

**Restoration of Native Groundcover Vegetation
on Abandoned Improved Pasture
at Okaloacoochee Slough Wildlife Management Area**

Contract No. OT051030

**submitted to the
South Florida Water Management District
Big Cypress Basin Watershed Initiative**

**By
Florida Fish and Wildlife Conservation Commission**

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The restoration area is located north of the 2003 1-acre research plots and on the northeast portion of the improved bahiagrass pasture on the Florida Fish and Wildlife Conservation Commission (FWC) managed property in the Okaloacoochee Slough Wildlife Management Area in Hendry County (Map 1).

The site preparation for the 53-acre 2005-6 groundcover restoration project began with herbicide treatments with glyphosate in December 2004 and September 2005. Both applications were done with a helicopter (Figures 1 and 2); then missed spots were treated on the ground. FWC staff expended 3.25 weeks of time on herbicide treatment (Table 1).

There is a ditch with a dike on the North side along the north border of the plot and not far to the west is another ditch running north to south; the control structure located where these ditches meet backed up water onto the adjacent area this year. Much of the area was inundated earlier than normal from June into September due to heavy initial rains in June of approximately 15.6 inches (Table 2). In October, Hurricane Wilma flooded the area with 10" of rain and disking, which was scheduled for late October and early November, could not be begun until early January 2006. Location for the planting was moved during the fall to the northeast portion of the 425-acre improved pasture since the more western areas originally chosen were inundated for longer than the final area.

Disking, dragging, and rolling were completed by late January and took 3.7 weeks of FWC staff time (Figure 3). The plan to plant the site with seed collected with a green silage cutter was also cancelled because of Hurricane Wilma; the 1.3 mile drive from Twin Mills Grade west to the planting site on two-track across pasture was much too wet to support the semi trucks and trailers needed to deliver silage cut seed (Map 1). So the field was planted with seed collected with a flail-vac, which is much less bulky and can be bagged and delivered on smaller lighter equipment. The flail-vac (Figure 4) has a large horizontally mounted brush that rotates rapidly and brushes seed off the stem and up into a bin located behind the brush. The bin is then emptied onto plastic sheets, the seed mix is allowed to dry thoroughly, and is then bagged or rolled in the plastic for storage.

Seed was collected with a flail-vac from Avon Park Bombing range and Triple Diamond Ranch in November and early December. Lopsided indiangrass (*Sorghastrum secundum*), which ripens earlier in the year, was collected in October at Avon Park Bombing Range with a flail-vac (Figure 4). Hand collected seed was collected from June through December at various locations. This included primarily grasses such as giant plume grass (*Saccharum giganteum*), lovegrass (*Eragrostis elliottii*), muhlygrass (*Muhlenbergia capillaris*) (Table 3).

Seed was planted at the January 31st through February 3rd (Figures 5-7). An 8-foot Grasslander was used to plant the seed; this machine can be used with uncleaned seed. It cuts a shallow groove in the soil with disks, then drops the seed and rolls it into the ground with a row of uninflated tires. A total of 892 pounds of seed mix was spread at a rate of 17 pounds per acre (Table 3). FWC staff spent 2.15 weeks on the planting contract.

A 3.7-inch rain fell the day after planting was finished and flooded a portion of the field again, leaving wrack lines of litter and possibly seed. After that, the only rain that has fallen up to May 10th was 0.2 inches on February 25th and 0.4 inches on March 23rd. (Table 2).

A three-strand 18” tall electric fence was constructed around the planting area in April 2006. The area within two feet of the fence was sprayed with glyphosate and Sahara herbicide to keep plants from shorting out the fence. The 1.25 mile fence was necessary to keep feral hogs from digging up the planting. White-tailed deer and bob-white quail have also been seen feeding on the planted area.

