

FY 2003

Plant Materials Project Summary Reports

from the

Natural Resources Conservation Service

to the

National Park Service

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Compiled By

Russell J. Haas
NRCS Plant Materials Technical Advisor to NPS

National Park Service, Denver Service Center, Lakewood Colorado

INTRODUCTION

This is the 2003 NRCS Plant Materials Centers annual progress report on cooperative project agreements between the National Park Service (NPS) and the Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service. These projects relate to development of native plant materials for park roads and restoration projects. The NPS and NRCS have been cooperating in testing and increasing of native plants under a Memorandum of Understanding and Interagency Agreement since 1989.

The 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 copies of the "one page summary report" are available on request. This report can be requested from Russ Haas, NRCS National Technical Advisor, National Park Service, Denver Service Center, Planning and Site Design, P.O. Box 25287, Lakewood CO. 80225. E- Mail russ_haas@nps.gov or Phone 303- 969-2172.

The comprehensive 2003 Annual Technical reports are also available at the above address or from respective plant material centers.

Below is the "Table of Contents" which lists the projects that were active at parks in 2003. If you have any questions or comments to improve the use and distribution of these reports, please contact Russ Haas or Nancy Dunkle, NPS National Technical Advisor at 303-969-2568, E-Mail: nancy_dunkle@nps.gov.

**NATIONAL PARK SERVICE
And
NATURAL RESOURCES CONSERVATION SERVICE

INTERAGENCY PLANT MATERIALS PROGRAM

FY 2003 PROGRAM SUMMARY**

Technical Assistance

- NRCS NTA provided to Landscape Architect Job Captains and Project Managers at the NPS Denver Service Center relative to revegetation project needs at 18 National Parks in addition to those with interagency agreements.
- On site program technical assistance was provided by NRCS NTA and the NPS NTA at 8 National Parks.
- Technical assistance in addition to that agreed to Interagency Agreements was provided by Plant Materials Center staff or Specialists to 6 National Parks.

Development and Administration of Interagency Agreements

- Ten new agreements and 7 IA amendments to agreements were developed this Fiscal Year.
- There were 42 projects at 25 National Park units in cooperation with 12 Plant Materials Centers.
- 75% of the projects are Federal Lands Highway Program (FLHP) related. The remainder involve bioengineering, exotic species control, riparian/wetland restoration and revegetation of campgrounds, new visitor's facilities, parking lots etc.

CY 2003 Native Seed and Plant Production

- 12 National Parks
- 1,479 PLS pounds of seed
- 31,100 transplants
- 128 park indigenous species (40 grasses, 13 forbs, 54 shrubs, and 21 tree)

CY 2003 Native Seed/Plant Deliveries

- 12 National Parks
- 1564 PLS pounds of seed
- 11,896 transplants (container and bareroot)
- 219 park indigenous species (62 grasses, 65 forbs, 87 shrubs and 15 tree)

CY2003 Processing of Park Collected Seed

- 5 National parks
- 348 pounds of seed
- 136 species (53 grasses, 41 forbs, 27 shrubs, 15 tree)

Interagency Program Reviews

Reviews were held at:

- National Parks: Chiricahua NP, Bryce Canyon NP, Zion NP, Pipespring NM, Rocky Mountain NP, Mesa Verde NP
- Plant Materials Centers: Meeker Colorado EPC, Los Lunas New Mexico PMC

Technology Transfer and Research

- Data entry into the interagency website, “Native Plants Network” (<http://nativeplantnetwork.org>) continues to grow. NPS and NRCS contributions make up approximately 50% of the 1997 entries of 1300 species/ecotypes in the database.
- NRCS/NPS NTA and program staff coordinated with DSC Operations Information/Technology staff to download revegetation program related information to the *Inside NPS* intranet website.

Information provided includes basic FLHP program 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 are also available.

- Wetland/Riparian and Bioengineering Technical Assistance to Intermountain and western parks. An interagency agreement was developed and finalized which provides for assistance to parks from the NRCS Interagency Wetland/Riparian Project located at Aberdeen Idaho. Technical assistance and training workshops were provided to Grand Teton and Yellowstone NPs.
- An interagency agreement was finalized with the NRCS Interagency wetland/Riparian Project at Aberdeen Idaho. The agreement provides for a three year research study relative to the establishment of wetlands by seed and a related literature search.
- NRCS NTA researched and prepared native seed storage guidelines for use by park revegetation staff. The intent is to provide guidance to parks for the proper conditions and facilities necessary for long term storage of native seeds. This will be finalized into a NPS Technical note for distribution to all National Park units, National and Regional Offices and placed on the *Inside NPS* Revegetation website.
- NRCS NTA made three program related oral presentation at professional society meetings and NPS/NRCS agency workshops.
- NRCS NTA and program staff prepared and distributed to cooperating Parks/PMCs and key NPS and NRCS personnel, the FY2003 Annual Interagency Program Report.

DISCUSSION

I. DEVELOPMENT AND ADMINISTRATION OF INTERAGENCY AGREEMENTS

A. Finalized New Agreements

- **Pipe spring NM (AZ) with Los Lunas NM PMC.** Finalized four year agreement to provide seed production of three grass species for general revegetation and riparian restoration.
- **Great Sand Dunes NM (CO) with Meeker CO PMC.** Finalized three year agreement to provide seed production of two grass species for revegetation of areas disturbed by visitors center addition and new parking lot.
- **Acadia NP (ME) with Big Flats NY PMC.** Finalized two year agreement to provide production of 3,350 transplants of tree/shrub and forb species for rehab of Carriage Road Bridges.
- **Crater Lake NP (OR) with Corvallis OR PMC.** Finalized two year agreement to provide seed of two grass species and 9,000 transplants of grass, forbs and sedges for FLHP Rehab of Hwy 62.
- **Acadia NP (ME) with Cape May PMC.** Finalized a four year \$120,000 IA which reimburse the Cape May PMC for propagation and delivery of 15,000 tree and shrub and 3,000 forb containerized transplants. These transplants will be used to rehabilitate Blackwoods Campground at the park.
- **Rocky Mountain NP (CO) with Meeker EPC.** Finalized a three year I A which will reimburse Meeker for expenses related to seed and plant production of 9 native grass and forb species. Plant Material will be used to revegetation areas disturbed by FLHP Bear Lake Road construction
- **Wetland/Riparian and Bioengineering Assistance with Aberdeen PMC and the NRCS Interagency Wetland/Riparian Project.** Finalized an agreement which will reimburse the PMC for assistance provided to national parks related to wetland/riparian and bioengineering.
- **Wetland Establishment Research Study.** A three year agreement was finalized with the PMC and the NRCS Interagency Wetland/Riparian Project at Aberdeen Idaho. The study will include research into the establishment of wetlands by seed and a related literature search.
- **Bryce Canyon NP (UT) with Meeker EPC.** Developed a new IA that will continue seed increase of Bryce Canyon slender wheat grass and nodding brome grass and establish a new 2.0 acre field of Bryce origin slender wheatgrass.
- **Mount Rainier NP (WA) with Corvallis PMC.** Developed and finalized a two year agreement that will provide seed production of three grass species to be used for revegetation after highway construction.

B. IA modifications/Amendments

- **Grand Canyon (AZ) with Los Lunas NM PMC (2 times).** Extended existing IA to provide for continued maintenance of existing seed increase fields of two grass species, expand size of one field and reimburse the PMC for production of containerized trees and shrubs.
- **Mesa Verde NP (CO) with Meeker CO EPC.** Modified agreement to provide funding to produce containerized trees and shrubs of 8 species for revegetation of Main Entrance Road construction project in 2005.

- **Acadia NP (ME) with Big Flats NY PMC.** Modified agreement to reimburse PMC for additional plants needed for Seawall Campground rehab.
- **ZION NP (UT) with Los Lunas NM PMC.** Modified existing agreement to include seed production of 5 additional grass species for invasive plant control.
- **Lassen Volcanic NP (CA) with Meeker PMC.** Amended the IA to provide for a one year extension to continue seed production of California brome and blue wild rye.
- **Hubbell Trading Post NM (AZ) with Los Lunas PMC.** IA modified to continue riparian plant propagation for an additional two years.

C. Potential FY2004 Project Agreements:

Program opportunities continue to arise. There is possible program involvement in future projects at:

- Craters of the Moon NM (ID) with Aberdeen Idaho PMC
- Cedar Breaks NM (UT) with Meeker Colorado EPC
- Olympic NP , Mt. Rainier NP (WA) with Corvallis Oregon PMC
- George Washington's Birthplace NM (VI), Gateway NRA (NY) and with Cape May New Jersey PMC.
- Carlsbad Caverns NP (NM) Grand Canyon NP and Capulin Volcano NM (NM) with Los Lunas New Mexico PMC
- Homestead NHS (NE) with Manhattan Kansas PMC
- Saguaro NP (AZ) with Tucson Arizona PMC
- Wind Cave NP (SD) with Bismarck North Dakota PMC
- Little Bighorn Battlefield (MT) with Bismarck North Dakota or Bridger Montana PMC

