Native Plants for Parks

FY 2002

Plant Materials Project Summary Reports

From the

Natural Resources Conservation Service

To the

National Park Service

A Cooperative Program between the
National Park Service, U.S. Department of the Interior
and Natural Resources Conservation Service,
U.S. Department of Agriculture

FY 2002

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INTRODUCTION

This is the 2002 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 2002 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 2002. 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 2002 PROGRAM OVERVIEW

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 28 National Parks.
- On site program technical assistance was provided by NRCS NTA and the NPS NTA at 9 National Parks.
- Technical assistance in addition to that agreed to Interagency Agreements was provided by Plant Materials Center staff or Specialists to 24 National Parks.

Development and Administration of Interagency Agreements

- Five new agreements and 10 IA amendments to agreements were developed this Fiscal Year.
- There were 42 projects at 25 National Park units in cooperation with 11 Plant Materials Centers.
- 75% of the projects are Federal Lands Highway Program (FLHP) related. The remainder involves bioengineering, exotic species control, riparian/wetland restoration and revegetation of campgrounds, new visitor's facilities, parking lots etc.

Native Seed and Plant Production

- 1,574 PLS pounds of seed
- 28,515 transplants
- 190 park indigenous species (53 grasses, 24 forbs, 42 shrubs, and 68 tree)

Native Seed/Plant Deliveries

- 15 National Parks
- 1,800 PLS pounds of seed
- 62,237 transplants (container and bareroot)
- 265 park indigenous species (63 grasses, 77 forbs, 75 shrubs and 50 tree)

Interagency Program Reviews

This year, reviews were held at:

- National Parks: Crater Lake NP, Yellowstone NP, Chickasaw NRA, Mt. Rainier NP, Yosemite NP, Sequoia NP, Rocky Mountain NP, Mesa Verde NP
- Plant Materials Centers: Meeker EPC, Los Lunas PMC, Lockeford PMC

Technology Transfer

- Progress continues to be made towards the interagency website, "Native Plants Network" (http://nativeplantnetwork.org. NPS and NRCS contributions make up approximately 50% of the 1600 entries of 1300 species/ecotypes in the database.
- NRCS NTA made seven program related oral presentations at professional society meetings and NPS/NRCS agency workshops.
- Developed seed collection and plant salvage guidelines for use by park revegetation staff.

I. DEVELOPMENT AND ADMINISTRATION OF INTERAGENCY AGREEMENTS

A. Finalized New Agreements

- **Zion NP with Los Lunas PMC**. Four year agreement to provide seed production of three grass species for general revegetation and riparian restoration.
- **Hubbells Trading Post with Los Lunas PMC**. Two year agreement at to provide technical assistance and production of five tree and shrub species for riparian restoration.
- **Acadia NP with Big Flats PMC**. Two year agreement to provide production of 3,000 transplants of 7 tree and shrub species for Campground rehab.
- **Sequoia/Kings Canyon NP with Lockeford PMC**. Three year agreement to provide seed production of four grass and 2 forb species for highway construction revegetation.
- **Dinosaur NP with Meeker EPC.** Provides for continued production of seed of 4 native grass species

B. IA modifications/Amendments

- **Crater Lake NP with Corvallis PMC.** Extended agreement through FY2002 to continue seed production of two grass and one sedge specie.
- **Crater Lake NP with Corvallis PMC.** Extended agreement through FY2003 to continue seed production of two grass and one sedge specie.
- **Grand Canyon with Los Lunas PMC.** Extended existing IA to provide for one additional year to continue production of 2 grass species.
- **Rocky Mountain NP with Meeker EPC.** Modified IA to include seed collection training and processing of seed to be used for future road project.
- **Chickasaw NRA with Knox City PMC**. Extended three existing agreements one more year. Two of the agreements document substitution of native warm season grass seed for shortages of agreed -to number of plants and shrubs. No change in funding amounts.
- **Bryce Canyon NP with Meeker EPC.** Extended existing agreement one year and provided additional funds to continue production of two native grass species.
- **Lassen Volcanic NP with Meeker EPC**. Modified agreement to provide additional funding to process park collected native forb/grass seed.
- **Acadia NP with Big Flats PMC.** Extended term of agreement 1 year.

C. Potential FY2003 Project Agreements:

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

- Craters of the Moon NM (Idaho) with Aberdeen Idaho PMC
- Great Sanddunes NM (Colorado) and Cedar Breaks NM (Utah) with Meeker Colorado EPC
- Olympic NP (Washington), Mt. Rainier NP (Washington), Crater Lake NP (Oregon) with Corvallis Oregon PMC
- George Washington's Birthplace NM (Virginia), Gateway NRA (New York) and Acadia NP (Maine) with Cape May New Jersey PMC.
- Carlsbad Caverns NP (New Mexico) and Capulin Volcano NM (New Mexico with Los Lunas New Mexico PMC
- Homestead NHS (Nebraska) with Manhattan Kansas PMC
- Saguaro NP (Arizona) with Tucson Arizona PMC
- Wind Cave NP (South Dakota) with Bismarck North Dakota 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 recommendations to the Federal Highway Administration relative to revision of the sections of USDT Federal Highway Administration "Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects". Recommended technical changes of sections related to erosion control, revegetation methods and materials for National Park FLHP Projects.

3. Provided technical assistance to DSC Landscape Architects, Project Managers, Regional specialists and individual parks with projects at the following parks:

   - **Capulin Volcano NM.** Provided assistance to FHWA regarding interpretation of project specification/ implementation and sources of materials. On site technical assistance to park personnel relative to seed collection, processing, and establishment of native grasses.

   - **Mesa Verde NP.** Provided assistance to park and DSC project manager/job captain relative to revegetation plan development and funding for highway revegetation project in FY2003. Assisted park in evaluation/monitoring of revegetation of previous highway projects.

   - **Chiricahua NM.** Coordinated with Tucson PMC to provide technical assistance relative to exotic plant control.

   - **Grand Teton NP and Yellowstone NPs.** Coordinated wetland/riparian technical assistance to the parks by Chris Hoag, Wetland Ecologist, NRCS PMC Aberdeen. Provided oversight for establishment of Grand Teton seed sources at Meeker EPC. Site visit to Grand Teton to review reclamation of Snake River gravel pit. Site visit to Yellowstone to review current and future FLHP projects.

   - **Chickasaw NRA.** Met at park with DSC, park and Knox City PMC personnel to review program and discuss Parks concerns related to PMC plant quantity/quality and meeting schedule. Meeting resulted in PMC providing additional grass seed to make up for plant shortages.

   - **Lava Beds NM**. Assisted in the development of seed collection and plant salvage guidelines for revegetation of new park visitor's center. Coordinated with Aberdeen PMC for seed cleaning.

   - **Grand Canyon NP.** Coordination with park and the Los Lunas PMC relative to funding, seed field management, IA extension and plant production delivery. Provided specifications to DSC Job Captain for erosion control techniques and materials.

TECHNICAL ASSISTANCE (Provided by NRCS NTA) CONTINUED

- **Rocky Mountain NP.** Assisted in monitoring and sampling on future road corridor. Coordinated and assisted in seed collection training of park staff in cooperation with Meeker EPC staff.

- **Mount Rainier NP.** Site visit to review completed road project and provide technical assistance relative to condition/ revegetation issue of wide road shoulders. Discussed potential new IA with Corvallis PMC.

- **Crater Lake NP.** Site visit and assistance in review of **future** parking lot and FLHP road project. Coordinated technical assistance by Corvallis PMC relative to genetics of blue wildrye.

- **Lassen Volcanic NP**. Coordinated seed collection, processing, testing and planting of new seed increase fields at Meeker EPC. Developed amendment to provide seed processing of park collected seed.

- **John Day Fossil Beds NM.** Coordinated with Pullman PMC in order to provide assistance relative to seedbed preparation recommendations and locate seeding equipment

- **Santa Monica Mountains NRA.** Provided tree and shrub species recommendations and plant source information.

- **Great Sand Dunes NM.** Technical assistance to park and coordination with Meeker EPC relative to recommended species, seed/plant production IA for revegetation of V.C addition and IA development.

- **Cape Cod NS.** Coordinated with Chris Miller and local NRCS DC to locate source of weed free straw bales for park construction project.

- **Cumberland Gap NHP.** Advice to DSC project Job Captain relative to suitable tree species for visitor's center.

- **Great Smoky Mountains NP.** Assistance to FHWA regarding seed mixtures/seed sources.

- **Sequoia/Kings Canyon NP.** Park revegetation program review and development of IA with Lockeford PMC.

- **Ft. Wadsworth Beach.** Assistance to park and Cape May PMC to develop a cost estimate for possible revegetation project.

