

**2004 ANNUAL REPORT**  
**to the**  
**NATIONAL PARK SERVICE**  
**for**  
**CUMBERLAND GAP NATIONAL HISTORICAL PARK**

**USDA**  
**Natural Resources Conservation Service**  
**National Plant Materials Center**  
**Beltsville, Maryland**

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# CUMBERLAND GAP NATIONAL HISTORICAL PARK

## 2004 Annual Report

### Introduction and Summary

**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. The 2005 plantings will complete the agreement and utilize remaining live plant materials at the National Plant Materials Center.

**Accomplishments:** This year the NPMC staff coordinated a spring planting at the park.

In March twelve students from Cumberland Mountain Research Center, Lincoln Memorial University in Harrogate, TN were hired to help plant 4,404 bare-root woody plants consisting of 7 species and 900 container-grown woody plants consisting of 19 species of trees, 6 species of shrubs and 1 vine species. An estimated total of 12 acres was planted.

A total of 900 container-grown plants of 26 species were delivered in 2004.

All areas in need of planting have been planted at least once with the exception of the Visitor Information Center (VIC) and a slide area adjacent to the Thomas Walker Parking. The VIC will be planted in 2005. The slide area will not be planted due to expected repairs not being complete. The majority of the 2004 planting was used to further enhance areas that had already been planted in previous years.

About 18 pounds of grass seed were produced and conditioned in 2004, bringing the amount of bulk seed in the inventory to approximately 130 lbs.

For March 2005 delivery and planting, approximately 2,400 bare-root trees and shrubs have been harvested, 6,000 herbaceous plugs are being produced and 525 container-grown trees and shrubs have been prepared. Trees and shrubs will be planted in March, 2005. Herbaceous plugs have been scheduled to be planted in April, 2005 to allow for better survival in the warmer weather.

### **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. To minimize loss of the root dip from excess handling, the bare root bundles were combined into large mixed bundles and wrapped in burlap and stretch wrap. This was the same procedure that was done for the spring 2002 planting, but was not repeated last year due to time constraint in preparation. Handling labor at the planting site was reduced greatly. This and the excellent student workers contribute to the completion of the planting in just 3 days, one day earlier than expected.

The spring plantings were observed during a trip in October, 2005 and were observed to have excellent survival (>95%) and growth. Again there was adequate rain this year which certainly contributed greatly to their survival. In the vernal pool area, the sphagnum moss has continued to spread over a larger area and is expected to continue to do so, thereby increasing critical nesting habitat for the rare four-toed salamander.