II. TECHNICAL ASSISTANCE (Provided by NRCS NTA)

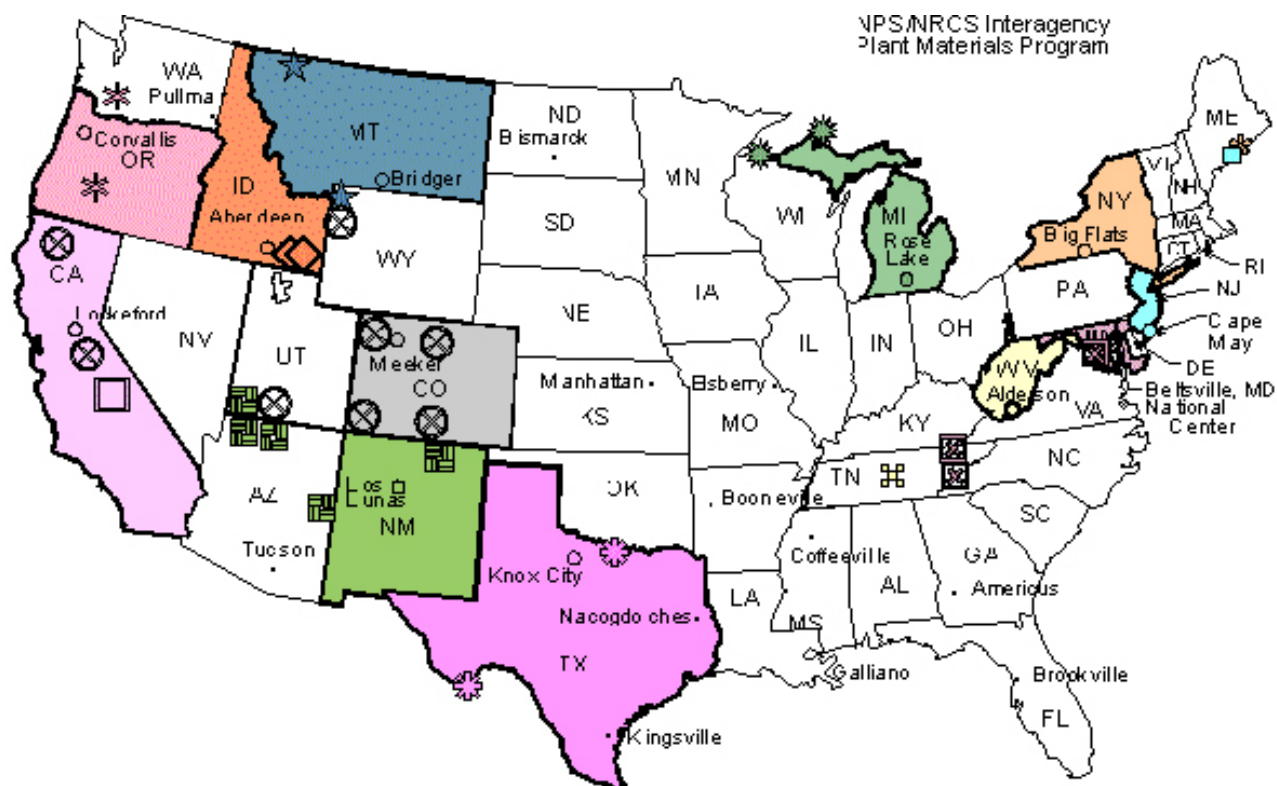
1. Provided technical assistance and advice to Nancy Dunkle, NPS National Technical Advisor and Program leader, regarding program budget, review of FLHP funding requests, construction specification, interagency agreements and technology transfer aspects of the cooperative plant materials program.
2. Provided technical assistance to DSC Landscape Architects, Project Managers, Regional specialists and individual parks with projects at the following parks:
 - **Mesa Verde NP.** Provided assistance to park and DSC project manager/job captain relative to development and implementation of revegetation plan. Interagency agreement modification, seed collection /propagation of native species and funding for highway revegetation project.
 - **Chiricahua NM.** Reviewed park revegetation program at park. Provided technical assistance regarding invasive species control, modification to existing revegetation plan and estimate of costs needed to complete road and utility line construction revegetation.
 - **Grand Canyon NP.** Coordination with park and the Los Lunas PMC relative to funding, IA extension and seed and plant production/ delivery.

TECHNICAL ASSISTANCE (Provided by NRCS NTA) CONTINUED

- **Mount Rainier NP.** Review of revegetation plan. Potential new IA with Corvallis PMC.
- **New River Gorge NR.** Reviewed Park visitors center Maintenance/establishment plan and provided recommended changes to DSC project manager.
- **George Washington's BP.** Continued assistance to park relative to a possible future IA with the Cape May PMC which could lead to a NPS NE Region PM Development Program.
- **Grand Teton NP.** Reviewed project revegetation plans and funding requests.
- **Bryce Canyon NP.** Provided technical assistance/advice to park, project manager and FHwy relative to construction specifications and revegetation needs for current road project. Park requests on site technical assistance in June.
- **Yosemite NP.** Seeding information for Blue wild rye and shipment of seed from PMC to Park
- **Padre Island NS.** Provided recommendation of plant species to project job captain
- **Fire Island NS.** Provided BMPs for invasive plant control.
- **Virgin Islands.** Provided DSC job captain with recommended species and seeding rates for highway road shoulder seeding.
- **Gateway NRA – Jamaica Bay.** Advice to DSC job captain relative to contractors recommended native species mixture.
- **Mt. Rainier NP.** Reviewed and provided advice on construction cost estimate.
- **Lake Chelan NRA.** Lake shore stabilization. Provided advice to DSC job captain relative to bioengineering techniques and availability of technical assistance.
- **Grand Canyon NP (AZ).** Coordinated with park and the Los Lunas PMC relative to funding seed and plant production/ delivery.
- **George Washington's BP (VA).** Continued assistance to park relative to a possible future IA with the Cape May PMC which could lead to a NPS NE Region PM Development Program.
- **Bryce Canyon NP (UT).** Provided technical assistance/advice to park, project manager and FHwy relative to construction specifications and revegetation needs for current road project. Coordinated with Meeker EPC to provide seed to contractor.
- **Craters of the Moon NM (ID).** Provided on site revegetation assistance and coordinated with the Aberdeen Idaho PMC and Idaho PMS to provide assistance during the same visit.

III. TECHNOLOGY TRANSFER- (provided by NRCS NTA)

- Presented power point of Interagency Program at the multi-agency Desert Managers Group Conference held at Palm Springs California March 3-7, 2003.
- Presented Interagency Program overview to NPS personnel in attendance at Desert Managers Group Conference.
- Presented Interagency Program overview to NRCS personnel at Colorado State Plant Materials Committee Meeting, Lakewood, CO, March 18, 2003.
- Coordinated and compiled annual summary reports of NPS/NRCS revegetation projects into an annual program report to NPS. Report will be provided to all cooperating parks, Washington office, DSC staff, NRCS Plant Materials personnel, NRCS State and Regional Conservationists.
- Researched and prepared native seed storage guidelines. The intent is to provide guidance to parks for the proper conditions and facilities necessary for long term storage of native seeds. This will be finalized into a NPS Technical note for distribution to all National Park units, National and Regional Offices and placed on the Inside NPS Revegetation website.
- Coordinated with NPS NTA, Revegetation Program staff and DSC Information/Technology staff to down load revegetation program related information to the *Inside NPS* intranet website. Information provided includes basic program guidelines, examples of FLHP revegetation specifications, tools (seed collection, storage, plant salvage, propagation, cost estimating, monitoring etc.) Links to the NRCS Plant Materials and Plant Propagation Protocols websites have been established.



Plant Materials Center

Aberdeen	ID	●	◆
Alderson	WV	○	⊞
Beltsville	MD	●	⊞
Big Flats	NY	■	⊞
Bridger	MT	●	★
Cape May	NJ	●	■
Corvallis	OR	●	★
Rose Lake	MI	●	★
Knox City	TX	●	★
Lockford	CA	●	□
Los Lunas	NM	●	■
Meeker	CO	○	⊞

In cooperation with these National Parks

Craters of the Moon National Monument
 Stones River National Battlefield
 Cumberland Gap Historical Park, George Washington Memorial Parkway, Great Smoky Mountains National Park
 Acadia National Park
 Glacier National Park, Yellowstone National Park
 Acadia National Park
 Crater Lake National Park, Mt. Rainier National Park
 Apostle Islands National Lakeshore, Isle Royale National Park
 Big Bend National Park, Chickasaw National Recreational Area
 Sequoia and Kings Canyon National Parks
 Capulin Volcano National Monument, Grand Canyon National Park, Hubbell Trading Post National Historical Site, Pipe Spring National Monument, Zion National Park
 Bryce Canyon National Park, Dinosaur National Monument, Grand Teton National Park, Great Sand Dunes National Monument, Lassen Volcanic National Park, Mesa Verde National Park, Rocky Mountain National Park, Yosemite National Park

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BIG BEND NATIONAL PARK

FY 2003 Summary Report

Prepared by

**NATURAL RESOURCES CONSERVATION SERVICE
JAMES E. 'BUD' SMITH, PLANT MATERIALS CENTER
KNOX CITY TEXAS**

Introduction : The original agreement with Big Bend National Park and the James E. 'Bud' Smith Plant Materials Center (PMC) was developed and signed in 1989. Early agreements involve seed and/or plant collection at the Park and seed increase at the PMC. Materials produced were used for roadside revegetation within the park. Plant materials (seeds) were drilled and/or broadcast along road shoulders following construction. The first agreement was completed in 1993. The second agreement scheduled for completion in 1997 was modified to incorporate an additional study to look at techniques for road slope revegetation. In 1998 an additional agreement was put into place to provide materials for the next phase of road construction. This agreement originally scheduled from 1998 - 2001 was amended in 1999 and placed on hold through 2001, pending the rescheduling of construction activities. Currently there are no active agreements targeting roadside revegetation projects.



Big Bend NP- Grass and forb species for vegetated road shoulders

In 2001 a new agreement was prepared between the Park and PMC addressing the need to revegetate areas after removal of invasive plants. Several new plant species will be looked at to determine if seed production fields can be developed.

Accomplishments:

Since 1989 nine different species have been produced for the park and three species are being looked at to determine production and propagation techniques.

At the end of 2003, the park had received a total of 2380 bulk pounds of seed totaling 983 PLS lbs.

Seed Production and Available Inventory

Common Name	Area(ac)	2003 Prod./Lbs *	PLS Inventory On Hand
Alkali sacaton	-	-	340.0
Sideoats grama	-	-	186.0
Green sprangletop	-	-	395.7
Cane bluestem	-	-	34.0
Showy menodora	.50	19.50	238.00
Whiplash pappusgrass	increase	.30	.30
Chino grama	.75	12.00	26.7
Tobosa	.10	increase	-
Limoncillo	-	-	29.0 *

* bulk material wt.

Conclusion:

At the end of FY 2003 seed production fields being maintained and harvested included showy menodora, and Chino grama. The center will continue to work with and develop the *Hilaria mutica*, tobosagrass increase field. In 2003, seeds of *Scleropogon brevifolius*, burrograss, and *Pappophorum vaginatum*, whiplash pappusgrass were planted to investigate the possibilities of field seed production. The burrograss failed to establish and the whiplash pappusgrass produced sufficient seed for future increase. The new agreement signed in 2001 addressing post weed control revegetation will continue through the year 2004.



Big Bend Chino grama

BRYCE CANYON NATIONAL PARK

FY2003 Summary Report

Prepared by

UPPER COLORADO ENVIRONMENTAL PLANT CENTER
MEEKER, COLORADO

Introduction: Bryce Canyon National Park and Upper Colorado Environmental Plant Center (UCEPC) entered into an agreement which was formally approved June 1998. Preliminary steps were initiated to amend the agreement to increase target production quantities for additional vegetative treatment for highway projects within Bryce Canyon National Park and extend the agreement into Fiscal Year 2003. Two species, slender wheatgrass, *Elymus trachycaulus*, and nodding brome, *Bromus anomalus*, were identified for seed increase.