- **Olympic NP.** Assistance to Park and Corvallis PMC relative to development of a new Interagency Agreement for revegetation after removal of Elwah Dam.

- **Valley Forge NHP.** Coordinated contact between Chris Miller, park and NPS Terrestrial Restoration Ecologist to provide technical assistance related to studies to evaluate native species to control erosion on earthworks.

- **New River Gorge NR.** Coordinated contact between Alderson W.V PMC, Park and DSC Project Manager relative to production of native plant species for new visitors center

- **Grand Teton NP.** Assisted with species substitution for current IA.

- **Ft Donaldson NB.** Coordinated with Alderson PMC to provide species and seeding rate recommendations to FHWA for road construction revegetation.

- **Stones River NB.** Provided assistance to Alderson PMC in the development of a new IA for seed/plant production**.**

- **George Washington's BP.** Assisted park and coordinated with NE PMCs to provide species/seed source information for highway project. Also assisted park with a possible future IA with the Cape May PMC which could lead to a NPS NE Region PM Development Program.

- **Hanes Point.** Coordinated onsite technical assistance by Beltsville PMC relative to species, sources establishment.

- **Ozark NSR.** Construction/seeding specification review and assistance.

III. TECHNOLOGY TRANSFER- (provided by NRCS NTA)

- Provided program update at NRCS PM West Consortium Conference and UCEPC Advisory Board Meeting held at the Lockeford California PMC.

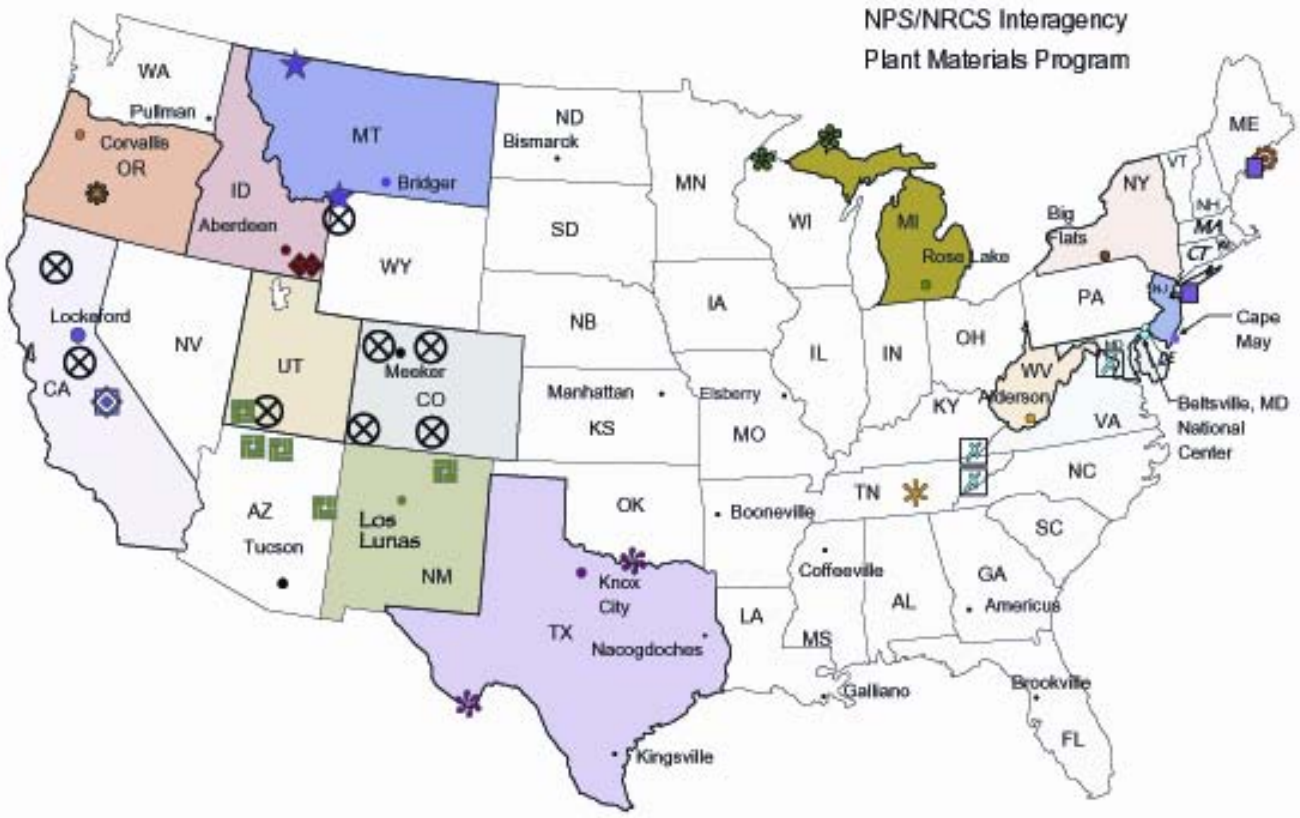
- Continued the coordination of interagency assembly of plant propagation technique data to revise the NPS/NRCS publication "Native Plant Propagation Techniques for Parks". In addition to a DSC employee, a former NRCS employee has been hired for the development and entry of Corvallis PMC data onto the interagency website. Approximately 250 NRCS native plant propagation protocols from PMCs have been entered into a cooperative NPS/NFS/NRCS and University of Idaho website entitled "Native Plant Network (http://www.nativeplantnetwork.org). Currently NPS and NRCS make up for 750 of the approximately 1500 entries in the database.

- Assisted in the program development of a NPS Western Mountain Parks Restoration Workshop, Seattle Washington. Workshop was attended by approximately 50 NPS revegetation personnel. NRCS NTA made three presentations, co-chaired three sessions and coordinated the NRCS participation in the program by Mark Majerus, Chris Hoag and Steve Parr.

- Presented a poster paper and oral paper on the NRCS/NPS PM Program at the annual meeting of the Society for Range Management, Kansas City, MO.

- Chairman for the poster session at the 15th High Altitude Revegetation Workshop, Ft. Collins, CO

- Made a program presentation at the NPS Western Great Lakes Research Conference, Marquette, MI.



Plant Materials Center		In cooperation with these National Parks
Aberdeen	ID	Craters of the Moon National Monument
Alderson	WV	Stone River National Battlefield
Beltsville	MD	George Washington Memorial Parkway, Cumberland Gap Historical Park, Great Smoky Mountains National Park
Big Flats	NY	Acadia National Park
Bridger	MT	Yellowstone National Park, Glacier National Park
Cape May	NJ	Gateway National Recreational Area, Acadia National Park
Corvallis	OR	Crater Lake National Park
Rose Lake	MI	Apostle Islands National Lakeshore, Isle Royale National Park
Knox City	TX	Big Bend National Park, Chickasaw National Recreational Area
Lockeford	CA	Sequoia and Kings Canyon National Parks
Los Lunas	NM	Grand Canyon National Park, Hubble Trading Post National Historic Site, Zion National Park, Pipe Spring National Monument, Capulin Volcano, National Monument
Meeker	CO	Bryce Canyon National Park, Mesa Verde National Park, Yosemite National Park, Dinosaur National Monument, Grand Teton National Park, Rocky Mountain National Park, Lassen Volcanic National Park, Great Sand Dunes National Monument

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INTERMOUNTAIN REGION

Big Bend National Park
2002 Annual Summary Report
Prepared by
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. 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. All agreements involve seed and/or plant collection at the Park and seed increase at the PMC. Materials produced are used for roadside revegetation within the park. Plant materials (seeds) are drilled and/or broadcast along road shoulders following construction. In late 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 2002, the park had received a total of 2179 bulk pounds of seed totaling 882 PLS lbs.

Seed Production and Available Inventory - 2001

Common Name	Area(ac)	2002 Prod./Lbs *	PLS Inventory On Hand
Alkali sacaton	-	-	362.24
Sideoats grama	-	-	208.2
Green sprangletop	-	-	419.2
Cane bluestem	-	-	55.3
Showy menodora	.50	20.00	248.9
Chisos bluebonnet	-	-	-
Chino grama	.75	60.00	36.37
Tobosa	.10	increase	-
Limoncillo	-	-	30.0*

* bulk material wt

Conclusion:

At the end of FY 2002 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 pappuugrass will be started to investigate the possibilities of field seed production. The new agreement signed in 2001 addressing post weed control revegetation will continue through the year 2004.

BRYCE CANYON NATIONAL PARK
2002 ANNUAL REPORT
prepared by
UPPER COLORADO ENVIRONMENTAL PLANT CENTER
MEEKER, COLORADO

INTRODUCTION: Bryce Canyon National Park and the Upper Colorado Environmental Plant Center entered into an agreement, which was formally approved in June 1998. Preliminary steps have been initiated to amend the agreement to increase target production quantities to 1500 pounds and extend the agreement into fiscal year 2003. Two species, slender wheatgrass, *Elymus trachycaulus,* and nodding brome, *Bromus anomalus*, were identified for seed increase.

