NATIVE SANDHILL SPECIES REVEGETATION TECHNIQUES

PROBLEM STATEMENT

Florida's transportation industry has primarily utilized nonnative forage grasses to vegetatively stabilize rights-of-way. Increasing the use of native species, particularly beyond the clear zone, would be desirable for reasons such as increased consistency with statewide ecosystem management goals, decreased threat of nonnative species invasion into neighboring properties, and decreased costs for maintenance of roadsides. As a result, the Florida Department of Transportation (FDOT 1983) strategy document "Management of Natural Vegetation along Highway Rights-of-Way" called for expanding research on the use of native species.

OBJECTIVES

The goals of this project were to explore new methodologies for comparing several revegetation techniques to better understand methods that could be implemented on rights-of-way, and to extend and initiate research on management of natives on roadsides.

This project had five objectives:

1. Investigate site preparation, sowing methods, and management treatments for effectiveness in establishment and growth of native species.
2. Investigate the use of prescribed fire for vegetation height, flowering response, and control of woody species adjacent to the clear zone.
3. Investigate the propagation of little bluestem *(Schizachyrium scoparium)* for turf development potential and use along roadsides.
4. Continue assessment of experiments on native revegetation and on roadside vegetation management previously funded by FDOT.
5. Refine recommendations for the use and management of native plants along roadsides.

FINDINGS AND CONCLUSIONS

Site preparation for sowing native seed in longleaf pine systems should depend on the degree of site disturbance. In sandhills, if the site is degraded but has undisturbed soil, mechanically sown seeds can establish if the vegetation is burned and then irrigated early in the growing season. If irrigation or fire is not possible, lightly roller-chopping the site will also allow good establishment of species like wiregrass, though not as successfully as the fire and irrigation management. Burning prior to chopping appears unnecessary. Fire alone will not result in good establishment unless precipitation levels are high. In all cases, rolling the seed into the soil following sowing enhances seedling establishment.

If native vegetation is present on the sandhill site but the soil will be completely disturbed during the construction or revegetation process, perhaps the most important factor for successful colonization by natives is maintenance of the topsoil on the site. Native species appear to establish well on disturbed soils from both the sown material and the soil seedbank. Microtopographic features left from disking or bulldozing should be smoothed as much as possible to restore soil compaction and prevent seed from washing into depressions. Irrigation appears unnecessary for species establishment in a non-drought year.

If the site is covered with a nonnative species like bahiagrass, site preparation to remove the turfgrass and

other nonnative and weedy native species should be conducted for a year prior to sowing native seed mix. Multiple applications of glyphosate herbicide most successfully reduced the nonnative species and increased native species cover and richness in a flatwoods site. Revegetation results also appear to be dependent upon site hydrological and soil characteristics. If the site has subsurface soil or significant quantities of construction materials, revegetation may be unsuccessful. Soil nutrient levels, texture, and compaction were not studied in relation to research results. However, if significant soil modification is present, other approaches for revegetation, including the use of sod of native species, need to be investigated.

Hayblowers were found to be easier and more efficient for sowing native seed than hydroseeders, fertilizer spreaders, and cultipackers. Greater densities of wiregrass were established in the sandhill plots sown with the fertilizer spreader, but it was the most difficult machine to use (time required to prepare and sow seeds, uniformity of spreading seeds on the plots). Repeated driving over the plot when using the fertilizer spreader, rather than the spreader action itself, may explain the higher wiregrass establishment observed.

Re-establishment of native cover on disturbed sandhill soils results in stands able to carry fire within three years. Cover of native species in restored areas was within the range of cover in natural areas within three years of sowing. Similarity analysis of cover values between sown sites and reference sites showed high similarity indices within a year of sowing. Wiregrass contributed signficantly to increases in similarity in species composition.

Mowing frequency should not be more than every three years for controlling the height for woody species outside the clear zone in north Florida. After four years, heights of native vegetation on rights-of-way remained below two feet even in years of extreme rainfall and drought. While the results may not be applicable further south, reducing mowing in north Florida should provide significant savings for the State. Regardless of mowing frequency earlier in the season, the height of bahiagrass in the winter decreased to below six inches in north Florida. Consequently, mowing schedules in north Florida should be reevaluated.

Over the short-term, prescribed fire will not substitute for mowing to reduce woody species density on rights-of-way. Fire stimulated stem production in woody species and in the flowering of herbaceous species, significantly increasing the height of the vegetation. However, repeated fire should reduce woody species (e.g., Glitzenstein et al. 1997). On rights-of-way adjacent to natural areas managed with fire, using fire to control roadside vegetation may reduce mowing costs and impacts to native vegetation. Where such management would not jeopardize the safety of drivers, the result would be a roadside with diverse colors and textures and greater habitat value.

Little bluestem *(Schizachyrium scoparium)* may form a continuous turf and be useful for revegetation efforts. Prescribed fire appeared to increase seed production and germinability in little bluestem, although viable seed is produced without fire. Results showed that this species was sensitive to water availability, and may be more successfully propagated in field rather than greenhouse conditions. Both direct seeding and planting of plugs can be used to establish this species. Further work should evaluate the potential for larger-scale use of this species by FDOT.

Wiregrass *(Aristida beyrichiana)* seed may be stored for at least two years and remain viable. We found establishment of seed that were stored for two years in paper bags under temperature-controlled conditions. The relationship between seed age and germinability requires further research.

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