Rainbow Point Road construction



Bryce Canyon nodding brome

Accomplishments: Although no data is yet available on PLS quantities of harvested seed, 240 clean pounds of slender wheatgrass seed were produced in 2003 from 0.8 of an acre that was planted September 5, 2000. A one half-acre nodding brome field was planted August 29, 2001. Fifty pounds of clean nodding brome seed was produced this year. On August 29, 2003, 149 pounds of slender wheatgrass was shipped to Bryce Canyon National Park for revegetation purposes. Targeted quantities of seed were 1500 pounds from the amended agreement. Total production for the agreement is 1489.9 pounds, 10.1 pounds shy of the target. Current inventory of Bryce Canyon seed is 2003 production.

Technology Development: Specific information about germination trials, soil preparation, seeding rates, equipment, seeding establishment methods or any other seed processing or handling techniques are available upon request.

CHICKASAW NATIONAL RECREATION AREA

FY2003 Summary Report prepared by

**JAMES E. 'BUD' SMITH PLANT MATERIALS CENTER
KNOX CITY, TEXAS**

Introduction: The agreement between the Chickasaw National Recreation Area from Sulphur, Oklahoma and the James E. 'Bud' Smith Plant Materials Center from Knox City, Texas was developed and signed in 1990. The first through the fifth phase for re-vegetating of the Buckhorn Area, the Guy Sandy Area, the Veterans Lake Area, the Point Campground Rehab and the Point/Perimeter Roads were completed before and/or by 2003. The sixth Phase of the project, which was tree transplants for the Tree Park Wide Area completed by 2003. Phase one through two included native grass seed and woody productions. Phase three through five included seed production of native forb, legume, grass and several shrub/woody transplants. Phase six included several different native woody species for tree transplants for the Tree Park Wide Area. All native plant seeds and woody material were collected from the Park and increased and/or propagated at the Plant Materials Center in Knox City, Texas and delivered to the Park.



Point Campground Rehab- Chickasaw NRA

Accomplishments: From 1993 to 2003 the Park received a total of 1,383.43 bulk pounds of native forb and grass seed totaling 854.26 PLS lbs. and 6,628 shrub and woody transplants. They consisted of American & winged elm, black willow, blackjack oak, coralberry, Carolina buckthorn, buttonbush, bur oak, chinquapin oak, Chickasaw plum, cottonwood, eastern redbud, green ash, hackberry, post oak, red oak, rough leaf dogwood, sycamore, smooth & winged sumac, persimmon, mexican plum, skunk bush sumac, Virginia creeper, and white honeysuckle.



Chickasaw NRA Indian blanket at Knox City PMC

(Rudy Esquivel in photo)

DINOSAUR NATIONAL MONUMENT

FY2003 Summary Report

Prepared by

UPPER COLORADO ENVIRONMENTAL PLANT CENTER
MEEKER, COLORADO

Introduction: The Upper Colorado Environmental Plant Center entered into an agreement with Dinosaur National Monument in September of 1996 and amended the agreement in August of 1997. A new agreement was developed in 2002. These agreements involve the collection and seed production of four grass species native to Dinosaur National Monument.



Targeted species are: western wheatgrass (*Pascopyrum smithii* - 9070955), indian ricegrass (*Oryzopsis hymenoides* - 9070953), basin wildrye (*Leymus cinereus* - 9070951), bluebunch wheatgrass (*Psuedoroegneria spicata* ssp. *spicata* - 9070952), alkali sacaton (*Sporobolus airoides* - 9070954), sand dropseed (*Sporobolus cryptandrus*) and salina wildrye (*Leymus salinus* ssp. *salinus*). The last two species were not collected. An additional species was added in 2002 squirreltail (*Elymus elymoides*), however no seed field has been planted. The grasses will be used for restoration and to prevent non-indigenous weedy

Tamara Naumann collecting Basin Wildrye

plants from invading. The western wheatgrass seed field was plowed in 1999, due to numerous off types. Two seed fields (indian ricegrass and alkali sacaton) were interseeded to improve stands in 1999. An additional planting of bluebunch wheatgrass was planted in 2001.

Accomplishments: Seed was harvested from all seed fields in 2003.

Seed Harvested		Seed Fields	
Name	Clean Seed Amount	Name	Size
Alkali sacaton	6 lb	Alkali sacaton *	0.18 acre
Basin wildrye	52 lb	Basin wildrye	0.24 acre
Bluebunch wheatgrass	32 lb	Bluebunch wheatgrass**	0.42 acre
Indian ricegrass	8 lb	Indian ricegrass *	0.24 acre

* Interseeded in 1999, ** Increased in 2001



Dinosaur basin wildrye

(Steve Parr EPC Manager)



Dinosaur bluebunch wheatgrass

Technology Developments: Specific information on procedures and methods for seed cleaning etc. can be requested for each species.

GLACIER NATIONAL PARK

**FY2003 Summary Report
prepared by**

**NATURAL RESOURCES CONSERVATION SERVICE PLANT
BRIDGER MATERIALS CENTER
BRIDGER MONTANA**

Introduction: The Bridger Plant Materials Center (BPMC) has maintained a cooperative agreement with Glacier National Park (GNP) since FY 1986. This agreement facilitates the collection, increase, and re-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. Wildland seeds are collected by GNP staff, dried, and then mailed to the BPMC where they are cleaned, weighed, accessioned, inventoried, and stored until needed. GNP projects their seed and plant needs for each construction project, allowing 2 to 3 years of lead time for the increase of seeds or plants at the BPMC.



Logan Pass Glacier NP



Revegetated turnout area

Accomplishments: In 2003, 169 seed lots representing 64 individual species and totaling 195.9 pounds (88.84 kg) were delivered to GNP or used for BPMC production. The 2003 distribution included 47 grass lots (17 species), 69 forb lots (28 species), and 53 shrub lots (19 species).

In 2003, 75 wildland collections were sent to the BPMC and cleaned: 7 collections of grasses, sedges, and rushes (6 species); 42 forb collections (20 species); and 26 shrub and tree collections (15 species). A total of 10.41 lbs. (4.72 kg) of clean seed were processed; 3.59 lbs. (1.63 kg) of grass and grass-like, 3.61 lbs. (1.64 kg) of forbs, and 3.20 lbs. (1.45 kg) of trees and shrubs. A total of 29 new species: collection sites were identified and accessioned representing 4 grass or grass-like species (3 species), 16 forbs (14 species), and 9 woody plants (7 species).

Nine seed production fields remained active in 2003, including *Carex athrostachya* (9078591-Camas); *Carex athrostachya* (9081443-Avalanche); *Carex pachystachya* (9078645 and 9078646-Avalanche); *Carex deweyana* (9078646-Avalanche); *Elymus glaucus* (9075844-Many Glacier); *Elymus glaucus* (9075846-West Glacier); *Poa alpina* (9057881/9058304 bulk-Logan Pass); and *Symphyotrichum laeve* (*Aster laevis*) (9081447-Avalanche). These fields produced a total of 38.49 lbs. (17.46 kg) of seed. The *Poa alpina* (9057881/9058304 bulk-Logan Pass) seed production fields were retired in 2003 because of declining productivity. Seed production was generally down in 2003, the result of hot, dry growing season conditions, high insect predation, and localized reductions in soil fertility. In the fall of 2003, approximately 40 lbs. /A of nitrogen was applied to all seed production fields in Field 4. An additional 40 lbs. /A application is planned for spring 2004.

Seed germination tests are currently being conducted on 7 accessions (5 species) grown in 2003 including *Carex athrostachya* (9078591-Camas), *Carex athrostachya* (9081443-Avalanche), *Carex pachystachya* (9078645-Avalanche), *Elymus glaucus* (9075844-Many Glacier), *Elymus glaucus* (9075846-West Glacier), *Poa alpina* (9057881/9058304 bulk-Logan Pass), and *Symphyotrichum laeve* (*Aster laevis*) (9081447-Avalanche). Results will be presented in the 2003 GNP Annual Technical Report.

A total of 1,938 containerized woody plants were delivered to GNP in 2003. This material represented 8 individual lots from 6 accessions and four species.

Plants delivered included *Rosa woodsii* (9054492-Headquarters [342 plants]); *Rubus parviflorus* (9078626-Camas [55]); *Rubus parviflorus* (9078331-Walton [169]); *Rubus parviflorus* (9082172-Goat Haunt [536]); *Symphoricarpos albus* (9082136-Headquarters [463]); and *Arctostaphylos uva-ursi* (9082137-Walton [373]). A total of 588 1-0 *Mahonia repens* (9054489-Apgar) and approximately 70 1-0 *Arctostaphylos uva-ursi* (9082137-Walton) remain in cold storage at the BPMC. No new stratifications were initiated in late 2003.

Technology Developments: A presentation was given March 27, 2003 in Portland, Oregon at the Society of Ecological Restoration Annual Meeting titled *Producing Wildland Ecotypes from Summer Cuttings: Potential Applications For Ecological Restoration*. A presentation titled *Improving Germination of Wildland Ecotypes* was presented at the 25th Annual Intermountain Container Seedling Grower's Association Meeting in Polson, Montana on October 15, 2003. The content of both presentations was based largely on techniques developed for National Park Service propagation and production projects. Data was collected on a *Mahonia repens* germination study in 2003.

GRAND CANYON NATIONAL PARK

FY2003 Summary Report Prepared by

NATURAL RESOURCES CONSERVATION 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 and the Natural Resources Conservation Service 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 has agreed to deliver 900 transplants to the GCNP at an agreed upon date. All transplants will be grown from seed collected from indigenous ecotypes at the GCNP.

Accomplishments:

Seed Production 2003

In 2003, the LLPMC planted an additional 0.90 acre of Muttongrass using the transplants grown by the LLPMC. The LLPMC produced the following seed in 2003 for the GCNP:

Common Name	Scientific Name	Pounds
Blue Grama	<i>Bouteloua gracilis</i>	15.44 PLS
Muttongrass	<u>Poa fendleriana</u>	33 Bulk



Danny Goodson harvesting muttongrass



Grand_Canyon blue grama

Transplant Production 2003

In 2003, the LLPMC produced the following transplants for the GCNP:

Common Name	Transplants delivered
Fourwing Saltbush	54
Rubber Rabbitbrush	22
Utah Serviceberry	54
Coralberry	17
Curl-leaf Mountain Mahogany	91
Fernbush	54
Banana Yucca	27
Mormon Tea	31
New Mexico Locust	85
Fremont's Mahonia	150
Total	585



Grand Canyon containerized shrubs ready for delivery

Technology Development: The Blue Grama and Muttongrass fields were both harvested in 2003. Irrigation was increased on both species to promote greater seed production. Insecticide was applied to the Blue grama to control insects and promote seed production. Fertilizer rates were increased in 2003 to help improve seed production.

