

**Project COPMC-S-0308-CR**  
**Annual Report - December 2007**  
**By: Steve Parr**

**ROCKY MOUNTAIN NATIONAL PARK**  
**COOPERATIVE AGREEMENT**

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**INTRODUCTION** - Upper Colorado Environmental Plant Center (UCEPC), Rocky Mountain National Park (ROMO), and the USDA Natural Resources Conservation Service (NRCS), signed a cooperative plant materials agreement (IA Project No. 1211-03003) in June 2003. In September 2006, the agreement was amended to continue production of the same plant materials through 2008. This agreement, as amended, involves seed production of four forbs and four grass species for revegetation of the Bear Lake Road Project. The Bear Lake Road Project involves widening Bear Lake Road by two feet for ten miles, adding pullouts and retaining walls, widening switchbacks, and expanding some of the parking lots. This will amount to 20 acres of disturbance with an elevation change of 1500 feet. The first of two phases was completed in December 2005. Seed production of the same species has been identified for use in the second phase with the potential addition of more species in 2008.

A separate agreement was signed in August 2007 to increase seed for the Colorado River Power Line project. Seed increase products have not all been determined at this time, but there is a production target of 210 pounds of seed.

**Bear Lake Road Project**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Symbol</b>	<b>Accession</b>
<b>Grasses</b>			
Blue grama	<i>Bouteloua gracilis</i>	BOGR	9070991
Junegrass	<i>Koeleria macrantha</i>	KOCR	9070962
Mountain muhly	<i>Muhlenbergia montana</i>	MOMU	9070957
Needle and thread	<i>Stipa comata</i>	STCO	9070977
<b>Forbs/Legumes</b>			
Fringed sage	<i>Artemisia frigida</i>	ARFR	9070993
Hairy goldenaster	<i>Heterotheca villosa</i>	HEVI	9070992
Purple locoweed	<i>Oxytropis lambertii</i>	OXLA	9070989
Spreading goldenbanner	<i>Thermopsis divericarpa</i>	THDI	9070990

**ACTIVITIES** - This year, each of the eight materials was harvested for use in the revegetation of the Bear Lake Road Project. Three forbs, hairy goldenaster, purple locoweed, and goldenbanner all produced good quantities of seed and accounted for 28 pounds of the 30.4 pounds of seed produced. A fourth forb, fringed sage, produced a small quantity of seed. On September 12, 2.4 clean pounds were hand harvested. There were three nights of freezing temperatures recorded in late May. We believe this affected seed formation and set as the plants were just blooming at the time. The four grasses produced a little over 35 clean pounds of seed, with blue grama producing the most at 13 pounds this year. Ten pounds of seed were harvested from needle-and-thread, five pounds of prairie Junegrass and seven pounds of mountain muhly. Purple locoweed continues to be a good producing species. This year, UCEPC harvested 10 clean pounds of seed from the 0.5 acre field. Also productive in volume in 2007 was hairy goldenaster with a little over 11 clean pounds harvested.

On June 26, 2007, Russ Haas, Lonnie Pilkington, Pat Davey, and Steve Parr met at Rocky Mountain National Park and reviewed the Colorado River Power Line Revegetation Project and located plant populations of identified species for targeted seed collection and increase. After a

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field session, a review of identified and unidentified species that looked to have merit for seed increase was conducted, and estimates of seed collection efforts and size of production fields were discussed. The revegetation needs were identified for both the Colorado River Power Line Project as well as the future revegetation needs of the Bear Lake Road Project.

No seed was shipped to the park this year.

**Production Fields and Goaled Production Quantities**

The following table includes actual seeded(s) or transplanted(t) plot size at UCEPC with germplasm received from Rocky Mountain National Park.

