Partnership in reforestation at Timucuan

Ecological and Historic Preserve

By Daniel R. Tardona and Richard Bryant

Timucuan Ecological and Historic Preserve in Jacksonville, Florida, was established in 1988 to protect one of the last unspoiled coastal wetlands on the Atlantic Coast (fig. 1). The 46,000-acre (18,616-ha) preserve contains nationally and regionally significant natural and cultural resources, including the lower Saint Johns River estuary, coastal uplands (which land development and a legacy of fire suppression are causing to disappear), Native American (Timucua) resources, early European settlements (e.g., Fort Caroline), and a cotton plantation site (Kingsley Plantation).

Timucuan is a nontraditional unit of the National Park System consisting of publicly and privately owned lands. This unit depends upon cooperative relationships with state and local governmental and nongovernmental entities, including businesses like the Castleton Beverage Corporation, for managing lands within and adjacent to the preserve boundary. Reforestation of the Thomas Creek area of the preserve is an example of the kind of successful working partnership that is needed to fulfill preservation goals.

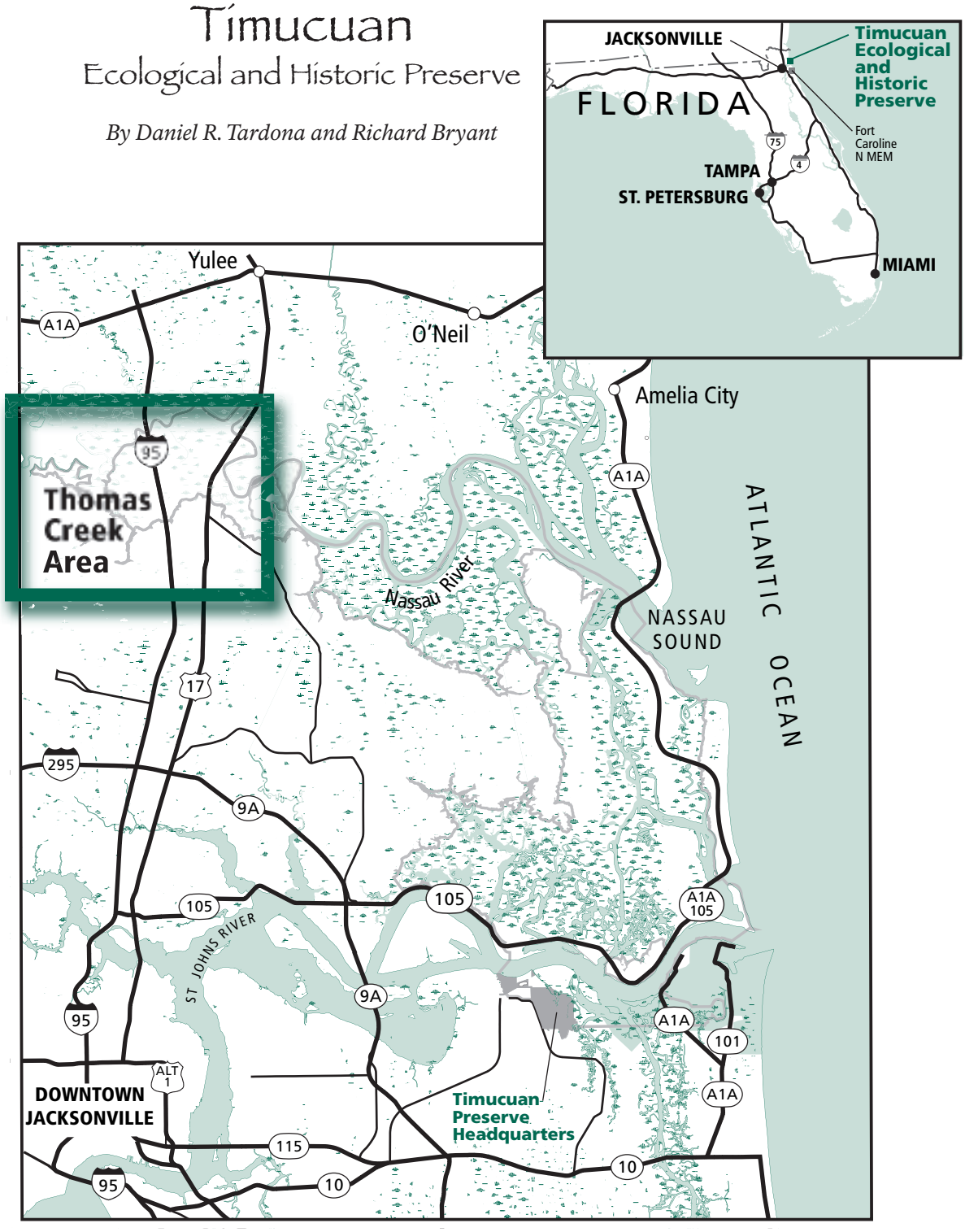

Figure 1. The 46,000-acre (18,616-ha) Timucuan Ecological and Historic Preserve in Jacksonville, Florida, preserves nationally significant natural and cultural resources. Natural resources include coastal wetlands and uplands; cultural resources include artifacts of Native American and European settlers, as well as the site (yet unidentified) of the southernmost battle of the Revolutionary War. Inset shows the Thomas Creek area, which the National Park Service is restoring to pre-settlement conditions in cooperation with Castleton Beverage Corporation.

Background

As reported in Tardona (1997), the National Park Service entered into a partnership with the Castleton Beverage Corporation, which owned approximately 927 acres (375 ha) of ecologically and culturally significant land within the preserve boundary. The project site, known as the Thomas Creek area, contains a 27-acre (11-ha) lake, 262 acres (106 ha) of freshwater wetlands, and approximately 145 acres (59 ha) of brackish salt marsh. Culturally, the area is thought to be associated with the historic southernmost battle of the Revolutionary War; however, no one has located the battle site yet.

