

Project COPMC-S-0308-CR
Annual Report - December 2006

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 1,500 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.

Bear Lake Road Revegetation Project

Common Name	Scientific Name	Symbol	Accession
Grasses			
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
Forbs/Legumes			
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 golden bean	<i>Thermopsis divericarpa</i>	THDI	9070990

ACTIVITIES - This year, each of the eight materials were harvested for use in the revegetation of the Bear Lake Road construction project. Three forbs, hairy goldenaster, purple locoweed, and fringed sage all produced at or near their productive potential based on three years of production. A fourth forb, golden spreading bean, did not produce appreciable seed quantities. However, 142 clean grams were hand harvested in July. There were three nights of freezing temperatures recorded from May 29 - May 31. We believe this dramatically affected seed formation and set as the plants were just blooming at the time. The four grasses produced a little over 50 clean pounds of seed, with blue grama producing the most at 28.5 pounds this year. Small quantities of seed were harvested from needle-and-thread, and in its first production year, prairie Junegrass. However, also in its first production year, the field of mountain muhly produced 20.5 clean pounds of seed.

Lambert's locoweed continues to be a good producing species. This year, UCEPC harvested 15 clean pounds of seed from the 0.5 acre field. Also productive in volume in 2006 was hairy goldenaster with a little over 60 clean pounds harvested and 7 pounds of fringed sage.

On April 25, staff from UCEPC, Rocky Mountain National Park and National Park Service, Denver Service Center, met at the Visitor Center in Estes Park to discuss the project. A review of accomplishments, field status and future revegetation needs were identified, and it was concluded that a visit by park personnel to UCEPC would be beneficial to determine the status of the fields and future production needs.

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On July 24, Rocky Mountain National Park personnel visited UCEPC to inspect the production fields and to view first hand the seed handling and storage facilities at UCEPC. After the tour, it was mutually determined that it would be best for Rocky Mountain National Park to pick up all the seed that had been produced under previous agreement as well as some that had been collected in the park so the seed would be on hand and available for use on various park projects. In all, 46 separate seed lots were picked up by Jeff Connor and Laura Wheatley for use in Rocky Mountain National Park. UCEPC also provided three production years of oatgrass, two years of sulphur buckwheat and one year's production of Rydberg's penstemon to the park free gratis. These were materials that UCEPC produced without compensation for potential cooperative release with Rocky Mountain National Park. Clearance for cooperation in plant releases by the National Park Service has yet to be approved. After the meeting in April and the visit to UCEPC, the amendment to the agreement was initiated and signed.

Because of the necessity to use the harvested seed for revegetation in the fall of 2006, Rocky Mountain National Park requested that UCEPC clean all the harvested products and have them tested via the tetrazolium method in order to expedite the delivery of the seed to the park for planting. Two species, fringed sage and mountain muhly, had not been harvested at the time of revegetation planting at Rocky Mountain National Park. The 2006 harvested seed of these two species remains on inventory. The other six species of 2006 harvested seed was cleaned, tested and delivered to Rocky Mountain National Park staff in person on September 15, 2006. In all, a little over 109 pounds of clean seed were delivered.

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
Grasses				
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)
Forbs/Legumes				
Fringed sage	<i>Artemisia frigida</i>	1.7	0.02	0.02(t)
Hairy golden aster	<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 golden bean	<i>Thermopsis divericarpa</i>	86.5	2.0	2.0 (s)
	Total:	141.7lb	6.22*	5.72

*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 acres in solid rows instead. This accounts for the difference in Proposed Acres and Planted Acres.

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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 golden banner seed.