ACCOMPLISHMENTS: Although no data is yet available on PLS quantities of harvested seed, 149 pounds of slender wheatgrass seed was produced in 2002. The production portion of the field, 0.5 acre, was established August 12, 1998. An additional 0.8-acre was planted September 5, 2000. A one-acre field of nodding brome established July 20, 1998, was removed due to poor vigor. In its place, a one half-acre nodding brome field was planted August 12, 2001. A small amount of nodding brome, 2.4 pounds, was produced this year. On September 11, 2002, 599 pounds of seed was shipped to Bryce Canyon National Park for revegetation purposes. Current inventory of Bryce Canyon seed is 151.4 clean pounds, all produced in 2002.

TECHNOLOGY DEVELOPMENTS: Specific information about germination trials, soil preparation, seeding rates, equipment, or other seeding establishment methods are available upon request.

Chickasaw National Recreation Area
2002 Annual Report
Prepared by
The James E. 'Bud' Smith Plant Materials Center
Knox City, Texas

Introduction

The original agreement with 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 phase for revegetating of the Buckhorn Area was completed in 1995. The second phase for revegetating the Guy Sandy Area was completed in 1999. Phase three of the project for revegetating of the Veterans Lake Area is under construction for the years 2000-2003. Phase four of the project for revegetating of the Point Campground Rehab is still under construction for the years of 2000-2003. Phase five of the project for revegetating of the Point/Perimeter Roads will occur between the years 2001-2003. Phase six of the project which is tree transplants for the Tree Park Wide will occur between 2001-2003. Phase one and two included native grass seed and woody productions. Phases three through five will include seed production of native forb, legume, grass and several shrub/woody transplants. Phase six will include eleven native different woody species for transplants and will total to 1,000 individual trees for the Park Wide Area.

Accomplishments

From 1993 to 2002 the Park had received a total of 1,383.43 bulk pounds of native forb and grass seed totaling 854.26 PLS lbs. and 5,767 shrub and woody transplants. They consisted of black willow, blackjack oak, coralberry, Carolina buckthorn, buttonbush, bur oak, chinkapin oak, Chickasaw plum, cottonwood, green ash, hackberry, post oak, redbud, red oak, roughleaf dogwood, sycamore, smooth & winged sumac, persimmon, Mexican plum, skunkbush sumac, Virginia creeper, winged elm and white honeysuckle.

Seed and Plant Production Inventory Jan. - Dec. 2002

Common Names	Units	2002 Prod. or lbs.	Total PLS and # of Plants-On Hand
sideoats grama	.33 ac.	40*	69.81 PLS
hairy grama	.25 ac.	8*	2.19 PLS
big bluestem	.25 ac.	2*	18.89 PLS
little bluestem	.15 ac.	35*	28.94 PLS

Indiangrass	.75 ac.	0*	184.80 PLS
purpletop	.23 ac.	10.0*	10.0*
wildrye sp.	.09 ac.	27.5*	27.5*
buffalograss	200 sq. ft.	1*	1*
eastern redbud	ea.	266	266
red oak	ea.	0	35
cottonwood	ea.	0	25
sycamore	ea.	0	45
purple coneflower	.03 ac.	1.30*	1.94*
Mexican hat	.03 ac.	3.00*	3.00*
Indian blanket	.03 ac.	1.30*	1.30*
purple prairie clover	.03 ac.	0	.49*
black-eyed Susan	.03 ac.	5.50*	10.50*
clasping-leaved coneflower	.03 ac.	0	0
gayfeather	.03 ac	2*	11.25*
American elm	ea.	217	217
Green ash	ea.	367	367
chinkapin x bur oak	ea.	0	28
winged elm	ea.	119	119
hackberry	ea.	103	103

Bulk lbs.*

DINOSAUR NATIONAL MONUMENT
Annual Report 2002
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. This agreement involves the collection and seed production of four grass species native to Dinosaur National Monument. Targeted species are: Western wheatgrass (*Pascopyron smithii* - 9070955), Indian ricegrass (*Oryzopsis hymenoides* - 9070953), Great basin wildrye (*Leymus cinereus* - 9070951), Bluebunch wheatgrass (*Psuedoroegneria spicata ssp. spicata* - 9070952), Alkali sacaton (*Sporobolus airoides* - 9070954), Sand dropseed (*Sporobolus cryptanderus)* and Salina wildrye (*Leymus salinus ssp. salinus*). These grasses will be used for restoration and to reduce pressure from non-indigenous weedy plants found in the National Monument. 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, since no seed was produced on the original planting in 2001. This planting had a good stand in 2002. Plant center personnel made one visit to Dinosaur National Monument in 2002.

ACCOMPLISHMENTS: Seed was harvested from all seed fields in 2002, except for the 2001 planting of bluebunch wheatgrass which was still in the seedling stage of growth. One field (alkali sacaton) was harvested twice in 2002 (July 17 and September 10).

Seed Harvested

Name	Amount
Indian ricegrass	3.6 lb
Basin wildrye	25.0 lb
Bluebunch wheatgrass	300.0 g
Alkali sacaton	6.2 lb

Seed Fields

Name	Size	
Basin wildrye	0.24 acre	
Bluebunch wheatgrass	0.24 acre	
Bluebunch wheatgrass	0.18 acre	(2001)
Indian ricegrass *	0.24 acre	
Alkali sacaton *	0.18 acre	

* Interseeded in 1999

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

GLACIER NATIONAL PARK
2002 SUMMARY REPORT
Prepared by

Natural Resources Conservation Service
Plant 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 anticipates their seed and plant needs for each project and then allows 2 to 3 years of lead time for seed or plant production.

ACCOMPLISHMENTS: In 2002 and early 2003, 108 seed lots representing 47 individual species totaling 60.20 pounds (27.31 kg) were delivered to GNP or used for BPMC production. The 2002 distribution included 17 grass lots (8 species), 36 forb lots (20 species), and 55 shrub lots (19 species). Fifty-eight of the 108 seed lots were 1992-1993 lots removed from inventory and sent to GNP to supplement seeding mixes.

In 2002, 151 wildland collections were sent to the BPMC and cleaned: 16 collections of grasses, sedges, and rushes (9 species); 81 forb collections (30 species); and 54 shrub collections (19 species). A total of 13.22 lb (5.99 kg) of clean seed were processed; 3.89 lb (1.76 kg) of grass and grass-like, 6.27 lb (2.84 kg) of forbs, and 3.07 lb (1.39 kg) of trees and shrubs. A total of 71 new species: collection sites were identified and accessioned representing 3 grass or grass-like species (3 species), 41 forbs (27 species), and 27 woodies (17 species).

Eight seed production fields remained active in 2002, including *Carex athrostachya* (Camas), *C. athrostachya* (Avalanche), *C. pachystachya* (two Avalanche sources), *C. deweyana* (Avalanche), *Elymus glaucus* (Many Glacier), *Poa alpina* (Logan Pass 9057881/9058304), and *Aster laevis* (Avalanche). These fields produced a total of 40.34 lb (18.30 kg) of seed. Although *E. glaucus* (Many Glacier) and *P. alpina* (Logan Pass 9057881/9058304) were not removed, they are declining and may be removed in early 2003. Production fields of *Phleum alpinum* (Sperry Chalet), *P. alpina* (Logan Pass; 9054561), *Pseudoroegneria spicata* (Many Glacier), and *Stipa nelsonii* (Rising Sun) were removed. Three new fields were sown in 2002, including *P. alpina* (Logan Pass), *P. alpinum* (Logan Pass), and *E. glaucus* (West Glacier); but only the *E. glaucus* established.

Seed germination tests are currently being conducted on 8 accessions (6 species) grown in 2002 including *C. athrostachya* (two collections: Avalanche and Camas Road), *C. deweyana* (Avalanche), *C. pachystachya* (two Avalanche collections), *E. glaucus* (Many Glacier Road), *P. alpina* (Logan Pass), and *Aster laevis* (Avalanche). Results will be available in the 2002 GNP Annual Technical Report.

No bareroot or containerized material was delivered to GNP in 2002. Woody seed stratifications established in late 2000 of *Rosa woodsii* (Quarter Circle Bridge), *Rubus parviflorus* (North Fork), and *Symphoricarpos albus* (Avalanche) were lost to a power failure while the lots were in cold chilling. Approximately 90 *R. parviflorus* were transplanted into 40-in^3 containers and will be available for delivery in 2003. Seed stratifications were initiated for *Mahonia repens* (Apgar), *R. woodsii* (Headquarters), *R. parviflorus* (Walton), *S. albus* (Headquarters), *Arctostaphylos uva-ursi* (Walton), and two lots of *R. parviflorus* (Goat Haunt).