On April 28th, the planting contractor, Nancy Bissett from The Natives, and I visited the site and found good germination (Figure 9). Seed appeared to be evenly distributed, not bunched in wrack lines in the flooded area. Seedlings are generally only a few inches tall, though there are some larger and some blooming. There are many wiregrass (*Aristida stricta*) (Figure 10), lopsided indiangrass (Figure 11), lovegrass (*Eragrostis elliottii*) and coreopsis (*Coreopsis leavenworthii*) (Figure 12) seedlings. The northeast corner, which was the most flooded after seeding, has a heavy germination of crowngrass (*Paspalum accuminatum*), considered an exotic by some and a native by others; it is not usually an aggressive plant, and there are other seedlings coming up in the area as well. Tropical soda apple (*Solanum viarum*) seedlings were seen, as well as caesarweed (*Urena lobata*) and some Vaseygrass (*Paspalum urvellei*), an aggressive space filler in the 2003 planting; these plants will need to be treated with herbicide or kicked out with a stick. Table 4 contains a list of species found, and Table 5 summarizes these data.

The electric fence is being monitored regularly for damage. Vegetation monitoring will be conducted in Fall 2006 and a report produced Spring 2007.

FWC would like to thank the South Florida Water Management Big Cypress Basin Watershed Initiative for funding this groundcover restoration effort and their generous efforts to make this project happen.

Map 1. Location of groundcover restoration plots on Okaloacoochee Slough Wildlife Management Area.