SPECIES	Blue grama			
Field Establishment	August 27, 2003	Approx. 15,000 transplants	Transplanter	1.2 acres
	June 9, 2004	Approx. 4,000 transplants	Hand transplant	Interplanted
	August 1, 2005	5,500	Hand transplant	Interplanted
Harvest	October 7, 2004	7 lb bulk	Hand harvest	
Harvest	September 2, 2005	10.4 lb bulk	Large combine	
Harvest	August 8 and 17, 2006	28.5 lb bulk	Hege and by hand	
Shipments	October 5, 2005	2,549 g and 10.4 lb		
	September 15, 2006	28.5 lb		
SPECIES	Fringed sage			
Field Establishment	September 4, 2003	600 transplants	Transplanter	0.02 acres
Harvest	September 10, 2004	3.5 lb bulk	Hand harvest	
Harvest	October 18, 2005	1.8 lb bulk	Hege combine	
Harvest	September 18, 2006	7.6 lb	Hege combine	
Shipment	October 5, 2005	3.5 lb bulk		
SPECIES	Golden aster			
Field Establishment	May 29, 2003	203 PLS g	Planet Junior	0.8 acres
	August 5, 2005	2,000 transplants	Hand transplant	Interplanted
Harvest	September 1, 2005	20.5 lb bulk	Hege combine	
Harvest	August 7, 2006	60.6 lb	Hege combine	
Shipments	October 5, 2005	20.5 lb bulk		
	September 15, 2006	60.6 lb bulk		
SPECIES	Mountain muhly			
Field Establishment	May 28, 2003	59 PLS g	Planet Junior	0.5 acres
	August 3, 2005	2,500 transplants	Hand transplant	Interplanted
Harvest	October 21, 2004	29 g	Hand harvest	
Harvest	October 17, 2005	443 g	Hand harvest	
Harvest	September 19, 2006	20.5 lb	Hege combine	
Shipment	October 5, 2005	70 g		
SPECIES	Needle and thread			
Field Establishment	September 4, 2003	600 transplants	Transplanter	.07 acres*
	September 14, 2004	4,000 transplants	Transplanter	0.20 acres
	June 30, 2005	5,500 transplants	Transplanter	0.30 acres
Harvest	June 30, 2005	14 g	Hand harvest	
Harvest	June 22, 2006	2.1 lb		
Shipments	October 5, 2005	1,080 g		
	September 15, 2006	2.1 lb		
SPECIES	Prairie Junegrass			

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Field Establishment	May 29, 2003	28 g	Planet Junior	0.2 acres*
	September 15, 2004	4,000 transplants	Transplanter	0.2 acres
Harvest	July 12, 2006	3.5 lb	Hege combine	
Shipment	September 15, 2006	3.5 lb		
SPECIES	Purple locoweed			
Field Establishment	May 28, 2003	203 g	Planet Junior	0.5 acres
	May 2004	100 g	Hoe	Interplanted
	September 15, 2005	45 transplants	Hand transplant	Interplanted
Harvest	July 14, 2005	5.8 lb bulk	Hege combine	
Harvest	July 6, 2006	15 lb bulk	Hege combine	
Shipments	October 5, 2005	290 g and 5.8 lb		
	September 15, 2006	15 lb		
SPECIES	Golden Banner			
Field Establishment	May 28, 2003	11.7 lb planted	Planet Junior	2.0 acres
Harvest	July 7, 2004	2.5 lb bulk	Hand harvest	
Harvest	July 18-19, 2005	21 lb bulk	Hege and hand	
Harvest	July 13, 2006	142 grams bulk	Hand	
Shipments	October 5, 2005	23.4 lb bulk		
	September 15, 2006	142 grams		

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 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.

CONCLUSION – This year signifies the first year of the two year amended agreement. Overall, the results for 2006 suggest some optimism for the production potential of the eight crops UCEPC is producing for RMNP. Seven of the eight crops produced substantially more seed than any previous year. Golden banner produced only grams of seed in 2006, but the plants in the field look fine with reasonable vigor, height and color that indicates something else was a major factor in the limited seed from this product in 2006. All eight species will be grown again in 2007 unless observations in the spring of 2007 indicate otherwise. In addition, cooperative efforts have been made with Colorado State University Extension entomologist Bob Hammon to locate some alkali bees near the golden banner field to insure the presence of suitable pollinators.

Interest in two additional materials for seed increase has been expressed by Rocky Mountain National Park personnel. The two species are bottlebrush squirreltail and pearly everlasting. If funding for the project continues and an additional amendment is made to extend the agreement, seed collection will be conducted in 2007 for seed field establishment of these two species.