TECHNOLOGY DEVELOPMENT: A BPMC:NPS cost estimating procedure was the basis for a paper titled *Nursery Cost Estimating at the USDA/NRCS Bridger Plant Materials Center* presented at the combined Western Forest and Conservation Nursery Association/Forest Nursery Association of British Columbia meeting held in August 2002 in Olympia, WA. A paper titled *Starting a Small-Scale Bareroot Production Nursery For Riparian Trees and Shrubs* was presented at the Inter-Tribal Nursery Council Conference and Workshop at Salish-Kootenai College in June 2002, and was based largely on PMC:GNP related production. Germination and establishment studies of *Xerophyllum tenax* initiated in 2001 were discontinued because of chronic plant mortality. Cultures of dead and dying seedlings indicate the presence of *Pythium*, and suggest this pathogen as a causal agent. Future *X. tenax* establishment studies will target control of this pathogen.

GRAND CANYON NATIONAL PARK

2002 Annual Summary Sheet Report

Prepared by

Natural Resources Conservation Service Plant Materials Center

Los Lunas, New Mexico

I. 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 New Mexico Plant Materials Center (NMPMC) 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 NMPMC 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.

II. Accomplishments

Seed Production 2002

In 2002, the NMPMC planted an additional one half acre of Muttongrass using the transplants grown by the NMPMC. The NMPMC produced the following seed in 2002 for the GCNP:

Common Name	***Scientific Name***	**PLS pounds**
Blue Grama	*Bouteloua gracilis*	.03
Muttongrass	Poa fendleriana	5.68

Transplant Production 2002

In 2002, the NMPMC produced the following transplants for the GCNP:

Common Name	**Transplants delivered**
Mexican Cliffrose	222
Fernbush	32
Apache Plume	396
Big Sagebrush	34
Pinon Pine	24
Ponderosa Pine	229
Currant	241
Curl-leaf Mountain Mahogany	615
Morman Tea	138
Mountain Snowberry	349
Utah Serviceberry	369
NM Locust	47
Datil Yucca	24
Century Plant	114
Black sage	101
Barberry spp.	393
Rubber Rabbitbrush	80
Woods Rose	70
Total	**3478**

III. Technology Development

The Blue Grama and Muttongrass fields were both harvested in 2002. The two fields received the following treatments in 2002. Three applications of Orthene insecticide were made to control seed damaging insects. One hundred pounds of Nitrogen and Phosphorous was applied to both fields during the growing season. Irrigation was increased to promote greater seed production

GRAND TETON NATIONAL PARK
2002 ANNUAL REPORT
prepared by
UPPER COLORADO ENVIRONMENTAL PLANT CENTER
MEEKER, COLORADO

INTRODUCTION: An agreement between Grand Teton National Park and Upper Colorado Environmental Plant Center (UCEPC) was formally approved in 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 and 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.

ACCOMPLISHMENTS: Two products, blue wildrye and slender wheatgrass, were established as seed increase fields. A one-acre field of blue wildrye was planted with the Planet Junior in field 4 on July 19, 2002, and a one-acre field of slender wheatgrass was planted in field 12A on July 15, 2002. It, too, was planted with the Planet Junior. Basin wildrye produced 53 pounds in 2002, well short of its potential, but the field remains relatively healthy.

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.

MESA VERDE NATIONAL PARK
Annual Report 2002
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 on September 26, 1990. This agreement was amended in 2000 and now involves the live plant production of six species; 9024895 Gambels oak (*Quercus gambelii),* 9024869 Utah serviceberry (*Amelanchier utahensis*), 9024874 Mountain mahogany (*Cercocarpus montanus),* 9024898 Mountain snowberry (*Symphoricarpus oreophilus*), 9024870 Blueleaf aster (*Aster glaucodes*) and 9024878 Fourwing saltbush (*Atriplex canescens*). In addition, the plant center will provide stored seed as requested. Seed production for Mesa Verde was concluded in 2000. All seed production fields have been removed. Two shipments of plant materials were made in 2002, one involved live plants and the other was seed. No plant materials were received from the park in 2002. All seed lots of Mesa Verde materials were updated for germination in 1999.

ACCOMPLISHMENTS: Below is a listing of plant materials provided to the park in 2002. Seed and live plants were shipped to the park.

LIVE PLANTS

Species	Number
Utah serviceberry	660
Mountain snowberry	96
Blueleaf aster	87

SEED PROVIDED

Species	Seed PLS
Slender wheatgrass	3.6 lb
Mutton grass	3.0 lb
Western wheatgrass	2.2 lb
Louisiana sage	1.5 lb
Yarrow	1.0 lb
Hairy golden aster	1.0 lb

TECHNOLOGY DEVELOPMENTS: Native Plant Mats grown in the plant centers greenhouse were placed on soil in 2000. These mats are still growing at the plant center; however, no notes were taken on them in 2002.

PETRIFIED FOREST NATIONAL PARK
2002 Annual Summary
Prepared by
Natural Resources Conservation Service Plant Materials Center
Los Lunas, New Mexico

I. Introduction

On November 14, 2000 an agreement was made between the National Park Service, Petrified Forest National Park of the U. S. Department of Interior, and the Natural Resources Conservation Service of New Mexico. The agreement declares that the New Mexico Plant Materials Center (NMPMC) will propagate plants for the Petrified National Forest.

II. Accomplishments

Transplant Production 2002

In 2002, the NMPMC produced the following transplants for the Petrified National Forest Park:

Common Name	Transplants Delivered
Sand Sagebrush	156
Goldenweed	321
Fourwing Saltbush	156
Globe-mallow	84
Total	**717**

III. Technology Development

The transplants were grown from seed collected at the Petrified National Forest Park and were delivered as per stated in the agreement. The agreement has been completed.

ROCKY MOUNTAIN NATIONAL PARK
2002 Annual Report
Prepared by
UPPER COLORADO ENVIRONMENTAL PLANT CENTER
MEEKER, COLORADO

INTRODUCTION: Upper Colorado Environmental Plant Center (UCEPC) Project No. 08S211 (IA No. 1520-2-9001) cooperative plant materials agreement was signed September 9, 1999 by Rocky Mountain National Park, the USDA Natural Resources Conservation Service (USDA-NRCS), and the UCEPC. This agreement involves the collection and seed production of three grass species native to the East side of Rocky Mountain National Park. Targeted species are: mountain muhly (*Muhlenbergia montana* - 9070957), Junegrass (*Koeleria cristata* – 9070962) and sleepy grass (*Stipa robusta* - 9070958)

ACCOMPLISHMENTS: Negotiations for the new Bear Lake Road Project began in 2002 with a proposed seed collection list. A seed identification and collection training was held at the park for personnel by UCEPC staff. Collections efforts are reflected below due to availability at the park. The following table includes the collection amounts from the park, and harvested amounts from UCEPC. The experimental plot (25' by 35') of mountain muhly, established in 1997, produced seed again this year. The sleepy grass field met production target and was plowed in 2002. Precipitation was 32% below longtime average.

EAST SIDE SPECIES

Scientific Name	Common Name	Seed on hand	2002 Harvest Cleaned seed
Muhlenbergia montana	Mountain muhly	5.50 lb	1.20 lb
St*ipa robusta*	Sleepy grass		
Koeleria cristata	Junegrass	162.00 g (SC)	1g (SC)

(SC) Seed Collected from RMNP

These are some of the potential species for the new contract that we will begin working on in 2003:

BEAR LAKE SEED COLLECTIONS AMOUNTS

Scientific Name	Common Name	Uncleaned Weight	Cleaned Weight
Annaphalis margaritacea	Pearly everlasting	15.20 lb	180.00 g
Oxytropsis lamberti	Locoweed	8.00 lb	305.00 g
Thermopsis divericarpa	Golden banner	45.90 lb	21.00 lb
Koeleria cristata	Junegrass	0.70 lb	1.00 g
Bouteloua gracilis	Blue grama	40.00 lb	unknown
Stipa comata	Needle and thread	42.00 lb approx.	unknown
Heterotheca villosa	Golden aster	4.40 lb	377.00 g
Trisetum spicatum	Spike trisetum	5.40 lb	187.00 g
Bromus anomalus	Nodding brome	1.40 lb	264.00 g
Muhlenbergia montana	Mountain muhly	32.80 lb	321.00 g
Eriogonum umbellatum	Sulphur flower	5.60 lb	1.58 lb
Artemisia frigida	Fringed sage		1.00 g
Carex stenophylla	Needle leaf sedge		10.00 g

TECHNOLOGY DEVELOPMENTS: So far we have found the *Stipa comata* and the *Bouteloua gracilis* difficult to clean. Germination test in the greenhouse on the *Thermopsis divericarpa* seed indicated a need for conditioning. *Oxytropsis lamberti* seed however germinated without pretreatment.