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**I. Accessions Involved**

Scientific Name	Common Name	Type	Accessions
<i>Acer negundo</i>	box elder	tree	9076354, 9078196
<i>Acer rubrum</i>	red maple	tree	9064521/2, 9069759 9064521, 9076349
<i>Acer saccharinum</i>	silver maple	tree	9064524
<i>Acer saccharum</i>	sugar maple	tree	9069958
<i>Aesculus octandra</i>	sweet buckeye	shrub	9064832, 9077053
<i>Agrimonia parviflora</i>	agrimony	forb	9064844
<i>Amelanchier arborea</i>	shadblow	tree	9064523, 9064827
<i>Andropogon virginicus</i>	broomsedge	grass	9064184
<i>Asclepias tuberosa</i>	butterfly-flower	forb	9069777
<i>Asimina triloba</i>	paw-paw	tree	9067050
<i>Aster patens</i>	late purple aster	forb	9069775
<i>Bignonia capreolata</i>	cross vine	vine	9078195
<i>Campsis radicans</i>	trumpet creeper	vine	9069945
<i>Carpinus caroliniana</i>	American hornbeam	tree	9069774
<i>Carya cordiformis</i>	bitternut	tree	9069776
<i>Carya glabra</i>	smooth hickory	tree	9064837
<i>Carya tomentosa</i>	hickory	tree	9067053
<i>Celtis occidentalis</i>	hackberry	tree	9069959, 9077056
<i>Cercis canadensis</i>	redbud	tree	9064842, 9077054
<i>Chasmanthium latifolium</i>	river oats	grass	9078198
<i>Clethra acuminata</i>	summer-sweet	shrub	9069940
<i>Coreopsis lanceolata</i>	lance-ld. coreopsis	forb	9064174
<i>Coreopsis major</i>	whorl-ld. coreopsis	forb	9064173, 9064836
<i>Danthonia compressa</i>	mountain oatgrass	grass	9064176
<i>Dichanthelium commutatum</i>	SYN=Panicum commutatum	grass	9064177
<i>Diospyros virginiana</i>	persimmon	tree	9064525
<i>Elymus villosus</i>	hairy wildrye	grass	9064168
<i>Elymus virginicus</i>	Virginia wildrye	grass	9064170
<i>Fagus grandifolia</i>	American beech	tree	9064835, 9076353
<i>Frangula (Rhamnus) caroliniana</i>	Carolina buckthorn	shrub	9069954, 9077059
<i>Fraxinus pennsylvanica</i>	green ash	tree	9078185, 9078186
<i>Gaylussacia baccata</i>	black huckleberry	shrub	9069762
<i>Hamamelis virginiana</i>	common witchhazel	shrub	9064845, 9069763, 9069943
<i>Helianthus atrorubens</i>	dark-eyed sunflower	forb	9064180
<i>Hydrangea arborescens</i>	Hills-of-snow	shrub	9077051
<i>Hystrix patula</i>	bottlebrush grass	grass	9064833
<i>Juglans cinerea</i>	bitternut	tree	9069956
<i>Juglans nigra</i>	black walnut	tree	9067051, 9060778, 9069957
<i>Juniperus virginiana</i>	Eastern red cedar	shrub	9076351
<i>Kalmia latifolia</i>	mountain laurel	shrub	9067057, 9069940
<i>Lindera benzoin</i>	spicebush	shrub	9064834, 9069769, 9069955, 9078181
<i>Liquidambar styraciflua</i>	sweet gum	tree	9076350

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**I. Accessions Involved - continued**

Scientific Name	Common Name	Type	Accessions
<i>Liriodendron tulipifera</i>	tulip poplar	tree	9064171, 9076346
<i>Magnolia tripetala</i>	umbrella magnolia	tree	9069767, 9077057
<i>Nyssa sylvatica</i>	tupelo	tree	9064839
<i>Oxydendrum arboreum</i>	sourwood	tree	9067056
<i>Parthenocissus quinquefolia</i>	Virginia creeper	vine	9069760/1, 9069944
<i>Pinus virginiana</i>	Virginia pine	tree	9064830, 9076352
<i>Pityopsis graminifolia</i>	grass-lvd. goldaster	forb	9064181
<i>Platanus occidentalis</i>	Eastern sycamore	tree	9069942
<i>Quercus alba</i>	white oak	tree	9064843, 9067058, 9067059, 9069764 9069770, 9069946, 9078194
<i>Quercus marilandica</i>	blackjack oak	tree	9077060
<i>Quercus muehlenbergii</i>	chinquapin oak	tree	9069947, 9069950
<i>Quercus prinus</i>	chestnut oak	tree	9064831, 9067054/5, 9069948, 9069951, 9077055
<i>Quercus rubra</i>	red oak	tree	9069766, 9069771 9069949, 9069953
<i>Quercus velutina</i>	black oak	tree	9069765, 9069772
<i>Rhododendron calendulaceum</i>	flame azalea	shrub	9067060, 9076345
<i>Rhododendron catawbiense</i>	Catawba rhododendron	shrub	9077052
<i>Rhus copallina</i>	shining sumac	shrub	9064840/1
<i>Robinia pseudoacacia</i>	balck locust	tree	9067052
<i>Saccharum alopecuroides</i>	silver plume grass	grass	9078199
<i>Sambucus canadensis</i>	elderberry	shrub	9064838, 9069768
<i>Sassafras albidum</i>	sassafras	tree	9067062, 9077058
<i>Schizachyrium scoparium</i>	little bluestem	grass	9064179
<i>Smilax rotundifolia</i>	common greenbriar	vine	9067061
<i>Sphagnum sp.</i>	sphagnum moss	moss	9078197
<i>Solidago odora</i>	anise-scented goldenrod	forb	9076348
<i>Tridens flavus</i>	purpletop	grass	9064178
<i>Tsuga canadensis</i>	Canadian hemlock	tree	9064829, 9069773, 9078183
<i>Vaccinium corymbosum</i>	highbush blueberry	shrub	9064828
<i>Vitis sp.</i>	wild grape	vine	9078182

