch. This agreement covered the initial crop establishment in 2006 and the subsequent seed production harvests from 2007-2009.

ACCOMPLISHMENTS

Seed was collected by YNP staff and delivered to the PMC in 2006, 2007 and again in 2008. Seed was cleaned by PMC staff and tested for viability by a seed laboratory prior to planting. The majority of the seed produced by the PMC under this agreement was also sent to a seed laboratory for germination testing.

In addition to the species covered in the original agreement, the PMC increased YNP seed of bottlebrush squirreltail (Elymus elymoides ssp californicus) and bluejoint (Calamagrostis candensis). PMC staff also produced and delivered 180 plugs of ladies tobacco

(Pseudognaphalium californicum), 120 plugs of nude buckwheat (Eriogonum nudum) and cleaned and stored small seed lots that YNP staff collected to diversify future revegetation efforts within the Park.

Table 1 Seed Details and Production Amounts (pounds)

SPECIES	Wildland Seed (viability)	2007 (purity / germination)	2008	2009*	Total	Target
Bromus carinatus	3.9 lbs. (92%)	37.2 (99.29/94)	24.8 (97.8/87)	8.75	70.75	100
Poa secunda	7.0 lbs (63%)	0.4 (- / 27)	0.07 (91.12/23)	0.5	0.97	10
Lupinus grayi	16 grams (26%)	--	2.2 (99.95/12)	3.84	6.04	20
Lotus crassifolius	182 grams (<25%)	--	--	0	0.00	10

Sandberg bluegrass 2008 production field

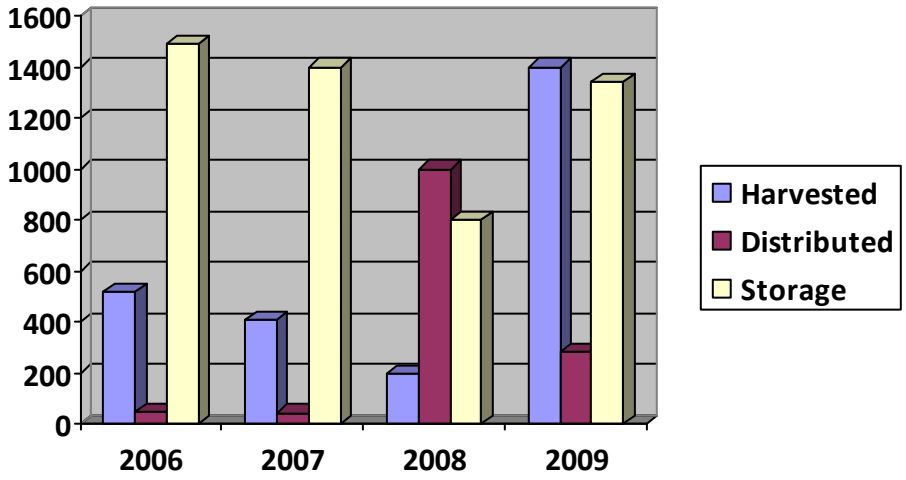
GREAT SMOKY MOUNTAINS NATIONAL PARK

FY2009 Annual Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
NATIONAL PLANT MATERIALS CENTER
BELTSVILLE, MARYLAND

INTRODUCTION

The current cooperative agreement between Great Smoky Mountains National Park (GRSM) and the National Plant Materials Center (NPMC) was signed in September 2006, for the fiscal years 2006-2010. The Great Smoky Mountains National Park and Foothills Parkway, has a need to preserve the native plant resources and revegetate parklands. The NPS requires that restoration of native plants will be accomplished using germplasm from populations as closely related genetically and ecologically as possible to park populations. The Great Smoky Mountains National Park has harvested seed from indigenous populations, but does not have the personnel, expertise, facilities or equipment needed to clean process, test and store the seed. The NRCS, National Plant Materials Center (NPMC) does have the personnel and is equipped to clean, process and store quantities of seed sufficient to meet the NPS needs within the required time frame. Technical expertise as necessary to achieve this goal will be provided by the NPMC under this agreement.



Seed harvested by the GRSM staff, distributed, and in storage at the National P.M.C. (lbs. bulk) for the duration of the 2005 – 2010 Interagency Agreement

ACCOMPLISHMENTS

2009 was a higher than average year for rainfall in the Cades Cove increase fields, and the amount of seed harvested from the increase fields directly correlates to the amount of rainfall.

The high rainfall resulted in a bumper crop of over 1400 lbs. (bulk) of grass, legume and wildflower seed harvested! The following table lists the 11 different lots of seed which was harvested. The seed was cleaned (de-bearded and then run through a clipper) by NPMC staff to yield 630 lbs of cleaned seed. Also included in the table are the species, amounts of seed harvested, and the resulting cleaned seed
weights.