Common Name	Scientific Name	Goaled PLS Amt	Proposed Acres	Planted Acres
<b>Grasses</b>				
Blue grama	<i>Bouteloua gracilis</i>	12.6	1.0	1.2 (t)
Junegrass	<i>Koeleria macrantha</i>	4.5	0.2	0.20 (t)
Mountain muhly	<i>Muhlenbergia montana</i>	6.2	0.5	0.5 (s) (t)
Needle and thread	<i>Hesperostipa comata</i>	12.9	0.5	0.5 (t)
<b>Forbs/Legumes</b>				
Fringed sage	<i>Artemisia frigida</i>	1.7	0.02	0.02(t)
Hairy goldenaster	<i>Heterotheca villosa</i>	11.4	1.0-1.5	0.8 (s) (t)
Purple locoweed	<i>Oxytropis lambertii</i>	5.9	1.0*	0.5 (s) (t)
Spreading goldenbanner	<i>Thermopsis divericarpa</i>	86.5	2.0	2.0 (s)
	<b>Total:</b>	<b>141.7 lb</b>	<b>6.22*</b>	<b>5.72</b>

\*Purple locoweed was to have been planted in a spaced planting occupying 1 acre. UCEPC, with agreement and assistance from Russ Haas, planted 0.5 acre in solid rows instead. This accounts for the difference in Proposed Acres and Planted Acres.

A second agreement, the Colorado River Power Line Project, was also initiated this year. A total of seven materials were cleaned for this project plus two more for the Bear Lake Road Project. The cleaned seed quantities are listed below.

Antennaria	23 g	Bear Lake Road
Blue wildrye	227 g	
Bottlebrush	493 g	Bear Lake Road
Buckwheat	317 g	
Nodding brome	11.4 lb	
Potentilla	637 g	
Red fescue	20 lb	
Stipa	345 g	

At this time, it has not yet been determined what materials and what size of production fields will be established for this project. Blue wildrye and nodding brome will be utilized, but field sizes will be somewhat dependent on PLS seed quantities.

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**RESULTS** – Seed harvest was conducted for eight Rocky Mountain National Park materials in 2006. Seed production was better than expected for blue grama and mountain muhly, but less than expected for needle and thread and prairie Junegrass. Forb harvests were about as good as might be expected with the exception of a lack of harvestable goldenbanner seed.

<b>SPECIES</b>	<b>DATE</b>	<b>QTY</b>	<b>PROCESS</b>	
<b>Blue grama</b>				
<b>Field Establishment:</b>	August 27, 2003	Approx. 15,000 transplants	Transplanter	1.2 acres
	June 9, 2004	Approx. 4000 transplants	Hand transplant	Interplanted
	August 1, 2005	5500	Hand transplant	Interplanted
<b>Harvest:</b>	October 7, 2004	7 lb bulk	Hand harvest	
	September 2, 2005	10.4 lb bulk	Large combine	
	Aug. 8 and 17, 2006	28.5 lb bulk	Hege and by hand	
	August 29, 2007	13 lb.	Flail-Vac	
<b>Shipments:</b>	October 5, 2005	2549 g and 10.4 lb		
	September 15, 2006	28.5 lb		
<b>Fringed sage</b>				
<b>Field Establishment:</b>	September 4, 2003	600 transplants	Transplanter	0.02 acres
<b>Harvest:</b>	September 10, 2004	3.5 lb bulk	Hand harvest	
	October 18, 2005	1.8 lb bulk	Hege combine	
	September 18, 2006	7.6 lb	Hege combine	
	September 12, 2007	2.4 lb	Hand harvest	
<b>Shipment</b>	October 5, 2005	3.5 lb bulk		
<b>Goldenaster</b>				
<b>Field Establishment:</b>	May 29, 2003	203 PLS g	Planet Junior	0.8 acres
	August 5, 2005	2000 transplants	Hand transplant	Interplanted
<b>Harvest:</b>	September 1, 2005	20.5 lb bulk	Hege combine	
	August 7, 2006	60.6 lb	Hege combine	
	August 8, 2007	11 lb	Flail Vac	
<b>Shipments</b>	October 5, 2005	20.5 lb bulk		
	September 15, 2006	60.6 lb bulk		
<b>Goldenbanner</b>				
<b>Field Establishment:</b>	May 28, 2003	11.7 lb planted	Planet Junior	2.0 acres
<b>Harvest:</b>	July 7, 2004	2.5 lb bulk	Hand harvest	
	July 18-19, 2005	21 lb bulk	Hege and hand	
	July 13, 2006	142 grams bulk	Hand	
	July 12, 2007	7 lb	Combine	
<b>Shipments</b>	October 5, 2005	23.4 lb bulk		
	September 15, 2006	142 grams		