YELLOWSTONE NATIONAL PARK
2002 Summary Report
Prepared by
Natural Resources Conservation Service
Plant Materials Center
Bridger Montana

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 projects within Park boundaries.

In 2001, 154 lots of seed from 41 species were delivered to YNP or the PMC totaling 391.23 pounds (177.46 kg). This included 69 grass lots (23 species), 67 forb lots (28 species), and 19 tree/shrub lots (15 species). Distribution to the PMC for planting seed increase included 13 grass lots (7 species).

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.

Collections are made by Yellowstone National Park crews, dried, and either delivered to the Bridger PMC, or picked up by PMC personnel. In 2002, 154 collections were made from 66 species: 44 grasses (14 species) at 28.86 pounds (13.09 kg); 99 forbs (44 species) at 34.87 pounds (15.82 kg); and 11 shrubs/tree (8 species) at 1.8 pounds (.814 kg). The wildland seed collections totaled 65.52 pounds (29.72 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 2002, YNP personnel spent more than 575 hours in the activity of seed collection. There were approximately 137 hours (average 3.11 hours per recorded collection) dedicated to collecting grass seed, 420 hours (average 4.24 hours per recorded collection) for forbs, and 18 hours (2 hours per recorded collections) for woody species.

There were 10 grass increase blocks planted in 2002 for road projects. Older increase blocks of 12 grasses and 1 forb were removed due to natural decline in production or poor establishment. Currently there are 21 accessions of 7 grass species (4.31 acres/1.74 hectares) and one forb species (.03 acres/.01 hectares) planted in seed increase blocks at the Bridger PMC.

During the past growing season, 20 different grass accessions (7 species) were harvested, producing 522.20 pounds (236.86 kilograms) of clean seed. Seed production averaged 130 pounds-per-acre (147 kilograms-per-hectare).

Seed germination tests were conducted on PMC seed increase production for 16 grass accessions. Percentage germination for the 5 grass species ranged from 48 to 100 and averaged XXX.

The wildland collection and seed increase inventory contains 545 accessions (118 species) totaling 1,928.63 pounds (874.81 kg). This is comprised of 229 grass accessions (28 species) at 1,809.20 pounds (820.64 kg), 298 forb accessions (77 species) at 91.69 pounds (41.59 kg), and 18 shrub accessions (13 species) weighing 27.74 pounds (12.58 kg).

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.

ZION NATIONAL PARK
2002 Annual Summary
Prepared by
Natural Resources Conservation Service Plant Materials Center
Los Lunas New Mexico

I. 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 New Mexico Plant Materials Center (NMPMC) will produce seed for the Zion National Park.

II. Accomplishments

Seed was collected by the Zion National Park staff and shipped to the NMPMC for conditioning. In 2002, the NMPMC received the following seed: Indian Ricegrass, Sand Dropseed, and Big Bluestem. This seed will be cleaned and treated for use in establishing production fields. The quality of seed has been a problem. Due to drought conditions at the park, the seed fill has been poor.

III. Technology Development

Indian Ricegrass seed has been imbibed, sown in plug trays and placed in cold stratification (40F°) for 10 weeks as recommended for increasing optimum seed germination. Big Bluestem and Sand Dropseed seed will be stored to assure sufficient after-ripening prior to being used for seeding the production fields.

MIDWEST REGION

APOSTLE ISLANDS NATIONAL LAKESHORE
IAA No. IA-6140-A-0007 (Rasp. and Outer Islands)
FY2002 Summary

Prepared by
USDA- NATURAL RESOURCES CONSERVATION SERVICE
ROSE LAKE PLANT MATERIALS CENTER
East Lansing, MI

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 will be selected from an amendable list. A minimum of 2 grass, 2 forb and 4 shrub species from this list will be supplied by the Center based on the material's availability, viability and site adaptability for the intended use. The Agreement further specifies deliverables as 30 pounds of Canada wildrye seed, 500 forb/grass plugs and 500 shrub transplants. Deliverables are scheduled for 2002 and 2003.

Accomplishments: Twenty-five species have been collected for increase and will be return to Raspberry and Outer Islands. Propagation of all the woody species from seed has been initiated. All seed from the forb and grass species (except Canada wildrye, *Elymus canadensis*), as well as the reserve seed for most woody species, has been placed in cold storage. Vegetatively collected plants either remain in the greenhouse or have been placed in cold storage. A total of 1021 plants have been propagated at the Center for this project. Collected Canada wildrye seed was cleaned, debearded and sown into a production field mid-September. The plants are being held at the Center and two/thirds of the plants will be returned for planting in the spring of 2003. Guidance was also provided to the sub-contractor for the installation of the Brush Layers on the slope. Upon the contractors completion of the remaining slope shaping plants will be return for planting the slope.

Technology Development and Observations:

APOSTLE ISLANDS NATIONAL LAKESHORE
IAA No. IA-6140-A-0004 (Oak Island)
FY2002 Summary

Prepared by
USDA- NATURAL RESOURCES CONSERVATION SERVICE
ROSE LAKE PLANT MATERIALS CENTER
East Lansing, MI

Introduction: This project was initiated in 2000 to assist Apostle Islands National Lakeshore with the restoration of the Oak Island sandscape. Efforts by the Plant Materials Program staff included (1) evaluating the extent of invasive non-native species, (2) assisting with the determination and collection of species for use in restoration, (3) determine collection methods for selected species, (4) determining the best propagation methods for selected species (5) developing plot designs for establishing collected species on the sandscape, (6) planting plots and determining the information to be collected, and (7) preparing a restoration plan. Under the Memorandum of Agreement this project was completed in September 2002.

Accomplishments: During the past two years the 15 species of plants collected at or near Oak Island have been increased at the Rose Lake PMC. In 2001 eighteen 2'x 2' test plots were established for nine of these species to determine ease of restoration. Survival, colonization and vigor data continues to be collected on each of the plots. As part of the restoration effort over 3200 additional plants were transplanted on Oak Island in 2002. Monitoring on survival and aerial coverage was done on 20 separate square meter plots established within the denser planted areas.

Two 20' x 20' areas were established to evaluate hawkweed control methods. An attempt to eliminate orange hawkweed (*Hieracium aurantiacum*) by mechanical (hand) removal was used in one area while a glove-applied glyphosate treatment was used in the other. Post-application hawkweed counts were made. In addition, Garlon 3A was spot sprayed with a backpack sprayer on hawkweed in a separate, larger area.

Technology Development and Observations:

Not enough information has been gathered to draw many conclusions concerning the propagation of these species. Some species such as wild strawberry (*Fragaria virginiana*) and beachgrass (*Ammophila breviligulata*) lend themselves quite easily to vegetative propagation, other species such as pearly everlasting (*Anaphalis margaritacea*) and Canada wildrye (*Elymus canadensis*) are more easily propagated by seed. Equisetum did well in the shade and was colonizing the bare sand area.

ISLE ROYALE NATIONAL PARK
IAA No. F6310010001
FY2002 Summary

Prepared by
USDA- NATURAL RESOURCES CONSERVATION SERVICE
ROSE LAKE PLANT MATERIALS CENTER
East Lansing, MI

Introduction: While most of the land base of Isle Royale National Park is designated Wilderness and under a 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 this area. Though a Memorandum of Agreement with Isle Royale National Park the USDA Natural Resource Conservation Service, Rose Lake Plant Materials Center has 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 will include collection, establishment and management techniques on various park plant species. The MOA extends through September 2005.

Accomplishments: A site visit was made to the three areas of concern on Isle Royale; Mott Island, Rock Harbor and Windigo, for assessment and collection purposes. A trip report including assessments and recommendations was prepared by David Bergdorf, NRCS Plant Materials Specialist, and sent to the Isle Royale management staff. In addition, thirty-two species have been collected for research, increase and return to Isle Royale. All vegetative material and some seed collected from the park is currently growing and under observation in the Center's greenhouse. A sample plant fact sheet for use in the restoration guide was developed and sent to Jack Oelfke, Isle Royale's Resource Manager. Plants grown at the Center were returned to Isle Royal and four planting sites establish. Two of the planting sites are located at Windigo, one at the dock area and another adjacent to the housing. Evaluations of the plantings were completed by park staff through out the summer. A third site was planted at Mott Island adjacent to the septic field. This planting involved the lateral root development study. Evaluations of the planting were conducted by park staff. A fourth planting was established at Rock Harbor Marina along the walkway and wall.