GRAND TETON NATIONAL PARK

FY2003 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 September of 2001. This new agreement will extend through fiscal year 2005, and calls for the production of five grass species. One species, basin wildrye, had been established for production in an earlier agreement. Two other species, bluebunch wheatgrass and slender wheatgrass, had been produced in an earlier agreement as well. It was hoped that seed from these previously produced materials could be used to establish new seed fields. As it turned out, only bluebunch wheatgrass seed had enough viability to establish a field. Two other species, blue wildrye and slender wheatgrass, were collected from the park in 2001, cleaned, tested, and were established in July 2002. To date, prairie junegrass has not produced good collectible populations of seed for seed increase of this species as targeted in the agreement. Discussions of producing a substitute material have occurred. During the summer of 2003, showy golden eye was targeted for increase and collections were made by park personnel. The seed was obtained through direct delivery by Russ Haas, National Technical Advisor for plant materials.

Accomplishments: In the first year of production for blue wildrye, slender wheatgrass, and bluebunch wheatgrass, a total of 323 pounds were produced. In addition, basin wildrye produced 225 pounds of clean seed. The four materials collectively produced a total of 548 pounds of clean seed for Grand Teton National Park. A fifth material, showy golden eye, was hand collected in the park in 2003. Although the results from the seed test are not available at this time, there is 1.16 pounds of clean seed that will be used for field establishment in 2004.



Grand Teton basin wildrye at Meeker EPC



Grand Teton bluebunch wheatgrass- Meeker EPC



Grand Teton bluewildrye- Meeker EPC



Grand Teton slender wheatgrass

Meeker EPC

Technology Developments: Specific information about seed treatment, seeding rates, irrigation schedules or other production methods are available upon request. Work is continuing with head smut transfer, longevity, and relationship through time to infected and resistant plants alike.

GREAT SAND DUNES NATIONAL MONUMENT AND PRESERVE

FY2003 Summary Report
Prepared by

UPPER COLORADO ENVIRONMENTAL PLANT CENTER
MEEKER, COLORADO

Introduction: In April of 2003, an interagency agreement was signed into effect that calls for Upper Colorado Environmental Plant Center to produce seed of two species, one acre of blue grama and one half acre of Indian ricegrass, through 2005. These products will be utilized for revegetation projects in and around the headquarters area of the monument in 2006.



Great Sand Dunes National Monument and Preserve

Accomplishments: During the summer of 2003, park personnel collected 3.68 pounds of Indian ricegrass seed and 186 grams of blue grama. Seed tests are not available at this time, but very likely there will be adequate Indian ricegrass seed to establish the one half acre field as called for in the agreement. Adjustments may be necessary for blue grama establishment and production quantities.

Technology Developments: Standard cleaning protocols were utilized for each material. No additional technology advancements or observations have been identified.

HUBBELL TRADING POST NATIONAL HISTORIC SITE

**FY 2003 Summary Report
Prepared by**

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

Introduction:

On February 3, 2003, 1500 coyote willow whips and 150 Fremont cottonwood poles were picked up by Dan Yarbrough. These plant materials were under contract to Hubbell Trading Post for riparian restoration work.



Cottonwood poles at Los Lumas PMC

(Greg Fenchel PMC Mgr.)

MESA VERDE NATIONAL PARK

FY2003 Summary Report Prepared by

UPPER COLORADO ENVIRONMENTAL PLANT CENTER
MEEKER, COLORADO

Introduction: The Upper Colorado Environmental Plant Center (UCEPC) entered into an agreement with Mesa Verde National Park September 26, 1990. The Interagency Agreement Project No. 1211-00-003 was amended in 2000 and an additional amendment referred to as "MEVE 278F, Main Entrance Road" was signed September 17, 2003, involving the live plant production of seven shrubs and one conifer species. Seed production for Mesa Verde was concluded in 2000. All seed lots of Mesa Verde materials were updated for germination in 1999. The Plant Center will provide stored seed as requested.



Revegetation of road realignment cutslopes



Establishment of native grass/forb mix .
Containerized shrubs planted with "biologs" .



Experimentation with "dri water"



2 yr old four wing saltbush

Accomplishments: Seed of the following species were collected in Mesa Verde National Park in 2003, and shipped to UCEPC to be dried, cleaned, stored, and conditioned for live plant production.

Targeted Species:

Scientific Name	Common Name	Quantity
<i>Quercus gambelii</i>	Gambel's oak	875
<i>Amelanchier utahensis</i>	Utah serviceberry	875
<i>Cercocarpus montanus</i>	mountain mahogany	260
<i>Symphoricarpos oreophilus</i>	mountain snowberry	675
<i>Atriplex canescens</i>	fourwing saltbush	100
<i>Rosa woodsii</i>	Woods' rose	175
<i>Prunus virginiana</i>	chokecherry	175
<i>Pseudotsuga menziesii</i>	Douglas fir	<u>100</u>
Total :		3235

Technology Developments: Specific information on procedures and methods of seed cleaning, germination trials, or propagation methods, are available upon request. This year, the seed of woods rose seed was shipped to us fresh and then cleaned in a modified blender for immediate propagation. Gambel's oak acorns arrived fresh and were immersed overnight, and then directly seeded into containers

PIPE SPRING NATIONAL MONUMENT

FY 2003 Summary Report

Prepared by

NATURAL RESOURCES CONSERVATION SERVICE PLANT MATERIALS CENTER
LOS LUNAS NEW MEXICO

Introduction: On September 12, 2002, an agreement was made between Pipe Spring National Monument of the U.S. Department of Interior and the Natural Resources Conservation Service of New Mexico. This agreement declares that the Los Lunas Plant Materials Center (LLPMC) will produce seed for Pipe Spring National Monument.

Accomplishments:

Seed Production 2003

In 2003, Galleta and Blue grama seedlings were grown to establish seed production blocks. The seed of these two species was collected on the Monument in 2002. Unfortunately, seed germination of both species was low, and only small, raised beds of plants were established in the LLPMC nursery. No seed was harvested in 2003.



Pipe Spring blue grama and galleta in raised beds at Los Lunas PMC

Technology Development: Seed production from the raised beds did not yield any good viable seed in 2003. These beds will be maintained and allowed to grow in 2004 in hopes of producing good viable seed. Seed from those beds can then be used to start larger production blocks. Galleta and Indian ricegrass seed also was collected by the Monument in 2003 and will be propagated in 2004 to establish seed fields at the LLPMC.

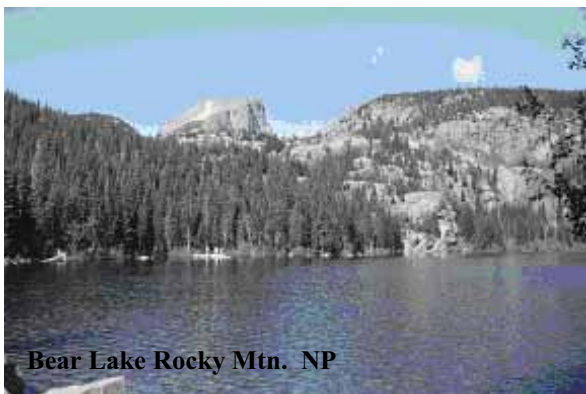
ROCKY MOUNTAIN NATIONAL PARK

FY2003 Summary Report Prepared by

UPPER COLORADO ENVIRONMENTAL PLANT CENTER
MEEKER, COLORADO

INTRODUCTION: The 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 Project No. O8S211 (IA No. 1520-2-9001) on September 9, 1999. This agreement involves the collection and seed production of three grass species native to the East side of Rocky Mountain National Park. The targeted species were: mountain muhly (*Muhlenbergia montana*), Junegrass (*Koeleria cristata*), and sleepy grass (*Stipa robusta*).

Another cooperative plant materials agreement: Project No. S-0308CR (IA Project No. 1211-03003), NPS Project Name: Rehab Route 10, Bear Lake Road, was signed April 22, 2003. This agreement involves the collection and seed production of eight species: four forbs and four grass species, referenced in the table below.



Bear Lake Rocky Mtn. NP



Bear Lake Road construction

Targeted species:

Scientific Name	Common Name	Target PLS Amt	Current Acres
Grasses			
<i>Bouteloua gracilis</i>	blue grama	12.6	1.0 (t)
<i>Stipa comata</i>	needle and thread	12.9	0.07 (t)
<i>Muhlenbergia montana</i>	mountain muhly	6.2	0.5 (s)
<i>Koeleria macrantha</i>	Junegrass	4.5	0.2 (s)
Forbs/Legumes			
<i>Artemisia frigida</i>	fringed sage	1.7	0.07(t)
<i>Heterotheca villosa</i>	hairy golden aster	11.4	0.8 (s)
<i>Thermopsis divericarpa</i>	spreading golden bean	86.5	2.0 (s)
<i>Oxytropis lambertii/sericea</i>	purple loco weed	5.9	0.5 (s)
Total:		141.7lb	5.14

Accomplishments: In order to optimize limited seed amounts for the Bear Lake Road Project, grass seedling for three species were grown in the UCEPC greenhouse for field transplants. Five other species were direct seeded into production plots. The following table includes actual seeded(s) or transplanted(t) plot size at UCEPC with germplasm received from Rocky Mountain National Park. In regards to continued work on cooperative agreement, IA No. 1520-2-9001, the experimental (25' by 35') plot of mountain muhly, established in 1997, produced seed again this year.



Thermopsis divaricata seed increase field



Bouteloua gracilis plugs in Meeker EPC greenhouse



Stipa comata



Artemisia frigida

Technology Developments: Jiffy forestry peat pots (50 mm) were used for the first time at UCEPC to propagate grass seedlings. A Mechanical Transplanter (Model 800-2) was adapted for field establishment as noted above. So far we have found *Stipa comata* and *Bouteloua gracilis* seed difficult to clean.

YELLOWSTONE NATIONAL PARK

FY 2003 Summary Report prepared by

NATURAL RESOURCES CONSERVATION SERVICE PLANT MATERIALS CENTER BRIDGER MONTANA PLANT MATERIALS CENTER

Introduction: The Bridger PMC has maintained a cooperative agreement with Yellowstone National Park (YNP) since FY 1986. This agreement facilitates the collection, increase, and reestablishment of indigenous plant material for restoration of disturbances resulting from road construction and other improvement projects within Park boundaries.



In 2003, 15 allocations of 159 seed lots from 61 species were distributed to YNP, YNP-contracted growers, or the PMC totaling 330 pounds (150 kg). This included 85 grass lots (19 species) weighing 310 pounds (140 kg); 60 forb lots (32 species) weighing 16 pounds (7 kg); and 14 tree/shrub lots (15 species) weighing 4 pounds (2 kg). This includes the distribution of 10 grass lots (6 species) and 6 forb lots (4 species) to the PMC for planting seed increase fields.