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**II. Collection Information**

No collections were made in 2004

**III. Seed Conditioning Information**

No collections were conditioned in 2004

**IV. Field Establishment**

No additional Field establishment occurred in 2004

**V. Seed Production**

Current Year (2004)

Scientific Name	Accession	Harvest Date	Clean (lbs)	Clean (kg)	Purity (%)	Germ (%)	Pure Live Seed (kg)
<i>Elymus hystrix</i>	9064833	8/10/2004	18.0	8.16	na	na	na
<b>Total lbs cleaned:</b>			<b>18.0</b>				

**VI. Seed Delivered**

No seed was delivered in 2004

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**VII. Park Establishment                      Current Year (2004)**

<b>Spring 2004 Woody plants - Containerized</b>	<b>Acc. #</b>	<b>Source</b>	<b>Date Started/ Container Size</b>	<b>Height</b>	<b>Number Produced</b>	<b>Pre-germination Treatments</b>
<i>Acer rubrum</i>	9076349	seed	1 gallon	2-4'	17	germ under mist
<i>Acer rubrum</i>	9076349	seed	2 gallon	6-8'	22	germ under mist
<i>Acer rubrum</i>	9076349	seed	3 gallon	7-9'	8	germ under mist
<i>Acer saccharinum</i>	9064524	seed	2 gallon	6-8'	17	germ under mist
<i>Acer saccharum</i>	9069958	seed	1 gallon	2-4'	13	germ under mist
<i>Acer saccharum</i>	9069959	seed	2 gallon	4-7'	26	germ under mist
<i>Amelanchier arborea</i>	9064522	seed	1 gallon	1-4'	2	natural stratification
<i>Asimina triloba</i>	9067050	seed	2 gallon	5-7'	10	natural stratification
<i>Carpinus caroliniana</i>	9069774	seed	1 gallon	1-3'	4	natural stratification
<i>Carpinus caroliniana</i>	9069774	seed	2 gallon	5-8'	3	natural stratification
<i>Carpinus caroliniana</i>	9069774	seed	4 gallon	5-6'	4	natural stratification
<i>Celtis occidentalis</i>	9069959	seed	2 gallon	3'-5'	4	natural stratification
<i>Cercis canadensis</i>	9077054	seed	3 gallon	3-5'	5	natural stratification
<i>Cercis canadensis</i>	9077053	seed	4 gallon	5-8'	20	natural stratification
<i>Diospyros virginiana</i>	9064525	seed	2 gallon	5-7'	13	natural stratification
<i>Fraxinus americana</i>	9078187	seed	2 gallon	5-7'	41	natural stratification
<i>Hamamelis virginiana</i>	9069941	seed	quart	1-2'	5	natural stratification
<i>Juglans nigra</i>	9069957	seed	1 gallon	1-2'	2	natural stratification
<i>Juglans nigra</i>	9069958	seed	2 gallon	2-3'	3	natural stratification
<i>Juniperus virginiana</i>	9076351	seed	1 gallon	2-3'	37	natural stratification
<i>Liquidambar styraciflua</i>	9076349	seed	2 gallon	4-7'	12	natural stratification
<i>Nyssa sylvatica</i>	9064839	seed	2 gallon	3-4'	5	natural stratification
<i>Oxydendrum arboreum</i>	9067055	seed	1 gallon	1'	4	germ under mist
<i>Oxydendrum arboreum</i>	9067056	seed	1 gallon	1'	7	germ under mist
<i>Platanus occidentalis</i>	9049942	seed	2 gallon	6-7'	9	germ under mist
<i>Quercus alba</i>	9069945	seed	2 gallon	3-5'	16	natural stratification
<i>Quercus prinus</i>	9069947	seed	4 gallon	4-7'	12	natural stratification
<b>Shrubs</b>		seed				
<i>Hydrangea arborescens</i>	9077050	seed	2 gallon	2'	5	germ under mist
<i>Kalmia latifolia</i>	9069940	seed	1 gallon	6-15"	103	germ under mist
<i>Kalmia latifolia</i>	9069940	seed	1 gallon	12"-18"	60	germ under mist
<i>Lindera benzoin</i>	9069769	seed	2 gallon	5-6'	14	natural stratification
<i>Rhododendron maximum</i>	9078187	seed	1 gallon	10-18"	53	germ under mist
<i>Rhododendron maximum</i>	9078188	seed	2 gallon	10-20"	14	germ under mist
<i>Rhus copallinum</i>	9064841	seed	quart	2-3'	15	natural stratification
<i>Rhus copallinum</i>	9064843	seed	2 gallon	5-6'	5	natural stratification
<i>Sambucus canadensis</i>	9069768	cuttings	2 gallon	4-6'	10	fall cuttings, spring planted
<b>Vines</b>						
<i>Bignonia capreolata</i>	9078196	seed	quart	3-10"	300	none
<b>Containerized Woody Plants Delivered and Planted in Spring 2004:</b>					<b>900</b>	