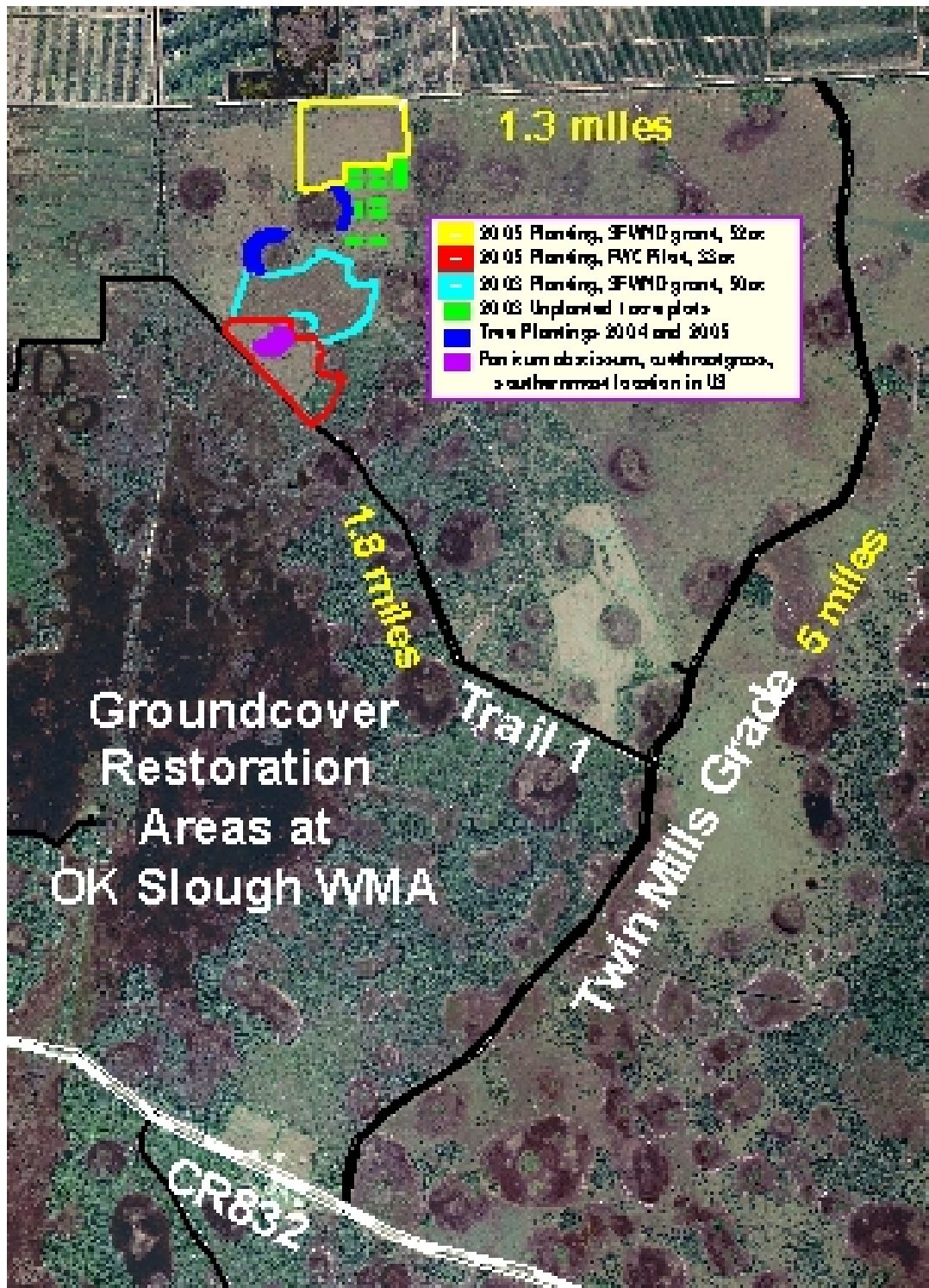


Figure 1. December 2004 herbicide treatment with helicopter.



Figure 2. December 2004 helicopter refilling for herbicide treatment of site.



Figure 3. Left shows final disking and dragging, right shows rolled with 42 in diameter drum roller and ready to plant.



Figure 4. Flail-vac collecting lopsided indiagrass seed at Avon Park Bombing Range October 2005.



Figure 5. Filling Grasslander with seed from bags during planting.



Figure 6. Seed mix.



Figure 7. Ground surface after planting February 2, 2006.



Northeast corner of planting area 3 days after heavy rain and 4 days after planting Feb. 7, 2006.



Figure 9. Seedlings coming up March 23, 2006.



Figure 10. Wiregrass (center) and bluestem (lower right) seedlings, April 28, 2006.



Figure 11. Lopsided indiangrass seedling April 28, 2006.



Figure 12. Coreopsis seedling April 28, 2006.JPG



Table 1. Time spent on groundcover restoration project by Florida Fish and Wildlife staff.

Action	Coordinating Time	Equipment Time	Total Hours	Total Weeks
Contract	86		86	2.2
Herbicide	105	19	124	3.1
Disking	60	70	130	3.3
Roll	6	12	18	0.5
Total	257	101	358	8.9

Table 2. Monthly rainfall at the SFWMD weather station OKALN_R located 1.9 miles WSW of the center of the groundcover restoration plot.

Year	Month	Rainfall (inches)
2005	June	* 15.64
	July	10.63
	August	5.36
	September	** 6.2
	October	10.41
	November	3.42
	December	0.00
2006	January	0.21
	February	3.94
	March	0.40
	April	0.00

*Weather data were missing for June 2-14 on OKALN_R station. Data from Sanctuary Road in Collier County were used for those 11 days.

** Weather data were missing for September 19-23 on the OKALN_R station. Data from Sanctuary Road in Collier County were used for those 3 days.

Table 3. Seed mix contents and amounts.

Jan/Feb 2006 OK Slough Planting		
Extra hand collected seed		Ounces
Andropogon glomeratus	bushy bluestem	118.3
Andropogon glomeratus glaucopsis	chalky bushy bluestem	250.0
Coreopsis leavenworthii	coreopsis	460.0
Eragrostis elliottii	Elliott's lovegrass	407.8
Saccharum giganteum	giant plumegrass	105.3
Sorghastrum secundum	lopsided indiagrass	4106.0
Muhlenbergia capillaris	muhlygrass	79.5
Panicum anceps	beaked panicum	2.6
Mixed wet species		53.0
Symphotrichum carolinianum	climbing aster	26.5
		5608.9

Total pounds seed mix added		350.55 lb.
For 52.3 acres 6.7 lb.per acre		

Triple Diamond Flail Vac harvest

Hydric mix		222 lb.
Mesic mix		36 lb.

Avon Park Bombing Range

Mostly hydric area of harvest		284 lb.
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Total pounds for site		892.55 lb.
For 52.3 acres 17 lb. per acre		

Table 4. Seedlings found in groundcover restoration area April 28, 2006.