Technology Development and Observations: Construction/development and foot traffic in the three areas of concern have contributed to erosion problems, the displacement of native vegetation and the spread of non-native vegetation. There were several disturbed sites in these areas including septic fields, dock zones, facility grounds, maintenance yards and a fuel spill site. Non-native vegetation has become well established at some sites. Of particular note and concern is Bachelor's Buttons (*Centaurea* sp.) that has spread near the dock area at Rock Harbor. Testing specific restoration technologies has been scheduled for 2002. The Mott Island Lateral Root Development will be further evaluated during the summer of 2003.

NATIONAL CAPITAL REGION

GEORGE WASHINGTON MEMORIAL PARKWAY
2002 Annual Report
summary sheet prepared by
USDA-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 the NPMC to provide an additional 200 woody container plants of the same species for revegetation of a telecommunications tower site within the park.

Accomplishments: A total of 457 woody plants were delivered to the park in April 2002. Planting was done by the GWMP natural resource management staff and by the park's interpretive staff with assistance from a local schoolgroup. Planting sites included a re-routed trail, an area disturbed by clean up of an asbestos pile, and a site where invasive exotic plants had been removed.

Currently, the NPMC has 1,100 tree and shrub container transplants of 9 species, most of which are ready for spring 2003 delivery to the park. An additional 200 bareroot plants of 8 species (one a repeat of a species already in containers) will be harvested over the 2003 and 2004 winter seasons and potted for delivery in 2004. The following 16 species are currently being grown:

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

No new seed was collected from the park in 2002, since the number of plants currently in production at the NPMC will fulfill the remainder of the agreement and amendment.

Technology Developments and Observations: While not necessarily a brand new technology development, the NPMC has found it to be cost effective to germinate seeds of some woody plant species on blotter paper. Species such as red maple, river birch, and sycamore have small seeds that do not fare well in our outdoor seedling beds, and may have poor germination on trays of media in the greenhouse. By scattering seeds in a thin layer across a 19 x 24-inch sheet of blotter paper under the mist bench in the greenhouse, we can pluck germinated seedlings from the paper and transplant into plug trays until they are large enough to be grown in the ground or larger containers.

NORTHEAST REGION

ACADIA NATIONAL PARK
2002 ANNUAL REPORT

Prepared by
USDA, Natural Resources Conservation Service
Big Flats New York Plant Materials Center

I INTRODUCTION:

The USDA, Natural Resources Conservation Service, Big Flats Plant Materials Center, entered into an interagency agreement with the USDI, National Park Service, Acadia National Park: IA Project No.4500-02-001 (2003).
The Natural Resources Conservation Service agreed to;

(A) Collect seed and plant material 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 Rehab Project from fall 2002 to fall 2004.

The park will use the plant materials for re-vegetation after upgrading the Seawall Campground and seeding areas disturbed during utility and reconstruction work in the park. 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, establishing seed increase fields, propagating materials vegetatively and delivering the plant material back to the Park.

II ACCOMPLISHMENTS:

During 2002, seed was collected in late October (winterberry, pasture rose, glycera, white birch, bayberry, arrowwood viburnum, wild raisin, mountain ash, and hawthorn). Vegetative cutting material was collected in mid-June (meadowsweet) and late October (meadowsweet, quaking aspen, and arrowwood viburnum). Vegetated Material was collected in mid-June (bunchberry, arborvitae and red maple) and late October (arborvitae, balsam fir, red spruce).

Two deliveries of plant materials were made in 2002. The June delivery was 6520 plugs, 365 plants and 59.5lbs of seed (forbs and grass) to complete the plants for package 229 and 232. The October delivery was 502 plants for the Seawall Campground project.

A seed increase field of red fescue, established on September 14, 2000, came on very well this year even with a severe summer drought conditions again this year. We got the first harvest in 2002 from this field plus we harvested the other production fields. For our forb production, we had been establishing stands on long single rows, allowing for easier mechanical cultivation and harvesting. In 2001 and 2002, we established new seed production blocks using weed barrier fabric. Plugs of goldenrod and aster were started in the greenhouse and then transplanted into six feet wide weed barrier fabric on an approximate spacing of 1 foot by 1 foot. The plantings were irrigated and they established well. The fabric will keep out weeds over a number of years and it has allowed us this year to harvest the seed with a combine by straddling the beds. Seed was harvested in 2002 of red fescue, goldenrods, and asters and the seed was processed. The small, light seed is still a challenge to harvest and clean. All seed is tested at the New York State Agricultural Experiment Station’s Seed Lab in Geneva, New York.

Seed of trees and shrubs that were growing in flats in the PMC cold frames, were potted up and placed in the lathe house. This included white birch, white spruce, winterberry, and mountain holly. Seedlings from prior year seeding (white spruce, white birch, bayberry) were re-potted into l gallon containers. Red maple seedlings, collected along the edge of a dirt road in the park, were planted in flats in the cold frame. Cuttings of meadowsweet rooted well in the greenhouse mist system and were potted up during the summer and placed in the lathe house. The dry summer and fall weather required the lathe house to be watered through November.

At Acadia, plant materials were utilized to revegetate disturbed areas from utility work, construction projects including the Seawall Campground project and sites of soil disturbance. Roping out the areas and posting re-vegetation signs have definitely helped keep the visitors out of the plantings, giving the plants a chance to get established and grow.

III TECHNOLOGY DEVELOPMENT/TRANSFER

Forb seed production fields were successfully established by planting into weed fabric. Harvesting and seed cleaning techniques continue to be refined each year. Many of the plantings in the park are growing well. Posting revegetation signs has helped to minimize the trampling of plants by visitors and has educated the public on how the park service is utilizing native plants.

PACIFIC WEST REGION

CRATER LAKE NATIONAL PARK
Mazama Dorm Project
2002 Annual Report Summary
Prepared by
NATURAL RESOURCES CONSERVATION SERVICE
CORVALLIS OREGON PLANT MATERIALS CENTER
(Dale Darris and Amy Bartow)

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 Project). It was agreed to maintain and harvest two grass and two sedge fields and clean/process and provide the resulting seed to Crater Lake National Park in September 2000, 2001, and 2002.

ACCOMPLISHMENTS- This agreement was extended again for 2002 with the requirements satisfied. Activities in 2002 included maintenance, harvest, and cleaning of seed from three increase plantings. The 4th field of showy sedge (*Carex spectabilis*), was very sparse and seed heads were produced. This field was removed in 2002. In addition, the older, 1996-1998 planted sections (32 rows or 0.28 acre) of the California brome were removed in August 2002 following harvest. Contamination from exotic annual bromes, perennial bromes and other grassy weeds, as well as a significant infestation of head smut were considered too high to justify continued maintenance and seed harvest into 2003. A total of 152.5 bulk lbs (69.2 kg) of seed of California brome (*Bromus carinatus*), 108.5 lbs (49.3 kg) of blue wildrye (*Elymus glaucus*), and 0.5 lbs (0.27 kg) of thick-headed sedge (*Carex pachystachya*) was harvested and cleaned. All seed harvested in 2002 remained in storage at the PMC, including 166.5 pounds of California brome from earlier harvest years. Seed will be stored until requested for future Park revegetation work. Seed tests showed satisfactory germination and purity for all grass seed lots.

TECHNOLOGY DEVELOPMENTS- Three fields, blue wildrye, California brome (old and new sections), and thick-headed sedge, were hand harvested, cleaned, and tested. The seed remained in dry storage. Disease management consisted of leaf and stem rust control with three spring applications of the fungicides Bravo plus Tilt. Head smut continued to be the major disease pest infecting a substantial portion of CA brome plants in the older sections of the field. No control measures were applied and infected panicles were avoided. Excellent control of annual weedy grasses was achieved with October application of Prowl plus Axiom to 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. Spot treatment of glyphosate was used for miscellaneous weed control. No broadleaf weed control herbicides were needed in 2002. Weed control in the thick-headed sedge was by hand hoeing and weeding only. Excellent purity results were obtained for grass seed lots, including 99.51% purity for the blue wildrye (germ. of 49%). Purity for the newer and older sections of the CA brome field were 99.81% (68% germ.) and 99.89% (71% germ.) respectively. Unlike the 2001 seed lots, the old and new sections had similar test results. Viability of thick-headed sedge was 85% (76% germ.).

LASSEN VOLCANIC NATIONAL PARK
2002 Annual Report
Prepared by
UPPER COLORADO ENVIRONMENTAL PLANT CENTER
MEEKER, COLORADO

INTRODUCTION: An agreement was made between Lassen Volcanic National Park and Upper Colorado Environmental Plant Center 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.

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. On July 11, 2002, 1.4 pounds of brome was harvested from field 2 and on July 18, 2002, 10.4 pounds of blue wildrye were harvested. Both harvests were conducted with the Hege plot combine.

Harvested seed was cleaned, and tested through tetrazolium procedures, and was shipped to Lassen Volcanic National Park on September 27, 2002 for on the ground application.

