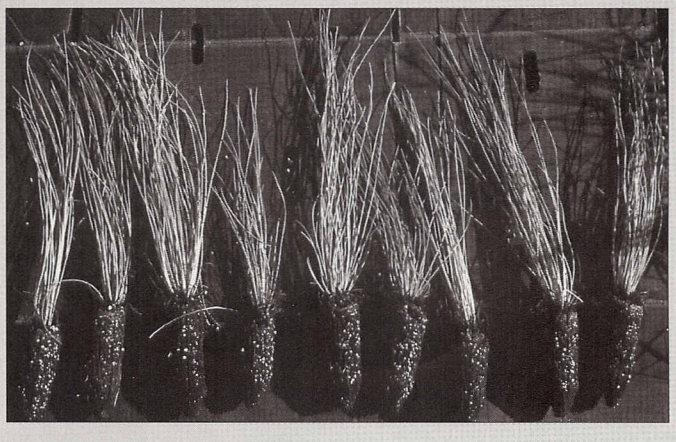
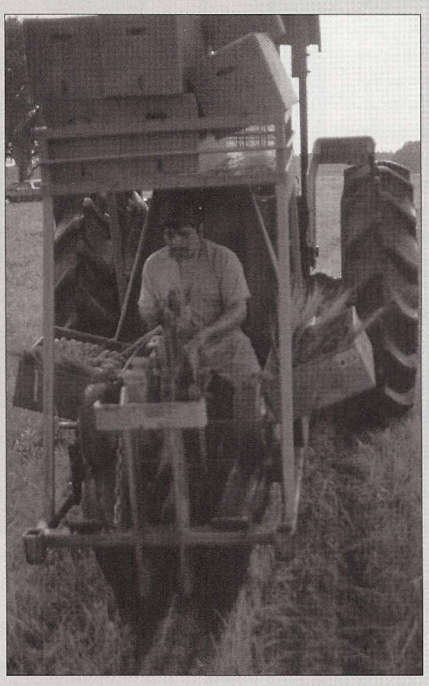
Details of Plant Restoration and Enhancement in Area 1





Above: Longleaf pine seedlings in plug form, ready for planting.

Left: A custom plug-planting system was used to install the tens of thousands of longleaf and wiregrass plugs.

As the Project Manager for Water and Air's restoration efforts for the Florida Department of Transportation's mitigation at Marion 1, I was excited about starting the large and ecologically challenging project. However, when we finished unloading the first Florida Division of Forestry truck, the realization of what a huge task we had taken on finally hit me. Under an impressive, gracefully spreading 150 year-old live oak, the stack of boxes lay seven feet high, ten feet wide, and nearly twenty feet long — a daunting site, more than 50,000 wiregrass (*Aristida beyrichiana*) plugs awaited planting, and that wasn't even half the number we were required to plant. But with the aid of a mechanical tree planting tractor and an experienced team, we accomplished the entire wiregrass installation task (117,000+ wiregrass plugs) in about nine days. The physical and logistical tasks associated with the wiregrass restoration were challenging, to say the least. But even more exhausting was the anxiety caused by unpredictable, late summer thunderstorms (or more specifically, the lack thereof). Fortunately, the rains came and went and came again, the wiregrass responded positively, and the installation was a success.

Two years later, with survival rates in the neighborhood of 90-95%, the planted areas are thick with healthy wiregrass clumps and well on their way to re-establishing the historical fire regime and habitat that existed prior to logging and cattle grazing disturbances. Wiregrass was installed at the site's higher elevations (about eight feet above the freshwater marsh elevations) in conjunction with 40,000 muhlygrass (*Muhlenbergia capillaris*) plugs at slightly lower elevations to increase the native grasses that produce fine fuels, a critical component required to re-establish a natural fire regime. Fine fuels like wiregrass and muhlygrass leaf-blades (as opposed to larger fuels such as woody twigs and branches) are very important in carrying fire across the landscape and are instrumental in the site's restoration plan. Other native grasses installed to increase plant di-

by Peter NeSmith, field biologist

Aerial view of Area 1 shows the planted rows of wiregrass plugs. Using a tractor was not only a timesaver, but the furrowing dislodged the surrounding vegetation, allowing the wiregrass and longleaf seedlings time to get established.

versity and wildlife habitat include eastern gamagrass (*Tripsachum dactyloides*), a food source for dove and quail, and the gracefully arching lopsided Indiangrass (*Sorghastrum secundum*).