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**VII. Park Establishment Continued      Current Year (2004)**

<b>Spring 2004</b>			<b>Date Started/</b>		<b>Number</b>	<b>Pre-germination</b>
<b>Woody plants - Bare-Root</b>	<b>Acc. #</b>	<b>Source</b>	<b>Produced</b>	<b>Height</b>	<b>Produced</b>	<b>Treatments</b>
<i>Acer negundo</i>	9078196	seed	Nov. '01	3-5'	1,128	germ under mist
<i>Cercis canadensis</i>	9077054	seed	Nov. '01	4-5'	975	natural stratification
<i>Diospyros virginiana</i>	9064525	seed	Nov. '01	3-4'	430	natural stratification
<i>Fraxinus americana</i>	9078185	seed	Nov. '01	4-5'	1,275	natural stratification
<i>Juniperus virginiana</i>	9076351	seed	Nov. '01	1'	500	natural stratification
<i>Liquidambar styraciflua</i>	9076350	seed	Nov. '01	3'	95	natural stratification
<i>Liriodenron tulipifera</i>	9076346	seed	Nov. '01	6"	1	natural stratification
<b>Total Bare-Root Woody Plants Delivered and Planted in Spring 2004:</b>					<b>4,404</b>	

<b>Spring 2004</b>			<b>Date Started/</b>		<b>Number</b>	<b>Pre-germination</b>
<b>Herbaceous Plugs</b>	<b>Acc. #</b>	<b>Source</b>	<b>Container Size</b>	<b>Height</b>	<b>Number</b>	<b>Pre-germ. Treatment</b>
<i>Saccharum</i>	9078199	seed	quart	1- 4'	24	3 weeks cold stratification
<i>Chasmanthium</i>	9078198	seed	67 multipot	6"	150	3 weeks cold stratification
<i>Coreopsis major</i>	9064173	seed	67 multipot	2-3'	804	3 weeks cold stratification
<i>Coreopsis lanceolata</i>	9064174	seed	67 multipot	2'	871	none
<i>Aster patens</i>	9069775	seed	67 multipot	2'	1139	none
<i>Helianthus atrorubens</i>	9064180	seed	67 multipot	1'	1139	3 weeks cold stratification
<b>Herbaceous Plugs Delivered and Planted in Spring 2004:</b>					<b>4,127</b>	

<b>Total Woody Plants Delivered and Planted in 2004:</b>	<b>5,304</b>
<b>Total Number of Plants Delivered and Planted in 2004:</b>	<b>9,431</b>