SEED PRODUCED IN THE GRSM CADES COVE INCREASE FIELDS FY 2009

Botanical Name	Common Name	Lot #	Bulk Weight (lbs)	Cleaned wt.(lbs)
Andropogon gerardii	Big bluestem	SWC-09-GRSMINCRS	130.6	28.6
Andropogon glomeratus	Bushy Bluestem	SWC-09-GRSMINCRS	3	.2
Lespedeza capitata	Roundheaded lespedeza	SWC-09-GRSMINCRS	9	2.5
Helianthus angustifolia	Swamp sunflower	SWC-09-GRSMINCRS	1.1	1
Helenium autumnale	Sneezeweed	SWC-09-GRSMINCRS	3.1	2.5
Monarda fistulosa	Bee balm	SWC-09-GRSMINCRS	20.6	2.8
Parthenium integrifolium	Wild quinine	SWC-09-GRSMINCRS	26.2	15.7
Saccharum giganteum	Beard Grass	SWC-09-GRSMINCRS	51.7	29
Schizachyrium scoparium	Little bluestem	SWC-09-GRSMINCRS	326	188.7
Sorghastrum nutans	Indiangrass	SWC-09-GRSMINCRS	837.7	346.3
Senna marilandica	Maryland Senna	SWC-09-GRSMINCRS	2	.75
total			1401	629.8

2009 Re-vegetation projects
A total of approximately 285 lbs. of seed was delivered to the park for the following revegetation projects:
Foot Hills Parkway - 126 pounds Site 1 8E15
Foot Hills parkway - 40 pounds 8614 Slide at MP 15.10
Crisp and Crisp - Tennessee Valley Authority (electricity transmission lines) - 27 pounds
Cades Cove Meadow Restoration – 40 lbs.

NATCHEZ TRACE PARKWAY

FY2009 Annual Summary Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
COFFEEVILLE, MISSISSIPPI

INTRODUCTION

The NPS is constructing a multi-use trail along a section of the Natchez Trace Parkway. The MSPMC will re-vegetate areas disturbed by construction. Seed stock and plant materials will be collected from the local plant population. The greenhouse facilities at the MSPMC will be used for propagation and increase of plant materials. Plants are to be delivered and installed at the Natchez Trace.

Jan. 6, 2010 - Longleaf wood oats in gallon containers.

Plants to be Propagated and Installed

Indian woodoats (*Chasmanthium latifolium* (Michx.) Yates) – seeds and divisions. Amount of container plants: 6000

Longleaf woodoats (*Chasmanthium sessiliflorum* (Poir.) Yates) – seeds and divisions. Amount of container plants: 6000

Switchgrass (*Panicum virgatum* L.) - seeds. Amount of container plants: 3000

ACCOMPLISHMENTS

Indian woodoats:

- Approximately 50 plants collected Fall 2009. Potted into 1-gallon containers. To be divided again Spring 2010.

- Approximately 100 grams of seed collected Fall 2009. To be germinated Spring 2010.

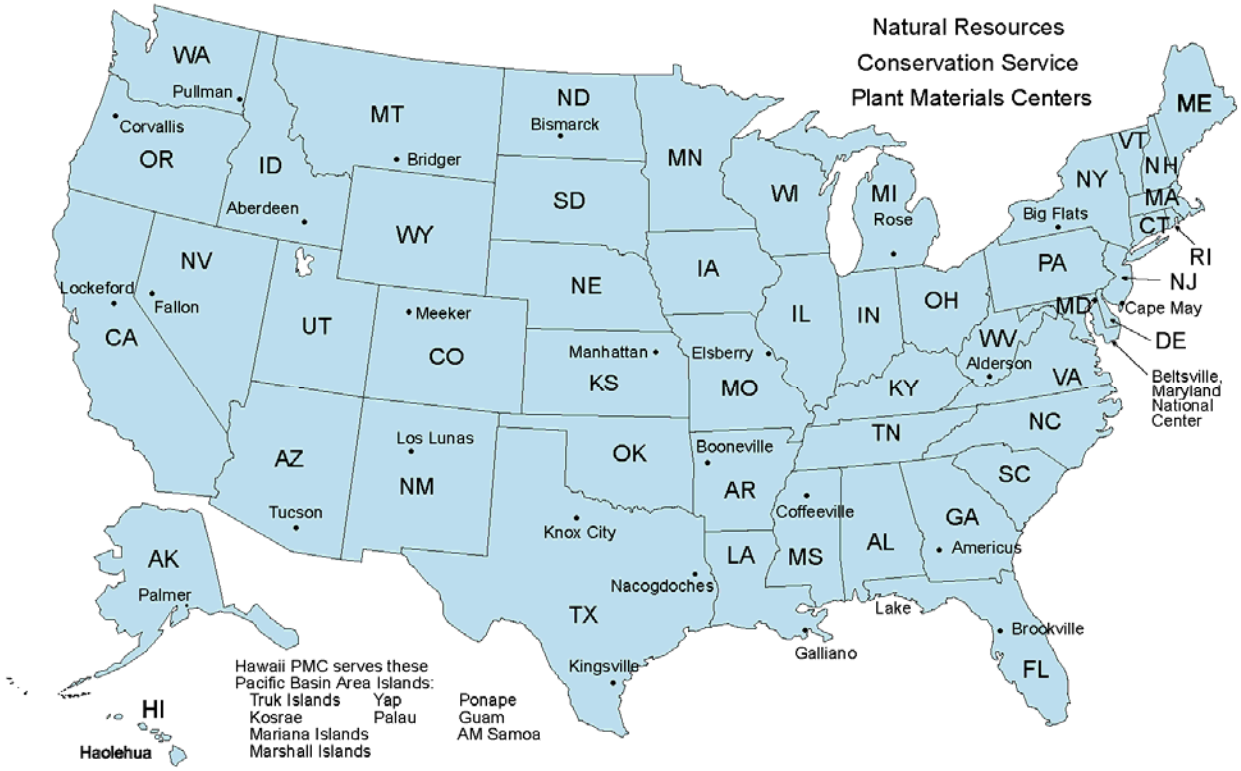
Longleaf woodoats:

- Approximately 130 plants collected Fall 2009. Potted into 1-gallon containers. To be divided again Spring 2010.

Switchgrass:

- Approximately 100 grams of seed collected Fall 2009. To be germinated Spring 2010.

Year initiated: FY 2009
Anticipated completion date: 2011



Plant Materials Centers (PMC)				
Palmer, AK	Alaska PMC	5310 South Bodenburg Spur Road	Palmer, AK 99645	(907) 745-4469
Tucson, AZ	Tucson PMC	3241 North Romero Road	Tucson, AZ 85705	(520) 292-2999
Booneville, AR	Booneville PMC	6883 S. State Highway 23	Boonville, AR 72927	(479) 675-5182
Lockeford, CA	Lockeford PMC	PO Box 68, 21001 N. Elliott Road	Lockeford, CA 95237	(209) 727-5319
Meeker, CO	Upper CO Environmental Plant Center	5538 RBC #4	Meeker, CO 81641	(970) 878-5003
Brooksville, FL	Brooksville PMC	14119 Broad Street	Brooksville, FL 34601	(352) 796-9600
Americus, GA	Jimmy Carter PMC	295 Morris Drive	Americus, GA 31709	(229) 924-4499
Hoolehua, HI	Hoolehua PMC	P.O. Box 236	Hoolehua, HI 96729	(808) 567-6885
Aberdeen, ID	Aberdeen PMC	PO Box 296, 1691A South 2700 West	Aberdeen, ID 83210	(208) 397-4133
Manhattan, KS	Manhattan PMC	3800 S. 20th Street	Manhattan, KS 66502	(785) 539-8761
Galliano, LA	Golden Meadows PMC	438 Airport Road	Galliano, LA 70354	(985) 475-5280
Beltsville, MD	National PMC	Building 509, BARC-East, E. Beaver Dam Road	Beltsville, MD 20705	(301) 504-8175
East Lansing, MI	Rose Lake PMC	7472 Stoll Road	East Lansing, MI 48823	(517) 641-6300
Coffeeville, MS	Jamie L. Whitten PMC	2533 County Road 65	Coffeeville, MS 38922	(662) 675-2588
Elsberry, MO	Elsberry PMC	2803 N. Highway 79	Elsberry, MO 63343	(573) 898-2012
Bridger, MT	Bridger PMC	98 South River Road	Bridger, MT 59014	(406) 662-3579
Cape May, NJ	Cape May PMC	1536 Route 9 North	Cape May Court House, NJ 08210	(609) 465-5901
Los Lunas, NM	Los Lunas PMC	1036 Miller Street, SW	Los Lunas, NM 87031	(505) 865-4684
Big Flats, NY	Big Flats PMC	3266A State Route 352	Corning, NY 14830	(607) 562-8404
Bismarck, ND	Bismarck PMC	3308 University Drive	Bismarck, ND 58504	(701) 250-4330
Fallon, NV	Great Basin PMC	2055 Schurz Highway	Fallon, NV 89406	(775) 423-7957
Corvallis, OR	Corvallis PMC	3415 NE Granger Avenue	Corvallis, OR 97330	(541) 757-4812
Nocogdoches, TX	East Texas PMC	6598 FM 2782	Nocogdoces, TX 75962	(936) 564-4873
Kingsville, TX	Kika De La Garza PMC	3409 North FM 1355	Kingsville, TX 78363	(361) 595-1313
Knox City, TX	James E. "Bud" Smith PMC	3776 Farm Road 1292	Knox City, TX 79529	(940) 658-3922
Pullman, WA	Pullman PMC	PO Box 646211, WSU	Pullman, WA 99164	(509) 335-6892
Alderson, WV	Alderson PMC	PO Box 390, Old Prison Farm Road	Alderson, WV 24910	(304) 445-3005

United States Department of the Interior • National Park Service

As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historic places, and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

NPS – 999/101258 (May 2010)