# RESTORATION OF SEASONALLY-FARMED EVERGLADES PRAIRIE WITHOUT REMOVAL OF DISTURBED SOIL

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## WHAT WAS DONE

**Miami-Dade County's Environmentally Endangered Lands (EEL) Program and the South Florida Water Management District (SFWMD) jointly manage over 20,000 acres of Everglades wetlands in southeastern Miami-Dade County. Persistent forested wetlands dominated by invasive non-native species (Figure 1) were converted to Everglades graminoid-dominated prairie without clearing and grubbing and without soil removal ("scrape-down") in approximately three years (Figure 2).**


Figure 1. Forested wetlands before (1a) and after (1b) traditional treatment of invasive non-native species, showing a shift from Brazilian pepper (*Schinus terebinthifolius*) dominance to mixed native woody species.

Figure 2. Vegetation for restored prairie after 3+ years includes bushy bluestem (*Andropogon glomeratus*), sawgrass (*Cladium jamaicense*), and primrose willow (*Ludwigia octovalvis*).

## WHY WAS THIS DONE?

### ❖ LOWER RESTORATION AND MAINTENANCE COSTS

- Traditional invasive control treatment of moderately to heavily-infested forested wetlands is costly. Conversion to a prairie that can be managed with fire ($25/acre) is cost-effective for the long term.


Figure 3. Typical selective invasive plant treatment in forested wetlands (3a) and representative five year unit costs for this technique (3b, adapted from Messer and Burzycki 2008).

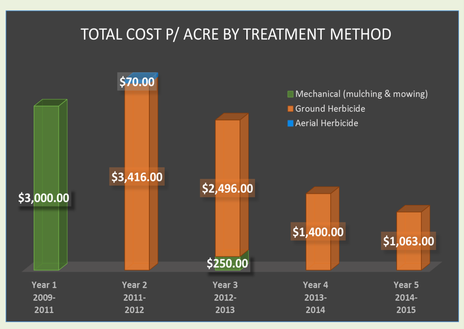


Figure 4. Five-year costs for conversion of forested wetlands to graminoid prairie.

### ❖ACHIEVE RESTORATION GOALS

- Everglades wetlands are oligotrophic graminoid-dominated prairies and marshes dotted with tree islands (Figure 5). Broad zones of forested wetlands in the southeastern Everglades exist as a result of abandonment of seasonal farming in wetlands. The unique slightly alkaline soils have been altered by farming practices (Figure 6), including addition of fertilizers. This disturbance resulted in post-abandonment succession to an altered community that includes ruderal and invasive species* (Figure 7). Return to oligotrophic conditions is needed to achieve long-term restoration (Doren et al. 1990). Fire has been shown to mobilize and redistribute nutrients via smoke and ash (cf. Qian et al. 2009). Forested wetlands cannot be managed with fire; conversion to prairie is necessary.

*** cf. extensive literature review in Doren et al. 1990**

Figure 5. Everglades prairie and tree islands


Figure 6. Typical southern Miami-Dade seasonal agriculture


Figure 7. 1940 (7a) vs. 2015 (7b) aerials of southeastern Miami-Dade showing extensive wetland clearing for agriculture followed by succession to forested wetlands after abandonment.

References:

Doren, R.F., L.D. Whiteaker, G. Molnar and D. Sylvia 1990. Restoration of former wetlands within the Hole-in-the-Donut in Everglades National Park, in Webb, F.J., Jr., Ed. 1990. Proceedings of the Seventh Annual Conference on Wetlands Restoration and Creation. Hillsborough Community College, Tampa, FL.

Giannini, H. C. and G. M. Burzycki 2008. Qualitative influence of fire on succession in a forested wetland following herbicide treatment of shoebutton ardisia (*Ardisia elliptica*) in the South Dade Wetlands Management Area. Presented at 2008 Weed Science Society of America Conference , Chicago, IL

Messer, M.A. and G.M. Burzycki 2008. Analysis of exotic control efforts for shoebutton ardisia (*Ardisia elliptica*) infested sites in the South Dade Wetlands Management Area. Presented at 2008 Weed Science Society of America Conference , Chicago, IL

Qian, Y., S.L. Miao, B. Gu, and Y.C. Li 2009. Effects of burn temperature on ash nutrient forms and availability from cattail (*Typha domingensis*) and sawgrass (*Cladium jamaicense*) in the Florida Everglades. J. Environ. Qual. 38: 451-464.

## HOW WAS THIS DONE?

### YEAR 1 – MULCHING

Figure 8. Brontosaurus mulching operation.

### YEAR 2 – AERIAL HERBICIDE

Figure 9. Substantial recruitment of bushy bluestem (*Andropogon glomeratus*) one year after mulching.

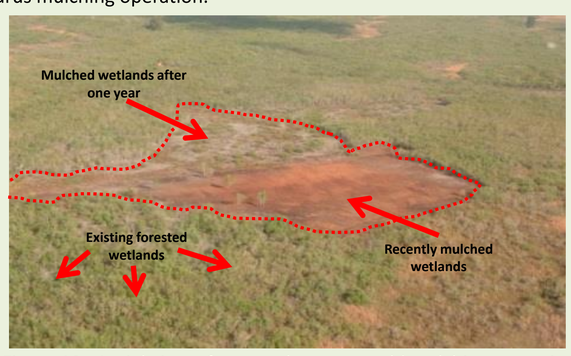


Figure 10. Aerial view of new and one-year-old mulching operations.

### YEAR 3 – HERBICIDE (FIRE POSSIBLE)


Figure 11. A dry season wildfire was extinguished by the Florida Forest Service, so additional herbicide treatment was needed for ruderal species (e.g. primrose willow, *Ludwigia octovalvis*).

### YEAR 4 – MOWING, HERBICIDE

Figure 12. View of prairie post-mowing but before herbicide treatment for invasive woody species and ruderals. The mowing improves visibility and access for treatment.

### YEAR 5 – HERBICIDE

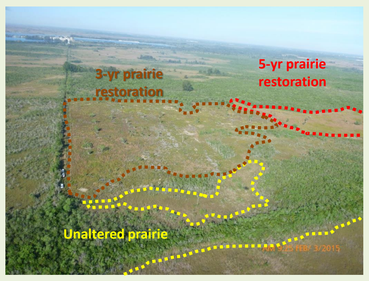


Figure 13. Aerial view of restored prairie area. Note similarity in appearance to nearby unaltered prairie.

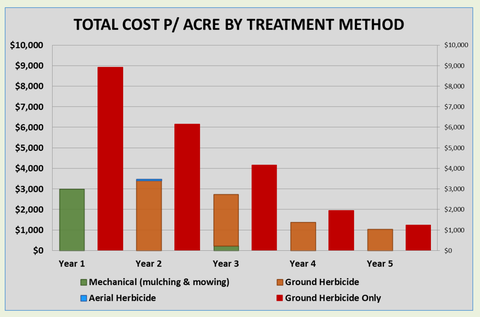


Figure 14. Five-year cost comparison for ground crew treatment of forested wetlands vs. prairie conversion.

## LESSONS LEARNED

- ❖ Phytosanitize all equipment. Graminoid recruitment included non-native species.
- ❖ Nature can be your ally in achieving good Integrated Pest Management. Seasonal and stochastic events (e.g. wildfires, onset of wet season) can replace herbicide treatments or amplify their effects**.
- ❖ Plan ahead for prescribed fire in order to implement this technique early. It's inexpensive and a necessary restoration component.
- ❖ Watch out for Poachers! Fauna recruitment in recently mowed areas can attract more than just the deer …

** cf. Giannini and Burzycki 2008