With the successful installation of the grasses, restoration efforts continued with the installation of various other floral components of a healthy and vital longleaf pine flatwoods. Interspersed randomly within the wiregrass and in open areas surrounded by wiregrass, approximately 5000 longleaf pine (*Pinus palustris*) were installed. Longleaf pine, an important and once dominant component of the Southeastern United States' wiregrass ecosystems, was the first of many non-grass, fire-dependent species to be installed. Other species incorporated in the restoration effort include saw palmetto (*Serenoa repens*), tough buckthorn (*Bumelia tenax*), various blueberries at different topological gradients (*Vaccinium arboreum, V. darrowii, V. myrsinites* and *V. corymbosum*), rusty lyonia (*Lyonia ferruginea*), gopher apple (*Licania michauxii*) concentrated in the vicinity of active gopher tortoise burrows, and various mast [acorn] producing oaks (*Quercus myrtifolia, Q. pumila* and *Q. virgininana*). Other important species incorporated into the restoration effort include Florida pennyroyal (*Piloblephis rigida*), blazing stars (*Liatris* spp.), Cherokee bean (*Erythrina herbacea*) and dotted horsemint (*Monarda punctata*). These species were interspersed within gaps in the wiregrass plantings and grouped to simulate natural occurrences and associations.

In addition to restoration of communities requiring frequent fire, several other communities that are less fire tolerant are being revegetated. Oak hammock species are being planted around several of the existing large old live oaks. Species to be included in these areas include laurel oak (*Quercus hemisphaerica*), pignut hickory (*Carya glabra*), beautyberry (*Callicarpa americana*), coontie (*Zamia pumila*), wild petunia (*Ruellia caroliniensis*) and yaupon holly (*Ilex vomitoria*). Fire shadows appear to have been a natural occurrence in areas where the prevailing summer winds, in association with wetlands, created a mosaic of unburned areas. To re-create the fire shadow effect, restorationists had to assess the surrounding landscape for smoke sensitive areas, and then site fire shadows based on acceptable winds for prescribed fire. These areas have been planted with sweetgum (*Liquidambar styraciflua*), water oak (*Quercus nigra*), Walters viburnum (*Viburnum obovatum*), and sabal palms (*Sabal palmetto*).

Over half of the restoration site consists of freshwater wetlands with a well-represented diversity of naturally occurring native plants. Several of the wetlands have been augmented with species that have been found to occur in surrounding off-site wetlands such as pond cypress (*Taxodium ascendens*), swamp blackgum (*Nyssa sylvatica* var. *biflora*), swamp dogwood (*Cornus foemina*), fetter bush (*Lyonia lucida*), Virginia willow (*Itea virginica*), soft rush (*Juncus effusus*) and pop ash (*Fraxinus caroliniana*). Wetlands on-site that are not planted with native hardwoods and cypress were sparsely planted with pond pine (*Pinus serotina*). Small, naturally occurring depressions were planted with sand cordgrass (*Spartina bakeri*), climbing aster (*Aster carolinianus*), Elliot's aster (*A. elliottii*), and string lily (*Crinum americanum*).

Despite difficult and unpredictable weather conditions experienced throughout the installation effort, the project has progressed with some pronounced success. There was some mortality due to drought in 1998, but it appears to be limited in extent. To date, approximately 170,000 native plants have been installed, comprising more than 35 species and four distinct habitat types. Ecological monitoring began in October 1998, feral pig trapping will commence as soon as possible, and the first of many summer burns will begin in May or June of 1999.

It appears, based on observations made during the past several years and many long days on-site, that faunal diversity has increased. This may be associated with the ever-increasing plant diversity and the elimination of the destructive cattle grazing; however, it is a mere pittance compared to what is expected many years from now, after maturation of the site's flora in combination with a natural fire regime. To many, this restoration project may seem like too much work and expense for just one site; however, the benefits are vast. This tract, which has been ecologically damaged by many decades of consumptive use by the cattle and logging industry and has experienced a great loss of plant and animal diversity, now has an additional seed source for many of the native species that once inhabited its various ecological niches. Entire regions of flora and fauna will benefit from the ecologically sound manner in which this project has progressed over the past three years.