Approximately 20 species of wild collected seed from 2002 were cleaned by UCEPC as per Amendment 2. The cleaned seed will be supplied to Lassen as requested, and the four products with the most seed will be tested by the Colorado Seed Laboratory. Another species, California brome, was collected in Lassen during 2002, cleaned by UCEPC and tested by the Colorado Seed Lab, will be used to increase the size of the production field at UCEPC in 2003.

TECHNOLOGY DEVELOPMENTS: Specific information about seed treatments, soil preparation, seeding methods, seeding rates or seedling establishment techniques are available upon request.

SEQUOIA/KINGS CANYON NATIONAL PARKS
FY2002 Annual Report
Prepared by
NATURAL RESOURCES CONSERVATION SERVICE
LOCKEFORD, CALIFORNIA PLANT MATERIALS CENTER

INTRODUCTION – This project was started in October 2002. The Lockeford PMC provided technical expertise and assistance in growing, cleaning and transplanting six plant species from Sequoia/Kings Canyon National Park. The three-year goal is to propagate approximately 150 PLS pounds of native seed

ACCOMPLISHMENTS – Bulk seed of six species was collected by NPS, then cleaned by the PMC and tested by a seed laboratory. After field preparation, 1.5 acres was planted to three grass species: California brome (15 LB PLS goal), Blue wildrye (12 LB PLS goal), California melic (16 LB PLS goal). Another field was leveled, 6000 SF of weed control fabric was installed, 5000 plants of three species were propagated and were then planted: One-sided bluegrass (4 LB PLS goal), Miniature lupine (74 LB PLS goal) and Foothill clover (25 LB PLS goal). As of 1-8-2003, all species are two to six inches high. Weed control and cultivation efforts are ongoing.

TECHNOLOGY DEVELOPMENT – During the seed cleaning process, each species was observed to determine the best cleaning methods. The use of weed control fabric in seed production is being tested on a large scale.

SEQUOIA AND KINGS CANYON NATIONAL PARKS
2002 Annual 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. The agreement was amended in 1995 and 1997. The new agreement IA 9000-00-001 was signed in 2000. The goal of the project is to preserve and maintain genetic resources within the park by developing propagation, cultivation, and cleaning technology in order to provide the desired amounts of seed and live plant materials. A new Cooperative Interagency Agreement was signed in 2000, for work to be done in 2000, 2001, and 2002.

ACCOMPLISHMENTS: Some seed was harvested from the *Phacelia mutabilis* plot in headquarters and from plants in the greenhouse. The trial plot 15' x 20' from 2000 of *Lianthus montanus* was plowed due to small stature and difficulty in cultivation. The focus was shifted to greenhouse plant production in 2002. *Lianthus montanus* was direct seeded into small bookplanters in the greenhouse and were later moved to the shade house until killing frost. The *Carex* plot 30' x 50' was in the second year of establishment but produced very little seed possibly due to climatic differences and drought. Precipitation was 32% below longtime average. The following tables include the number of plants produced in 2002 and cleaned seed weight from UCEPC plots.

Common Name	Scientific Name	Amounts
2002 SEED HARVESTED FROM UCEPC		
Changeable phacelia	*Phacelia mutabilis*	111 g cleaned
2002 GREENHOUSE PLANT PRODUCTION		
Draperia systyla	*Draperia systyla*	550 plants
Eriogonum nudum	*Eriogonum nudum*	580 plants
Stipa californica	*Stipa californica*	1000 plants
Melica aristata	*Melica aristata*	1000 plants
Carex spp.	*Carex whitneyi*	2000 plants

TECHNOLOGY DEVELOPMENT: Seed cleaning technology was developed for each species cleaned. Specific information can be provided on request. Seed treatment methods were developed to enhance the germination of *Draperia systyla.* Observations are being made on the phenology and survival on new species

YOSEMITE NATIONAL PARK
2002 Annual Report
Prepared by
UPPER COLORADO ENVIRONMENTAL PLANT CENTER,
MEEKER, COLORADO

INTRODUCTION: Yosemite National Park and the Upper Colorado Environmental Plant Center entered into an agreement, which was formally approved in 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. The first seed harvest is anticipated the summer of 2003.

ACCOMPLISHMENTS: The blue wildrye field planted in 1997 was managed for seed production in 2001. However, by mid-summer, it was noted that a large amount of non-native Kentucky bluegrass was present in the field. The presence of a non-indigenous park material presented obvious concerns about potential seed contamination. Harvest was attempted through roguing and spot harvest of several row portions within the field. Analysis determined that production potential was between 75 and 100 pounds of seed, but chances for contamination with Kentucky bluegrass was almost certain. As a result, harvest activities stopped, the field was removed, and a new 2.5 acre field was planted on November 20, 2001, with a Tye drill. Harvested seed will continue to be shipped to Yosemite as requested.

Although seed production was not expected until the summer of 2003, 25 pounds of clean seed was produced from UCEPC Field 8 this year. In addition, 25.7 PLS pounds of 1999 blue wildrye seed were shipped in December to Yosemite National Park for revegetation work.

TECHNOLOGY DEVELOPMENTS: Specific information about harvest methods or soil preparation, seeding methods, seeding rates or seedling establishment techniques are available upon request.

SOUTHEAST REGION

Cumberland Gap National Historical Park
2002 Annual Report
Prepared by
USDA-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.

Accomplishments: NPMC staff coordinated planting at the Park once again. Twenty-four students from Cumberland Mountain Research Center, Lincoln Memorial University in Harrogate, TN were hired to help plant 20,018 bare-root woody plants, 192 container-grown woody plants, and 8 flats of sphagnum moss. An estimated total of 45 acres was planted. There were 30 species of native trees, shrubs and moss delivered in 2002.

A total of 118 pounds PLS of native grass seed was delivered, in 2002, to plant 14.5 of the estimated 42 acres disturbed by the Gap restoration. Ten species of native grasses and wildflowers, grown from seed collected in the park, were used in the seed mixes.

Woody-species seed was not collected this year, because sufficient material is on hand or growing in the field to complete the agreement. However Chasmanthium latifolium (river oats) and Saccharum alopecuroides (silver plume grass) were collected by park staff and cleaned and conditioned by NRCS. These two highly ornamental grasses will be grown for planting at the Visitor Information Center and other visitor areas.

About 105 pounds of grass and wildflower seed produced in 2002 has been conditioned and weighed, with approximately 25 to 50 pounds more waiting to be cleaned and weighed.

Approximately 4,500 bare-root trees and shrubs are expected to be harvested for the spring 2003 planting. At least 500 container-grown plants are expected to be delivered in 2003 for parking lots.

Technology Developments and Observations: The very large spring 2002 planting required significantly more planning and preparation than previous years. Techniques for preparation, delivery and planting were modified to accommodate the large number of bare-root plants and the more remote areas of planting. Bare-root material was dipped in Silva-Dip (RTI), a solution of mycorrhizal inoculum, water-holding polyacrylamide gel, and humic acid and other biostimulants. Then larger bundles of predetermined mixes of species were wrapped with burlap then stretch-wrap to prevent desiccation. The use of Silva dip prior to delivery eliminated an extra step at planting time, was cheaper, and provided greater survivability to the bare-root material when compared to the use of Myco-Paks. Wrapping the bare-root material in large mixed species bundles allowed the material to be placed at the planting sites in the day before planting began. These techniques combined, resulted in significant decreases in the materials that needed to be hauled throughout the remote planting sites. The entire crew was then able to focus on planting rather than hauling supplies.

In the vernal pool area, the sphagnum moss was planted on the peat moss confinement area that was designed to provide suitably moist conditions for the sphagnum moss through periods of drought. However the log walls had failed and required rebuilding with more permanent rock pieces, before planting was possible. The sphagnum moss was observed in October 2002 to be surviving despite the severe drought that had occurred and is expected to thrive. Fifteen square feet of sphagnum moss were planted. Successful establishment of the sphagnum moss will provide critical nesting habitat for the rare four-toed salamander.

GREAT SMOKY MOUNTAINS NATIONAL PARK
2002 Annual Report
Prepared by
USDA-Natural Resources Conservation Service
National Plant Materials Center, Beltsville, MD

BACKGROUND

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/forb seed, 30,000 grass/forb plugs, 4,200 bareroot 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, and 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.

SUMMARY OF ACTIVITIES

Woody Plant Materials for Revegetation along the Foot Hills Parkway:

In March 2002, 1,645 bare-root trees and shrubs were delivered to the Park and planted on the Foot Hills Parkway and in other areas. In January, 2003, approximately 540 bare-root redbud seedlings *(Cercis canadensis)* were harvested from the NPMC woody beds for delivery to GRSM in March, 2003. Approximately 40 pitch pine (*Pinus rigida)* remain in the woody beds.