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 National Park crews, dried, and either delivered to the Bridger PMC, or picked up by PMC personnel. In 2003, 87 collections were made from 43 species: 49 grasses (21 species) at 28.65 pounds (13 kg); 37 forbs (21 species) at 9.13 pounds (4.141 kg); and 1 shrub at 0.03 pound (0.012 kg). The wildland seed collections totaled 37.81 pounds (17.15 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 2003, YNP personnel spent more than 478 person hours in the activity of seed collection. There were approximately 296 hours (average 6 hours per recorded collection) dedicated to collecting grass seed, 176 hours (average 4.9 hours per recorded collection) for forbs, and 6 hours for the shrub species.



There were 8 grass and 4 forb increase blocks planted in 2003 for road projects. Older increase blocks of 4 grasses were removed due to natural decline in production or poor establishment. Currently there are 5.33 acres (2.157 hectares) planted with 24 accessions of 10 grass species and 0.58 acres (0.238 hectares) with 5 accessions of 4 forb species in seed increase blocks at the Bridger PMC.

During the past growing season, 17 different grass accessions (6 species) and 1 forb species were harvested, producing 550.56 pounds (249.732 kilograms) of clean seed. Seed production averaged approximately 163 pounds-per-acre (183 kilograms-per-hectare).

The wildland collection and seed increase inventory contains 526 accessions (119 species) totaling 2,232 pounds (1,012 kg). This is comprised of 231 grass accessions (32 species) at 2,119 pounds (961 kg), 280 forb accessions (75 species) at 86 pounds (39 kg), and 15 shrub accessions (12 species) weighing 27 pounds (12 kg).

Technology Developments: 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.

A small trial was conducted at the PMC to assess the potential affect of head smut contamination on seed production in YNP mountain brome grass. The results indicate that overall production was reduced more than 35% when seed was not pre-treated with a fungicide to prevent head smut contamination, and seed viability was not necessarily impaired. The PMC intends to treat the seed of all *Bromus* species from YNP with a fungicide at or prior to, the time of planting.

A laboratory experiment was conducted at MSU-Bozeman to identify a naturally occurring head smut commonly found in plants and seed of many cool-season grasses. The results indicate that the species, *Ustilago bullata*, infects mountain brome plants and contaminates seed. The level of head smut infestation may range from locally sparse to abundant, and the pathogen is known to reduce plant and seed productivity.

ZION NATIONAL PARK

FY 2003 Summary Report
Prepared by

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

Introduction: On September 12, 2002, an agreement was made between the Zion National Park of the U.S. Department of Interior and the Natural Resources Conservation Service of New Mexico. This agreement declares that the Los Lunas Plant Materials Center (LLPMC) will produce seed for the Zion National Park.

Accomplishments: Big bluestem, Big Galleta, and Indian ricegrass seeds were sown into plug-flats in the spring of 2003. The Big Galleta yielded only a very few seedlings, and the Indian ricegrass was only a little better. The Big bluestem collections did yield a good amount of seedlings, but early on it was evident there was a distinct difference in some of the collected bluestem. The seedlings were grown in the LLPMC greenhouse and then hardened off in our lathhouse area prior to transplanting.

Technology Development: Small seed production fields were established at the LLPMC using the Bluestem seedlings. There appeared to be two distinct species from the seed collected at the Park and grown in plug trays at the LLPMC. Two fields were planted at the LLPMC and grown for possible increase and identification. After seed stalks were observed in the fields, it was determined that four different species had been planted. The species identified were Cane, Yellow, Big and Sand bluestem. The Yellow bluestem was immediately rogued out of the planting due to the fact it is an introduced species. The rest of the plantings were left to grow to maturity for possible harvest of seed for future plantings. Specimens of the Big, Sand and Cane bluestem were sent to Oregon State University for identification as requested by Zion National Park. Pending approval from the Park, seed harvested of the correct Bluestem species will be used to expand our seed fields in 2004.

Zion cane bluestem @ Los Lunas PMC



Zion "bluestems" @ Los Lunas PMC



APOSTLE ISLANDS NATIONAL LAKESHORE

(Raspberry, Oak and Outer Islands)

FY2003 Summary Report **Prepared by**

USDA- NATURAL RESOURCES CONSERVATION SERVICE
ROSE LAKE PLANT MATERIALS CENTER
EAST LANSING, MICHIGAN

Introduction: This project was initiated in 2000 to produce native plant stock for stabilizing slopes, preventing erosion, preserving native plant resources and revegetating park lands. Under a Memorandum of Agreement species to be propagated were selected from an amendable list. A minimum of 2 grass, 2 forb and 4 shrub species from this list were supplied by the Center based on the material's availability, viability and site adaptability for the intended use. The Agreement further specified deliverables as 30 pounds of Canada wildrye seed, 500 forb/grass plugs and 500 shrub transplants. Deliverables were distributed in 2002 and 2003. Additional plant distributions are planned for 2004.



Raspberry Island slope stabilization

Treated with live fascines, brush layering, erosion control blanket, native grass seeding and containerized forbs and shrubs



Same slope 1 year later

(Julie Van Stappen in photo)

Accomplishments: Fourteen species were propagated in 2002 and 2003 for delivery to the Park in 2003. A total of 1466 plants were delivered in June of 2003. Propagation efforts continue at the PMC greenhouse for plant delivery in 2004.

The following is a list of species propagated and number of plants delivered to Apostle Island National Park in 2003:

Red Elderberry - 349	Smooth Rose – 14
Poverty Oatgrass – 353	Western Panicgrass – 156
Redosier Dogwood – 53	Virginia Strawberry – 13
Staghorn Sumac – 19	Sandcherry – 91
Western Pearly Everlasting - 18	Beach Wormwood – 32
Speckled Alder – 54	Hairgrass – 101
Canada Wildrye – 35	Willow – 178

Technology Development and Observations: The Rose Lake Plant Materials Center developed a restoration plan for sand spit areas of Oak Island. The plan discussed the various factors to consider when developing a restoration program, including site characteristics, availability of plant materials, availability of water, and labor considerations.

The plan also summarized the performance of the plant species that were propagated at the Rose Lake Plant Materials Center and established on Oak Island in 2001. Equisetum, sedge, low-sweet blueberry, common juniper, Canada wildrye and wild rose were well established and vigorous one year after transplanting. Pearly everlasting, churchmouse 3-awn, and wild strawberry establishment and vigor were inconsistent.



Oak Island -Planting sand spit area



5/2/02

Four months later

ISLE ROYALE NATIONAL PARK

FY2003 Summary Report Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
EAST LANSING , MICHIGAN

Introduction: While most of the land base of Isle Royale National Park is designated Wilderness and under continuous vegetative cover, there are areas of significant human development of park operations and visitor use. These developments are focused in specific areas and have an assortment of disturbance ranging from new to several years old. As such these areas are prime locations for non-native plant infestation, unsightly and subject to continued or potential erosion. At present the park does not have the capability or program to restore these areas. Through a Memorandum of Agreement with Isle Royale National Park the USDA Natural Resource Conservation Service, Rose lake Plant Materials Center agreed to 1) increase native material collected from the park and return 1800 plants for restoration purposes, 2) develop and monitor propagation technology for use in shallow soil areas of the park that specifically promotes lateral root growth, and 3) prepare a restoration guide for park staff that included collection, establishment and management techniques on various park plant species. The MOA extends through September 2005.

Accomplishments: A lateral root development study was designed and established in 2002. Data was collected on survival, spread, and canopy coverage of each species in the test. Sedge, wild strawberry, and raspberry appear to spread well in the shallow soil growing conditions.

Technology Development: The Rose Lake Plant Materials Center completed a draft of a propagation manual for Isle Royale National Park. The manual describes techniques and considerations for propagating and establishing plant species specific to the Isle Royale National Park. The manual is currently under review by Park personnel.

GEORGE WASHINGTON MEMORIAL PARKWAY

FY 2003 Summary Report summary sheet prepared by

NATURAL RESOURCES CONSERVATION SERVICE
NATIONAL PLANT MATERIALS CENTER
BELTSVILLE, MD

Introduction: This is the second project initiated with the National Park Service to produce plants for revegetation of construction sites along the George Washington Memorial Parkway (GWMP). The National Plant Materials Center (NPMC) has been working with GWMP since 1994. The small agreement was initiated in 2000 for the NPMC to provide 1,200 tree and shrub container seedlings (minimum of 6 species from a recommended species list) from spring 2002 through 2004. An amendment was signed in October 2002 for production of an additional 200 woody container plants of the same species to revegetate a telecommunications tower site within the park.

Accomplishments: A total of 371 woody plants were delivered to the park in May 2003. Materials were either planted by the GWMP natural resource management staff or held at the park's small nursery for planting at a later date.

Currently, the NPMC has 672 tree and shrub container transplants of 9 species, most of which are ready for spring 2004 delivery to the park. An additional 77 bareroot plants of 5 species will be harvested this winter and potted for delivery in fall 2004. The following 14 species are currently being grown:

Bitternut hickory (<i>Carya cordiformis</i>)	Mountain laurel (<i>Kalmia latifolia</i>)
Black gum (<i>Nyssa sylvatica</i>)	Paw paw (<i>Asimina triloba</i>)
Black walnut (<i>Juglans nigra</i>)	Red maple (<i>Acer rubrum</i>)
Chestnut oak (<i>Quercus prinus</i>)	River birch (<i>Betula nigra</i>)
Flowering dogwood (<i>Cornus florida</i>)	Spicebush (<i>Lindera benzoin</i>)
Ironwood (<i>Carpinus caroliniana</i>)	Sycamore (<i>Platanus occidentalis</i>)
Mockernut hickory (<i>Carya tomentosa</i>)	White oak (<i>Quercus alba</i>)

With the spring and fall 2004 deliveries, the NPMC will have fulfilled its obligations for the current agreement and amendment. Unless additional agreements are pursued, 2004 will be the final year of reimbursable work with the George Washington Memorial Parkway.

Technology Developments and Observations: In recent years, the NPMC has been able to overwinter smaller containers (as small as 1 quart size) outdoors, instead of in a cold room, with the use of a microfoam blanket. Using laminated microfoam (a ¼-inch thick foam blanket laminated on one side) under an outer covering of white poly protects the plants from extreme fluctuations in temperature and prevents small pots from drying out.

ACADIA NATIONAL PARK

FY 2003 Summary Report Prepared by

NATURAL RESOURCES CONSERVATION SERVICE PLANT MATERIALS CENTER BIG FLATS NEW YORK

Introduction: The USDA, Natural Resources Conservation Service, Big Flats Plant Materials Center, entered into two interagency agreements with the USDI, National Park Service, Acadia National Park: IA Project No. 4500-02-001 (ACAD 234 Rehab of Seawall Campground) and IA Project NO.4500-03-001 (ACAD 320 Rehab Carriage Road Bridges).