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<b>SPECIES</b>	<b>DATE</b>	<b>QTY</b>	<b>PROCESS</b>	
<b>Mountain muhly</b>				
<b>Field Establishment:</b>	May 28, 2003	59 PLS g	Planet Junior	0.5 acres
	August 3, 2005	2500 transplants	Hand transplant	Interplanted
<b>Harvest:</b>	October 21, 2004	29 g	Hand harvest	
	October 17, 2005	443 g	Hand harvest	
	September 19, 2006	20.5 lb	Hege combine	
	September 13, 2007	13 lb	Swather	
<b>Shipment</b>	October 5, 2005	70 g		
<b>Needle and thread</b>				
<b>Field Establishment:</b>	September 4, 2003	600 transplants	Transplanter	0.07 acres*
	September 14, 2004	4000 transplants	Transplanter	0.20 acres
	June 30, 2005	5500 transplants	Transplanter	0.30 acres
<b>Harvest:</b>	June 30, 2005	14 g	Hand harvest	
	June 22, 2006	2.1 lb		
	June 27, 2007	10 lb	Flail Vac	
<b>Shipments</b>	October 5, 2005	1,080 g		
	September 15, 2006	2.1 lb		
<b>Prairie Junegrass</b>				
<b>Field Establishment:</b>	May 29, 2003	28 g	Planet Junior	0.2 acres*
	September 15, 2004	4000 transplants	Transplanter	0.2 acres
<b>Harvest:</b>	July 12, 2006	3.5 lb	Hege combine	
	July 12, 2007	5 lb	Swather	
<b>Shipment</b>	September 15, 2006	3.5 lb		
<b>Purple locoweed</b>				
<b>Field Establishment:</b>	May 28, 2003	203 g	Planet Junior	0.5 acres
	May 2004	100 g	Hoe	Interplanted
	September 15, 2005	45 transplants	Hand transplant	Interplanted
<b>Harvest:</b>	July 14, 2005	5.8 lb bulk	Hege combine	
	July 6, 2006	15 lb bulk	Hege combine	
	July 18, 2007	10 lb	Hand clipped	
<b>Shipments</b>	October 5, 2005	290 g and 5.8 lb		
	September 15, 2006	15 lb		

The table above provides a complete recap of the activities conducted by UCEPC as outlined in the cooperative agreement. Six of the eight contract materials have taken two or more years to establish. Three materials took three years of supplemental planting while three other products

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took two years of plug transplanting to establish fully productive fields. In fact, in 2005, over 15,000 transplants were produced and interplanted into five different production fields to increase production for 2006 and beyond. In 2007, approximately 2000 transplants of blue grama and 1000 plugs of mountain muhly were added to the fields for stand improvement.

**CONCLUSION** – This year signifies the second year of the two year amended agreement. A draft agreement to extend the production of the established materials and to add seed increase fields of rose pussytoes and bottlebrush squirreltail is underway. No formal agreement has been signed at this time. Because the established eight ROMO crops are producing seed, they will likely remain in production unless there is more hard freezing during bloom of the goldenbanner. This species was identified as the most important product for Bear Lake Road revegetation. However, hard freezes in late May at the peak of flowering have occurred the last two years. Goldenbanner produced much less than is expected from a field this size, but the plants in the field look fine with reasonable vigor, height, and color that indicates something else is a major factor limiting seed production.

This year, a cooperative effort with Colorado State University Extension entomologist Bob Hammon was conducted to locate some alkali bees near the goldenbanner field to insure the presence of suitable pollinators. Over 10,000 bees were transported from Grand Junction to Meeker in bee boards and those placed in a constructed plywood box for protection. Unfortunately, the freezes disrupted the enhanced pollination efforts since the blossoms fell off shortly after the freezing temperatures. Analysis of bee survival has not been conducted to determine if bees will be placed at UCEPC in 2008.

If funding for the project continues or an additional amendment is made to extend the agreement, seed field establishment will be conducted in 2008 for rose pussytoes and bottlebrush squirreltail.