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**VIII. Number of Species Delivered, Produced and in Production in 2004**

#	Total Species Delivered	#	Seed Produced	#	Plants In Production
1	<b>Vine</b>	1	<b>Grass</b>	26	<b>Trees</b>
22	<b>Trees</b>			10	<b>Shrubs</b>
6	<b>Shrubs</b>			7	<b>Herbaceous</b>
	<b>Vines</b> <i>Bignonia capreolata</i>		<b>Grasses</b> <i>Elymus hystrix</i>		<b>Trees</b> <i>Acer rubrum</i> <i>Acer saccharum</i> <i>Amelanchier arborea</i> <i>Asimina triloba</i> <i>Carpinus caroliniana</i> <i>Celtis occidentalis</i> <i>Cercis canadensis</i> <i>Diospyros virginiana</i> <i>Fagus grandifolia</i> <i>Fraxinus americana</i> <i>Fraxinus pennsylvanica</i> <i>Hamamelis virginiana</i> <i>Juglans nigra</i> <i>Juniperus virginiana</i> <i>Liriodendron tulipifera</i> <i>Liquidambar styraciflua</i> <i>Nyssa sylvatica</i> <i>Oxydendrum arboreum</i> <i>Platanus occidentalis</i> <i>Quercus alba</i> <i>Quercus prinus</i> <i>Quercus rubra</i>
	<b>Trees</b> <i>Acer negundo</i> <i>Acer rubrum</i> <i>Acer saccharinum</i> <i>Acer saccharum</i> <i>Amelanchier arborea</i> <i>Asimina triloba</i> <i>Carpinus caroliniana</i> <i>Celtis occidentalis</i> <i>Cercis canadensis</i> <i>Diospyros virginiana</i> <i>Fraxinus americana</i> <i>Hamamelis virginiana</i> <i>Juglans nigra</i> <i>Juniperus virginiana</i> <i>Liriodendron tulipifera</i> <i>Liquidambar styraciflua</i> <i>Nyssa sylvatica</i> <i>Oxydendrum arboreum</i> <i>Platanus occidentalis</i> <i>Quercus alba</i> <i>Quercus prinus</i> <i>Quercus rubra</i>				<i>Acer rubrum</i> <i>Acer saccharum</i> <i>Amelanchier arborea</i> <i>Asimina triloba</i> <i>Carpinus caroliniana</i> <i>Celtis occidentalis</i> <i>Cercis canadensis</i> <i>Diospyros virginiana</i> <i>Fagus grandifolia</i> <i>Fraxinus americana</i> <i>Fraxinus pennsylvanica</i> <i>Hamamelis virginiana</i> <i>Juglans nigra</i> <i>Juniperus virginiana</i> <i>Liriodendron tulipifera</i> <i>Liquidambar styraciflua</i> <i>Nyssa sylvatica</i> <i>Oxydendrum arboreum</i> <i>Platanus occidentalis</i> <i>Quercus alba</i> <i>Quercus prinus</i> <i>Sassafras albidum</i>
	<b>Shrubs</b> <i>Hydrangea arborescens</i> <i>Kalmia latifolia</i> <i>Lindera benzoin</i> <i>Rhododendron maximum</i> <i>Rhus copallinum</i> <i>Sambucus canadensis</i>				<b>Shrubs</b> <i>Clethra acuminata</i> <i>Gaylussacia baccata</i> <i>Hydrangea arborescens</i> <i>Kalmia latifolia</i> <i>Lindera benzoin</i> <i>Rhododendron calendulaceum</i> <i>Rhododendron maximum</i> <i>Rhus copallinum</i> <i>Sambucus canadensis</i> <i>Spirea corymbosa</i>
					<b>Herbaceous</b> <i>Aster patens</i> <i>Chasmanthium latifolium</i> <i>Coreopsis lanceolata</i> <i>Coreopsis major</i> <i>Helianthus atrorubens</i>

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		<i>Pityopsis graminifolia</i> <i>Saccharum alopecuroides</i>
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