The Natural Resources Conservation Service agreed to:

- (A) Collect seed and plant materials of selected species within Acadia National Park boundaries.
- (B) Use these seeds and plant materials to establish isolated seed increase fields of grasses and forbs, to produce plugs and transplants of grasses, forbs, trees and shrubs.
- (C) Make available seed, plugs and transplants to Acadia National Park for re-vegetation of the Seawall Campground and Carriage Road rehab projects in 2003 and 2004.

The park will use the plant materials for roadside re-vegetation after completion of the Seawall Campground and Carriage Road Bridges, and seeding areas disturbed during the reconstruction projects in the park.



Acadia NP golden rod and aster



Acadia NP red fescue

The PMC activities have focused on seed and plant collections in the Acadia National Park, seed production, processing and conditioning, seed/plant propagation of plugs and transplants at the plant materials center, maintaining seed increase fields, propagating materials vegetatively and delivering the plant material back to the Park

Accomplishments: Seed was collected in October (pasture rose, arrowwood, viburnum, white birch, wild raisin, mountain holly, winterberry, mapleleaf viburnum, bayberry, Mountain ash and hawthorn), in mid-September (bayberry, arrowwood viburnum, sheep laurel, fly honeysuckle, pasture rose, wild raisin, mountain holly, hobblebush and mapleleaf viburnum), and early November (winterberry, meadowsweet, pasture rose, downy goldenrod, sweet gale, New York aster, grass-leaved goldenrod, while flat-topped aster and staghorn sumac).

Vegetative materials were collected in late October (arrowwood viburnum, meadowsweet, quaking aspen, red spruce, arborvitae, balsam fir and white pine), mid-June (blueberry, rhodora, sweet fern, quaking aspen, sarsaparilla, wild raisin, meadowsweet, bunchberry, red maple, cinnamon fern, arrowwood viburnum, balsam fir, spruce, arborvitae, white pine and huckleberry) and early November (sweet fern, wild raisin, northern swamp dogwood, meadowsweet, arborvitae, arrowwood viburnum, fly honeysuckle, juniper, blueberry, balsam fir, sheep laurel and rhodora).

Three deliveries of plant materials were made in 2003. The June delivery was 444 plants, September was 650 plants and November delivery was 558 plants. Seed was shipped in May (17.2 lbs.) and in September (70 lbs.).

Seed increase fields of red fescue grew very well this year, with wetter than normal moisture conditions. A total of 158 pounds of clean red fescue seed was harvested. For forb production, in 2001 new seed production blocks were established using weed fabric that has worked well in controlling weeds. Seed of goldenrods (Canada and rough stemmed) and asters (New York, large leaf and white flat-topped) were harvested in 2003, using both combine and hand harvest methods.

Seed of trees and shrubs were seeded in flats in late January and placed in the PMC cold frames to get the cold stratification requirement. Seedlings that germinated from prior year seedings were potted up and placed in the lathe house. Young plants in the lathe house were re-potted into 1 gallon containers. Species included winterberry, white birch, pasture rose, bayberry, spruce, meadowsweet and white pine. Cuttings from the greenhouse mist system (wild raisin, arrowwood viburnum, meadowsweet and sheep laurel) were potted up and placed in the lathe house. Root cuttings of sweet fern, quaking aspen and blueberry were tried this year with limited success.



At Acadia, plant materials are utilized to revegetate disturbed areas. Roped off areas and the posting of re-vegetation signs has helped keep visitors out of the plantings, giving the plants a chance to grow.

Technology Developments/Transfer: Forb seed production using the weed fabric has worked well in controlling weeds. Development of root cutting techniques was initiated this year for a few species. In September, the staff of the Cape May Plant Materials Center was shown various sites in the park to collect seed for their Blackwood Campground Rehab Project. The re-vegetation signs have minimized the trampling of plants as well as educated the public on how the park service is utilizing native plants. Many of the plantings in the park are growing well.

ACADIA NATIONAL PARK

FY2003 Summary Report

Prepared by

NATURAL RESOURCES CONSERVATION SERVICE PLANT MATERIALS CENTER
CAPE MAY, NEW JERSEY

Introduction: On June 30th 2003 the USDA NRCS Cape May Plant Materials Center entered into IA # 4500-03-002 for the Rehabilitation of Blackwoods Campground.

The Agreement calls for the Cape May PMC to propagate 15,000 trees, shrubs, forbs and grasses over a 4 year period of time.



Acadia NP Blackwoods Campground

The targeted species are:

Common Name	Genus species
winterberry	Ilex verticillata
arrowwood	Viburnum dentatum
wild raisin	Viburnum nudum var. cassinoides
mountain holly	Nemopanthus mucronatus
highbush blueberry	Vaccinium corymbosum
red-berried elder	Sambucus racemosa subsp. Pubens
huckleberry	Gaylussacia baccata
northern swamp dogwood	Cornus racemosa
fly honeysuckle	Diervilla lonicera
meadowsweet	Spiraea latifolia
bayberry	Myrica pensylvanica
sweetfern	Comptonia peregrina
pasture rose	Rosa virginiana
mountain maple	Acer spicatum
paper birch	Betula papyrifera
red maple	Acer rubrum
white spruce	Picea glauca

The physiological characteristics of these species exhibit tremendous variation between species. While some species such as bayberry and maple are relatively simple to collect, condition and germinate others like black huckleberry, and white spruce require very specific conditions and longer periods of time to produce viable nursery stock.

Accomplishments: On September 14th 2003 the Cape May PMC Manager, the Big Flats NY PMC Manager and the NJ PMS traveled to Acadia National Park for the purposes of:

- Locating where these species were growing in the park boundaries.
- Identify which collection sites and species had either mature seed or any UN shattered seed to collect.
- Collect available materials and ship to the pertinent PMC for cleaning and conditioning.

During the fall of 2003 PMC staff have cleaned most of the seed and started some into the stratification process.

Technology Development: Due to the fact that this is a new contract agreement there are no new technologies to report at this time.

CRATER LAKE NATIONAL PARK

Highway 62 Revegetation Project

FY 2003 Annual Report
Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
CORVALLIS PLANT MATERIALS CENTER
CORVALLIS, OREGON

Introduction: The Corvallis Plant Materials Center (PMC) entered into a new agreement with Crater Lake National Park in 2003 to provide native plant materials for ecological restoration of the Highway 62 construction area. It was agreed that the PMC would propagate a minimum of 9150 plants of nine herbaceous species (two grasses, four sedges, one rush, one legume, and two forbs) as well as produce 180 pounds of two grass species (blue wildrye and California brome) for delivery in 2004. Activities in 2003 included cleaning of native seed collected by NPS staff, establishing two grass seed production fields, harvesting seed production fields, and germination research on new species.



“S” Curve section of Hwy 62 to be widened and revegetated

Accomplishments: Activities in 2003 included cleaning of native seed collected by NPS staff, establishing two grass seed production fields, harvesting seed production fields, and germination research on new species. Two new seed increase fields of California brome and blue wildrye were established via carbon banding on October 16, 2002. These fields produced 17 lbs (kg) and 2.5 lbs (kg) respectively. Seed will be used to expand the current seed increase fields in FY 2004.

Technology Developments: Seed cleaning techniques were improved for *Juncus parryii* to increase purity. Hand collected seedheads were threshed carefully by hand instead of being fed through a hammermill (or similar machine). This reduced the amount of plant matter in the seed lot, resulting in extremely pure seed. Seed stratification/germination trials were performed on five species that have not been previously produced for the Park. Initial trials with these species indicated that some form of pretreatment may be needed to overcome seed dormancy. Cold-moist stratification trials were set up in the fall of 2003. Final results will be summarized in the 2004 report.

CRATER LAKE NATIONAL PARK

2003 Annual Report Summary Prepared by

NATURAL RESOURCES CONSERVATION SERVICE
CORVALLIS PLANT MATERIALS CENTER
CORVALLIS, OREGON

Introduction: The Corvallis Plant Materials Center (PMC) entered into an amended agreement with Crater Lake National Park in 2000 to evaluate and increase grasses and sedges for revegetation purposes (Mazama Dorm and Rim Village Cafeteria projects). It was agreed to maintain and harvest one sedge and two grass fields, clean/process and store the resulting seed from 2003 until September 2005.



Accomplishments: This agreement was extended again for 2003 with the requirements satisfied. Activities in 2003 included maintenance, harvest, and cleaning of seed from three increase plantings. A total of 22 lbs (10kg) of seed of California brome (*Bromus carinatus*), 29 lbs (13kg) of blue wildrye (*Elymus glaucus*), and 0.5 lbs (.22kg) of thick-headed sedge (*Carex pachystachya*) were harvested and cleaned. All seed harvested in 2003 remained in storage at the PMC, including 456 pounds (207kg) of California brome, 154 pounds (70kg) of blue wildrye, and 2.5 pounds (1kg) of thick-headed sedge from earlier harvest years. Seed will be stored until requested for future Park revegetation work.

Technology Developments: Three fields, blue wildrye, California brome), and thick-headed sedge, were hand harvested, cleaned, and tested. The seed remained in dry storage. Excellent control of annual weedy grasses was achieved with October application of Prowl plus Axiom on the blue wildrye field. By December, 25% mortality and some die-back were noted, but this may or may not be from herbicide damage. The CA brome was similarly treated along with a December application of Goal and Karmex for further control of volunteer brome seedlings and annual bluegrass. Control was excellent and no injury or mortality to established plants was noted. This four herbicide regime appears to be viable options for weedy grass control in CA brome grown for seed. No spot treatment of glyphosate was needed for miscellaneous weed control. No broadleaf weed control herbicides were needed in 2003. Fields were hand-weeded to remove groundsel (*Packera* sp.). Weed control in the thick-headed sedge was by hand hoeing and weeding only.

LASSEN VOLCANIC NATIONAL PARK

FY2003 Summary Report Prepared by

UPPER COLORADO ENVIRONMENTAL PLANT MATERIALS MEEKER, COLORADO

Introduction: An agreement was made between Lassen Volcanic National Park and Upper Colorado Environmental Plant Center (UCEPC) June 2001. The agreement, as signed, calls for the production of one material, blue wildrye. An amendment to the agreement, signed in September 2001, added production of California brome to the list of contracted species. An additional amendment, executed in the fall of 2002, allowed for the cleaning and testing of wild collected seed from Lassen Volcanic National Park. A third amendment, signed in September of 2003, extends the production of California brome and blue wildrye through 2004.