About 506 containerized tree and shrub seedlings remain in the NPMC container nursery: About 40 *Pinus virginiana* will be delivered to GRSM in spring, 2003 and 95 container vines in fall, 2003.

Herbaceous Plug Production:

In May, 2002, the NPMC delivered 16,600 (17 species) herbaceous plugs to the Park for planting in Cades Cove. NPMC staff assisted with the planting. Over 21,000 plugs remain in the agreement.

Seed Production, Conditioning and Delivery:

Around 100 pounds of seed (6 species) was harvested from NPMC seed increase fields in 2002 and is now being conditioned and tested. NPMC staff will also process around 250 pounds bulk (11 species) of 2002 seed harvested from the Cades Cove seed increase fields. Approximately 1,147 pounds of cleaned GRSM herbaceous and woody seed is presently stored at the NPMC.

TECHNOLOGY DEVELOPMENTS:

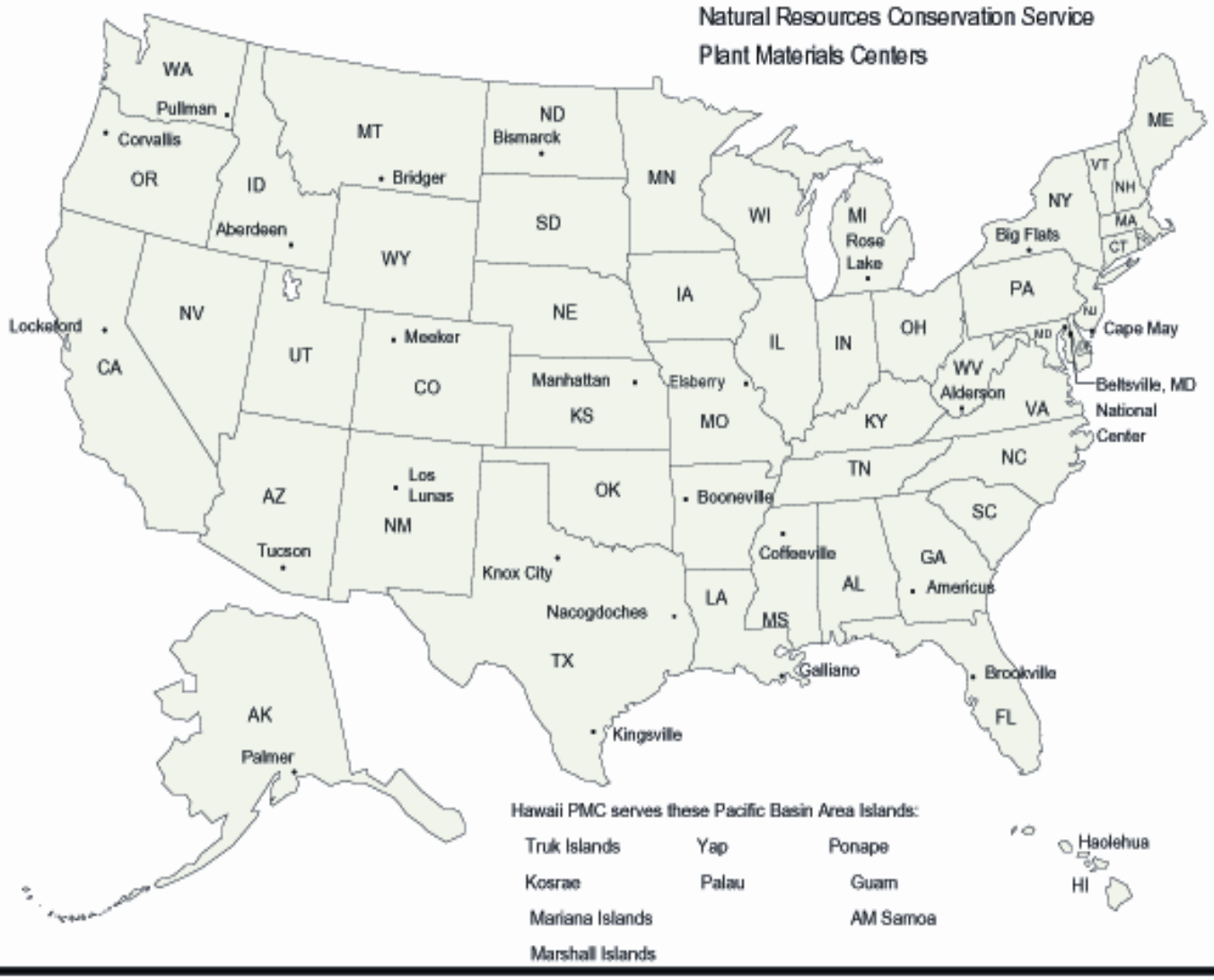
The NPMC gave recommendations to GRSM staff in 2002 for weed control and warm season grass establishment practices in the Cades Cove increase fields to increase seed yield, purity and viability.

Bare root seedlings were bundled and roots dipped in a mycorrhizal slurry prior to being wrapped in plastic and shipped. This was successful in overcoming prior years' problems with drying roots.

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.

APPENDIX



Plant Materials Centers

Palmer,	AK	Alaska Plant Materials Center	HC 04, Box 7440, Palmer, AK 99645 (907) 745-4469
Tucson,	AZ	Tucson Plant Materials Center	3241 North Romero Road, Tucson, AZ 85705 (520) 292-2999
Booneville,	AR	Booneville Plant Materials Center	6883 S. State Highway 23, Booneville, AR 72927 (479) 675-5182
Lockeford,	CA	Lockeford Plant Materials Center	PO Box 68, 21001 N. Elliott Road, Lockeford, CA 95237 (209) 727-5319
Meeker,	CO	Upper Colorado Environmental Plant Ctr.	PO Box 448, 5538 County Road 4, Meeker, CO 81641 (970) 878-5003
Brooksville,	FL	Brooksville Plant Materials Center	14119 Borad Street, Brooksville, FL 34601 (352) 796-9600
Americus,	GA	Jimmy Carter Plant Materials Center	295 Morris Drive, Americus, GA 31709 (229) 924-4499
Hoolehua,	HI	Hoolehua Plant Materials Center	4101 Maunaloa Highway, Hoolehua, HI 96729 (808) 567-6885
Aberdeen,	ID	Aberdeen Plant Materials Center	PO Box 296, 1691 A South 2700 West, Aberdeen, ID 83210 (208) 397-4133
Manhattan,	KS	Manhattan Plant Materials Center	3800 S. 20th Street, Manhattan KS 66502 (785) 539-8761
Galliano,	LA	Golden Meadows Plant Materials Center	438 Airport Road, Galliano, LA 70354 (985) 475-5280
Beltsville,	MD	National Plant Materials Center	Building 509, BARC-East, E. Beaver Dam Road, Beltsville, MD 20705 (301) 504-8175
East Lansing,	MI	Rose Lake Plant Materials Center	7472 Stroll Road, East Lansing, MI 48823 (517)641 6300
Coffeeville,	MS	Jamie L. Whitten Plant Materials Center	2533 County Road 65, Coffeeville, MS 38922 (662) 675-2588
Elsberry,	MO	Elsberry Plant Materials Center	2803 N. Highway 79, Elsberry, MO 63343 (573) 898-2012
Bridger,	MT	Bridger Plant Materials Center	99 South River Road, Route 2, Box 1189, Bridger, MT 59014 (406) 662-3579
Cape May,	NJ	Cape May Plant Materials Center	1536 Route 9 North, Cape May Court House, NJ 08210 (609) 465-5901
Los Lunas,	NM	Los Lunas Plant Materials Center	1036 Miller Street, SW, Los Lunas, NM 87031 (505) 865-4684
Big Flats,	NY	Big Flats Plant Materials Center	3266A State Route 352, Corning, NY 14830 (607) 562-8404
Bismarck,	ND	Bismarck Plant Materials Center	3308 University Drive, Bismarck, ND 58504 (701) 250-4330
Corvallis,	OR	Corvallis Plant Materials Center	3415 NE Granger Avenue, Corvallis, OR 97330 (541) 757-4812
Nocogdoches,	TX	East Texas Plant Materials Center	6598 FM2782, Nocogdoches, TX 75962 (936) 564-4873
Kingsville,	TX	Kika de la Garza Plant Materials Center	3409 N FM 1355, Kingsville, TX 78363 (361) 595-1313
Knox City,	TX	James E. "Bud" Smith Plant Materials Ctr.	3776 Farm Road 1292, Knox City, TX 79529 (940) 658-3922
Pullman,	WA	Pullman Plant Materials Center	PO Box 646211, WSU, Pullman, WA 99164 (509) 335-7376
Alderson,	WV	Alderson Plant Materials Center	PO Box 390, Alderson, WV 24910 (304) 445-3005