Scientific Name	Common name	Family	FL DEP Code	Floristic Status Category
<i>Andropogon</i> sp.	bluestem	Poaceae	FACW, FAC,U	--
<i>Aristida beyrichiana</i>	wiregrass	Poaceae	FAC	NC
<i>Centella asiatica</i>	pennywort	Apiaceae	FACW	NP
<i>Coreopsis leavenworthii</i>	Leavenworth's tickseed	Asteraceae	FACW	NC
<i>Cuphea carthagenensis</i>	waxweed	Lythraceae	FAC	EW
<i>Cynodon dactylon</i>	bermuda grass	Poaceae	U	EA
<i>Cyperus compressus</i>	poorland flatsedge	Cyperaceae	FACW	NP
<i>Cyperus retrorsus</i>	pinebarren flatsedge	Cyperaceae	FAC	NP
<i>Cyperus surinamensis</i>	flatsedge, tropical	Cyperaceae	FACW	NP
<i>Desmodium triflorum</i>	beggarweed	Fabaceae	U	EW
<i>Dichanthelium portoricense</i>	hemlock witchgrass	Poaceae	U	NP
<i>Diodia virginiana</i>	buttonweed	Rubiaceae	FACW	NC
<i>Elephantopus elatus</i>	tall elephantsfoot	Asteraceae	U	NC
<i>Eragrostis elliottii</i>	lovegrass, Elliott's	Poaceae	FAC	NP
<i>Eupatorium capillifolium</i>	dog fennel	Asteraceae	FAC	NW
<i>Eupatorium rotundifolium</i>	roundleaf thoroughwort; false horehound	Asteraceae	FAC	NC
<i>Euthamia caroliniana</i>	flat-topped goldenrod	Asteraceae	FAC	NP
<i>Fimbristylis autumnalis</i>	slender fimbry	Cyperaceae	OBL	NP
<i>Gamochaeta falcata</i>	cutweed, narrowleaf purple everlasting	Asteraceae	U	N
<i>Hydrocotyle umbellata</i>	water pennywort	Apiaceae	FACW	NP
<i>Hypericum mutilum</i>	dwarf St. John's-wort	Clusiaceae	FACW	N
<i>Liatris</i> sp.	gayfeather, blazing star	Asteraceae	FACW, FAC,U	NC
<i>Ludwigia octovalvis</i>	Mexican primrosewillow	Onagraceae	OBL	NP
<i>Ludwigia repens</i>	creeping primrosewillow	Onagraceae	OBL	NC
<i>Macroptilium lathyroides</i>	wild bush bean	Fabaceae	U	EW
<i>Oldenlandia uniflora</i>	clustered diamondflower	Rubiaceae	FACW	N
<i>Paspalum acuminatum</i>	brook crowngrass	Poaceae	FACW	EW
<i>Paspalum setaceum</i>	thin paspalum	Poaceae	FAC	NP
<i>Phyla nodiflora</i>	carpetweed	Verbenaceae	FAC	NP
<i>Phytolacca americana</i>	pokeweed	Phytolaccaceae	U	N
<i>Pluchea odorata</i>	camphorweed	Asteraceae	FACW	N
<i>Polygonum hydropiperoides</i>	smartweed	Polygonaceae	OBL	N

Table 4. continued.

Scientific Name	Common name	Family	FL DEP Code	Floristic Status Category
Polypremum procumbens	rustweed	Loganiaceae	FAC	NP
Saccharum giganteum	sugarcane plumegrass	Poaceae	OBL	NC
Scoparia dulcis	sweet broom	Scrophulariaceae	FAC	NW
Sesbania sp.	riverhemp	Fabaceae	FAC	--
Solanum americanum	American black nightshade	Solanaceae	U	N
Solanum viarum	tropical soda apple	Solanaceae	U	EA
Sorghastrum secundum	lopsided indiagrass	Poaceae	U	NC
Urena lobata	caesar weed	Malvaceae	U	E
40 species noted				

Table 5. Summary information on seedlings found in groundcover restoration area April 28, 2006.

Family		Florida DEP Code		Floristic Status Category	
Apiaceae	2	OBL	5	Exotic, aggressive	2
Asteraceae	8	OBL,FACW		E, not yet classified	1
Clusiaceae	1	FACW	10	Exotic, weedy	4
Cyperaceae	4	FACW,FAC,U	2	N, not yet classified	7
Fabaceae	3	FAC	12	Native, weedy	2
Loganiaceae	1	U	11	Native, pioneering	13
Lythraceae	1	Total	40	Native Characteristic	9
Malvaceae	1			Undetermined	2
Onagraceae	2			Total	40
Phytolaccaceae	1				
Poaceae	9			Exotic	7
Polygonaceae	1			Native	31
Rubiaceae	2			unknown	2
Scrophulariaceae	1			Total	40
Solanaceae	2				
Verbenaceae	1				
Total	40				