Lassen Volcanic California Brome grass at Meeker EPC

Accomplishments: On September 4, 2001, a one acre field of blue wildrye was planted using a hand pushed Planet Junior and on November 16, 2001, a 0.18 acre field of California brome was planted utilizing the same method. An additional 0.70 of an acre was planted on May 29, 2003 bringing the total production acreage to 0.88 acre, or 26 480-foot rows. The seed for the new seeding had been collected by Bitterroot Growers in 2002. Seed was treated with 'Vitavax' for head smut control prior to planting all but the four southern most rows, which were not treated for head smut.

On June 30, 2003, 64 pounds of clean *Bromus carinatus* seed was harvested while 205 pounds of blue wildrye was harvested July 21, 2003. No seed was produced from the 2003 planting.

Harvested seed was cleaned, and tested through tetrazolium procedures so that produced seed could be used for revegetation purposes within the park during the fall of 2003. A shipment of four bags of seed, two each of California brome and blue wildrye, were sent to Lassen Volcanic National Park on September 11, 2003 for on the ground application. A total of 35 PLS pounds of blue wildrye and 15 PLS pounds of California brome were sent.



Lassen Volcanic NP bluewildrye at Meeker EPC

(Russ Haas)

Approximately 20 species of wild collected seed from 2002 were cleaned by UCEPC as per Amendment 2 and shipped to the park along with 19 unlearned park collected materials. Four of the cleaned products were also tested.

Technology Development: Specific information about seed treatments, soil preparation, seeding methods, seeding rates or seedling establishment techniques is available upon request.

SEQUOIA/KINGS CANYON NATIONAL PARKS

FY2003 Summary Report

Prepared by

NATURAL RESOURCES CONSERVATION SERVICE PLANT MATERIALS CENTER
LOCKEFORD, CALIFORNIA

Introduction: During FY2003, six different species were grown at the Lockeford PMC for maximum seed production. A total of 88.27 pounds of pure live seed, which had a bulk clean weight of 142.86 pounds, was produced at the PMC. The PMC propagated 6000 plugs of three species for transplanting on an area which was covered with weed control fabric. The fabric allowed shattered seed to be vacuumed up with no soil.

This project started in FY2003 and will be completed in FY2005. The overall goal of the project is to produce 150 PLS pounds of seed from six species.

Accomplishments: All initial seed collection was accomplished by the park staff. The seed was then cleaned by PMC staff and tested by a seed laboratory. The initial cleaned seed was then used to propagate plants for placement on fabric (5000 S.F., one foot spacing) of three species (*Trifolium ciliolatum*, *Lupinus bicolor*, *Poa secunda*) and direct seed three species (*Melica californica*, *Elymus glaucus*, *Bromus carinatus*) on 30 inch rows .5 acre ea..



Bromus carinatus at Lockeford PMC



Trifolium ciliolatum at Lockeford PMC

The three species on the fabric were had harvested and shattered seed was vacuumed off the fabric. The three direct seeded species were harvested using a FailVac harvester. All seed was cleaned and tested. In the following table, purity and germination are shown as a percent.

Species	Harvest Lbs.	Clean Lbs.	Purity	Germ	PLS Lbs.
Trifolium ciliolatum 9083009	75.0	41.0	99.91	56	22.93
Lupinus bicolor 9083008	62.0	33.0	99.97	86	28.37
Poa secunda 9083007	2.63	.66	99.81	23	.15
Melica californica 9083006	6.10	3.20	99.17	17	.54
Elymus glaucus 9083005	40.8	34.0	99.53	79	26.70
Bromus carinatus 9083004	100	31.0	99.74	31	9.58



Lupinus bicolor



Melica californica

Technology Developments: All seed cleaning was documented and screen size and air flow for each species was determined. The weed control fabric was successfully used to control weeds and allow shattered seed to be vacuumed up with out soil.



Elymus glaucus at Lockeford PMC



Poa secunda at Lockeford PMC

SEQUOIA AND KINGS CANYON NATIONAL PARKS

FY2003 Summary Report Prepared by

UPPER COLORADO ENVIRONMENTAL PLANT CENTER
MEEKER, COLORADO

Introduction: The Upper Colorado Environmental Plant Center (UCEPC) entered into an agreement with Sequoia and Kings Canyon National Parks on June 20, 1994. Amendments were made in 1995 and 1997. A new agreement, IA 9000-00-001 was signed in 2000. An another amendment, issued under an Interagency Agreement: NRCS IA-3A75-9-134 and NPS IA 0773-0-9001, was signed May 24, 2003, for seed to be collected on established plots of two species.

Accomplishments: Seed was harvested from the changeable phacelia plots in headquarters. The 30' x 50' Whitney's sedge plot, after three years of growth is just beginning to be productive. The following table includes cleaned seed weight from UCEPC plots.

2003 SEED HARVESTED FROM UCEPC

Scientific Name	Common Name	Cleaned Seed Amounts
<i>Phacelia mutabilis</i>	changeable phacelia	2.3 lb
<i>Carex whitneyi</i>	Whitney's sedge	77 g



Carex whitneyi



Phacelia mutabilis

Technology Developments: Seed cleaning technology was developed for each species cleaned. Specific information can be provided on request. Observations are being made on the phenology of new species.

YOSEMITE NATIONAL PARK

FY2003 Summary Report Prepared by

UPPER COLORADO ENVIRONMENTAL PLANT CENTER
MEEKER, COLORADO

Introduction: Yosemite National Park and Upper Colorado Environmental Plant Center (UCEPC) entered into an agreement, which was formally approved September of 2001. This agreement extends a cooperative relationship which was initiated in 1997, and entails field establishment and seed increase of one grass species, blue wildrye, *Elymus glaucus*, for use in park revegetation efforts through 2004. The seed used for establishing the new field was from seed grown in 1999 by UCEPC.



Yosemite bluewildrye @ Meeker EPC



Seeded road cut – Yosemite NP

Accomplishments: A 2.5 acre field of blue wildrye was planted on November 20, 2001, with a Tie drill. Although seed production was not expected until the summer of 2003, 25 pounds of clean seed was produced from UCEPC Field 8 in 2002. On July 21, 2003, the blue wildrye field produced 271 pounds.

In 2003, seed shipments of blue wildrye seed were made March 26, April 21, and December 30. The first two shipments were approximately 25 PLS pounds while the December shipment was 50 PLS pounds.

Technology Development: Specific information about harvest methods or soil preparation, seeding methods, seeding rate or seedling establishment techniques are available upon request.

CUMBERLAND GAP NATIONAL HISTORIC PARK

FY2003 Summary Report prepared by

NATURAL RESOURCES CONSERVATION SERVICE
NATIONAL PLANT MATERIALS CENTER, BELTSVILLE, MD

Introduction: Cooperative agreements between the Cumberland Gap National Historical Park (CUGA) and the National Plant Materials Center (NPMC) have been in place since 1990. Currently, the fourth cooperative agreement with the Park covers the replanting of the Gap restoration areas, visitor areas and other revegetation needs. This agreement was initiated in 2002 and continues through 2005, with final plant deliveries scheduled for the spring of 2005. This agreement is expected to complete the remaining revegetation work anticipated by the park. All herbaceous seeds required for the agreement have been delivered, but additional seed has been harvested and conditioned. After the March 2004 planting, approximately 800 containerized and 3,000 bare-root trees and shrubs as well as 5,000 plugs will be delivered in 2005 to complete the agreement and utilized remaining live plant materials at the National Plant Materials Center.

Accomplishments: This year NPMC staff coordinated both a spring and fall planting at the park. In March twelve students from Cumberland Mountain Research Center, Lincoln Memorial University in Harrogate, TN were hired to help plant 4,985 bare-root woody plants consisting of 14 species and 1059 container-grown woody plants consisting of 32 species including 1 vine. An estimated total of 13 acres was planted not including the parking areas. A total of 34 species of woody plants were delivered and planted in 2003.



Restoration of historic Cumberland Gap



Plant installation after seeding

The fall planting was assisted by student volunteers and by several park staff. A total of 425 container-grown trees and shrubs of 27 species were planted into a total of approximately 0.7 acres.

A total of 1484 container-grown plants of 35 species were delivered in 2003.

About 85 pounds of grass and wildflower seed were produced and conditioned in 2003, bringing the amount of seed in the inventory to approximately 230 lbs.

For March 2004 delivery and planting, approximately 5,000 bare-root trees and shrubs have been harvested, 4,000 herbaceous plugs are being produced and 600 container-grown plants are expected to be delivered and planted.

Technology Developments and Observations: This year the roots of all bare-root material was again dipped in Silva-Dip (RTI), a solution of mycorrhizal inoculum, water-holding polyacrylamide gel, humic acid and other biostimulants. However these were not bundled in predetermined mixes as was done last year due to time constraints. After dipping the bundles were stacked for transport and had to be unloaded at arrival and sorted for planting. This resulted in the bundles be handled significantly more after dipping. A significant loss of the root dip from the roots was observed, however a significant portion did remain that appeared adequate. The spring plantings were observed during the fall trip to have been very largely successful with an approximately 95% survival. This was expected as there was adequate rain this year after the spring planting through much of the summer.



Restoration of vernal pools

(RJay Ugiansky and John Englert)

In the vernal pool area, the sphagnum moss has established very well and has expanded in size considerably. This successful establishment of the sphagnum moss will provide critical nesting habitat for the rare four-toed salamander.

GREAT SMOKY MOUNTAINS NATIONAL PARK

FY 2003 Summary Report prepared by

NATURAL RESOURCES CONSERVATION SERVICE
NATIONAL PLANT MATERIALS CENTER
BELTSVILLE, MD

Introduction: The current cooperative agreement between the Great Smoky Mountains National Park (GRSM) and the National Plant Materials Center (NPMC) was signed in May, 2000, for Fiscal Years 2001–2005. Approximately 300 lbs. of grass/forbs seed, 30,000 grass/forbs plugs, 4,200 bare root and 800 containerized trees and shrubs were to be supplied under the agreement for revegetation of approximately 2 acres yearly in the Foothills Parkway. GRSM staff will collect 530 pounds of seed from within the Park and ship it to NPMC for conditioning, testing, storage, and plug production. The NPMC will continue producing grass and wildflower seed for several species that are difficult to grow. It will also continue to produce plugs for the GRSM grass and wildflower seed production fields. The fields were established in Cades Cove in 1998 because of delays in the Foothills Parkway construction, the need to utilize materials produced by NPMC per the interagency agreement, and to ensure availability of native plants when construction on the FHP resumes. The Park plans to be able to handle the 2-acre per year revegetation efforts for the Foothills Parkway beyond 2005 by raising its own plugs and seed and increasing its own seed cleaning and storage.



Seeding of areas disturbed by road and bridge construction- Great Smoky Mountain NP

Summary of Accomplishments:

- **Woody Plant Materials:**

In March 2003, 577 containers (2 different species), and in September 2003, a total of 393 containers (7 different species) of trees and shrubs were delivered to the Park.

A handful of containers remain in the NPMC container nursery which will be delivered in the spring of 2004.

- **Herbaceous Plug Production:**

In May, 2003, the NPMC delivered 12,490 (6 different species) herbaceous plugs to the Park for planting in Cades Cove. 8,500 plugs remain in the agreement.

- **Seed Production, Conditioning and Delivery:**

58 pounds of seed (9 different species) and were delivered to the Park. Around 20 pounds of seed (3 different species) was harvested from NPMC seed increase fields in 2003. NPMC staff will process around 300 pounds bulk (6 different species) of seed harvested in 2003 from the Cades Cove seed increase fields. Approximately 1,147 pounds of cleaned GRSM herbaceous and woody seed is presently stored at the NPMC.



Invasive plant control and revegetation by containerized plants on highway roadslopes -GRSM

Technology Developments: The NPMC gave recommendations to GRSM staff in 2003 for seeding rates of forbs, and warm season grass establishment practices in the Cades Cove increase fields to increase seed yield, purity and viability. Overview and troubleshooting recommendations for: field production, greenhouse operations, and training of seed cleaning and machinery used were also given.

The NPMC's propagation protocols, developed as a result of the NPS agreements, have been posted on the Native Plants Network web site since 2000. There are protocols for over 100 species of native wildflowers, cool and warm season grasses, and woody plants not commonly found in the trade.

A power point presentation was given to an audience of about 60 at the Maryland Association of Environmental and Outdoor Educators conference, Feb.1, 2003, on propagating native plants from seed describing the protocols developed from GRSM plug production.

STONES RIVER NATIONAL BATTLEFIELD

FY2003 Summary Report Prepared by

NATURAL RESOURCES CONSERVATION SERVICE PLANT MATERIALS CENTER
ALDERSON, WEST VIRGINIA

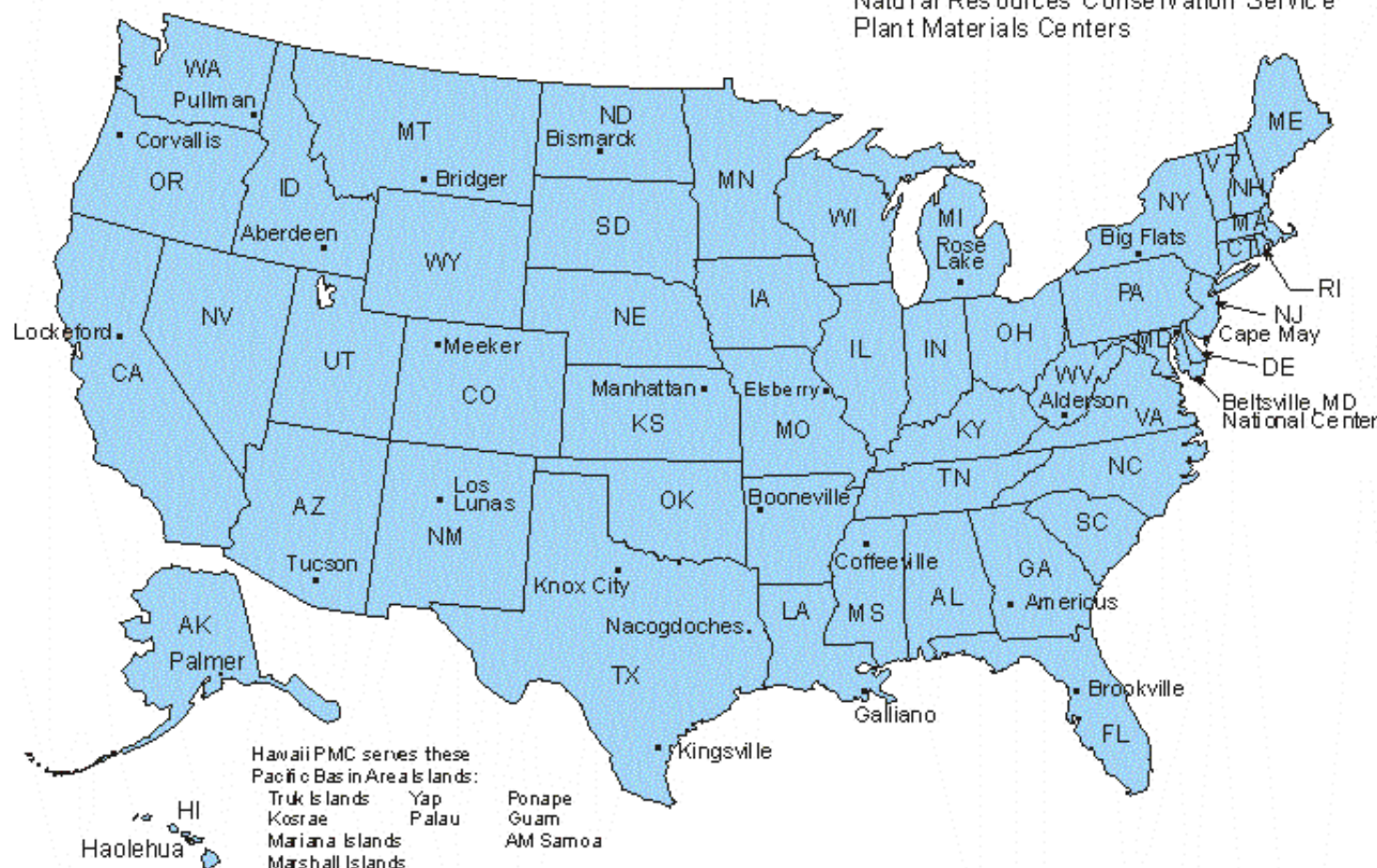
Introduction: The NPS, in managing the Stones River National Battlefield, has a need to preserve native plant resources and revegetate parklands. The NPS requires that revegetation of park lands utilize germplasm from within park boundaries where possible to maintain the genetic resources within the park. The NPS does not have the personnel, expertise, or equipment needed to propagate quantities of the required seed and plants.

The NRCS has the personnel and is equipped to propagate and clean quantities of seed sufficient to meet the NPS needs within the required time frame, and conduct evaluations on plant species to determine adaptation and cultural requirements for establishment.

The NPS has requested certain information and plant materials that are presently unavailable and is willing to reimburse the NRCS for the costs of obtaining such information and plant materials within the time frame specified in this agreement.

The NRCS has agreed to harvest seed from native species indigenous to Stones River National Battlefield, condition the seed, and produce seedling plugs to be used to establish permanent seed production fields at the park and/or at the Plant Materials Center. The species of interest are: *Andropogon virginicus*, *Andropogon ternarius*, *Andropogon gyrans*, *Bouteloua curtipendula*, *Carex* spp., *Chasmanthium latifolium*, *Dichanthelium* spp., *Eragrostis spectabilis*, *Leersia virginica*, *Melica mutica*, *Schizachyrium scoparium*, *Asclepius tuberosus*, *Aster* spp., *Eupatorium altissimum*, *Eupatorium coelestinum*, *Eupatorium serotinum*, *Lespedeza violacea*, *Rudbeckia* spp., *Solidago* spp., and *Forestiera ligustrina*.

Accomplishments: Fiscal year 2003 was the initiation year for this agreement. During 2003, NRCS personnel traveled to Stones River National Battlefield to become familiar with the park's ecological communities, identify prime seed collection locations for the nineteen species of interest, and to assess appropriate seed collection techniques and optimum harvest times. Several late summer seed collection trips netted small (less than 0.5 pounds) quantities of seeds from thirteen species. All seed was collected by hand stripping methods. The thirteen species represented in the 2003 seed harvest are: *Andropogon virginicus*, *Andropogon ternarius*, *Andropogon gyrans*, *Chasmanthium latifolium*, *Dichanthelium* spp., *Eragrostis spectabilis*, *Leersia virginica*, *Schizachyrium scoparium*, *Asclepius tuberosus*, *Aster drumondii*, *Lespedeza violacea*, *Lespedeza hirta*, and *Lespedeza triloba*. All seed harvested was transported to the Alderson, West Virginia Plant Materials Center, where it was conditioned and placed in appropriate seed storage until planting in fiscal year 2004.



Plant Materials Centers (PMC)

Palmer, AK	Alaska PMC	HC04, Box 7440, 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, Booneville, AR 72927	(479) 675-5182
Lockeford, CA	Lockeford PMC	POB 68, 21001 N. Elliott Road, Lockeford, CA 95237	(209) 727-5319
Meeker, CO	Upper CO Environmental Plant Ctr	POB 448, 5538 County Road 4, Meeker, CO 81641	(970) 878-5003
Brookville, FL	Brookville PMC	14119 Broad Street, Brookville, FL 34601	(352) 796-9600
Americus, GA	Jimmy Carter PMC	295 Morris Drive, Americus, GA 31709	(229) 924-4499
Halehewa, HI	Halehewa PMC	4101 Maunaloa Highway, Halehewa, HI 96729	(808) 567-6886
Aberdeen, ID	Aberdeen PMC	POB 296, 1691A South 2700 West, Aberdeen, ID 83210	(208) 997-4133
Manhattan, KS	Manhattan PMC	3800 S. 20 th 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	Bldg. 509, BARC-East, E. Beaver Dam Road, Beltsville, MD 20705	(301) 504-8175
East Lansing, MI	Rose Lake PMC	7472 Stroll Road, East Lansing, MI 48823	(517) 641-6300
Coffeeville, MS	Jamie L. Whitten PMC	2533 County Road 65, Coffeeville, MS 38922	(662) 675-2588
Elberry, MO	Elberry PMC	2803 N. Highway 79, Elberry, MO 63343	(573) 898-2012
Bridger, MT	Bridger PMC	99 South River Road, Route 2, Box 1189, 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
Las Lunas, NM	Las Lunas PMC	1036 Miller Street, SW, Las Lunas, NM 87031	(505) 866-4684
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
Corvallis, OR	Corvallis PMC	3415 NE Granger Avenue, Corvallis, OR 97330	(541) 757-4812
Nacogdoches, TX	East Texas PMC	6598 FM2782, Nacogdoches, TX 75962	(936) 564-4873
Kingsville, TX	Kika de la Giza PMC	3409 N. FM1355, 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) 335-7376
Alderson, WV	Alderson PMC	PO Box 390, Alderson, WV 24910	(304) 445-3005