Park managers reached an agreement with the corporation to allow the seller to harvest planted loblolly pines (*Pinus taeda*) seven years after completion of the sale. This agreement was mutually beneficial. From the perspective of the National Park Service, it created an opportunity to reforest the area without having to bear the cost of tree removal. The harvest eliminated unwanted trees, which Timucuan Ecological and Historic Preserve may not have gotten the funds to remove. From the Castleton Beverage Corporation's perspective, the agreement enabled it to recover its investment of land preparation and planting by waiting until the planted trees reached merchantable value as pulp. Thereby, Castleton recouped the value of the trees, approximately 1,000 trailer loads of pulp wood with some saw timber (primarily from the shelter wood cuts) that were trucked to the mill. The harvest provided the National Park Service with a means to reforest the area with a historically appropriate tree species, native longleaf pines (*Pinus palustris*), as opposed to "inheriting" a huge tree farm with little natural or cultural resource value (fig 2, page 56). The development of a mutual understanding of the goals and needs of both parties began a reciprocally beneficial, respectful, and cooperative working relationship that has carried the project through.

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Harvest methods

As a condition of the sale, the Castleton Beverage Corporation was responsible for coordinating the harvest, subsequent site preparation, and planting of longleaf pine, an appropriate pre-settlement condition for the site (Bartrum 1776) and consistent with Timucuan's general management plan objectives. Staff from the National Park Service and Castleton Beverage Corporation completed a vegetation management plan prescribing time lines and general objectives (Tardona et al. 1996). This plan outlined the areas to be clear-cut, partially cut (shelter wood), and not cut. The plan also contained guidance on how to intermittently plant the longleaf pine in a random fashion so as to mimic natural regeneration and prevent a predictable pattern. None of the site preparation or planting costs was borne by the National Park Service. Had it been otherwise, the reforestation project might have been precluded.

Timber harvest started in July 2002 by a contract logging firm hired by Castleton. In August, heavy rains resulted in poor road conditions and the National Park Service asked the contractor to halt operations until the roads dried out. Harvest resumed in April 2003 and was completed by June 2003 (fig 3, page 56). Harvest was totally mechanical and usually consisted of a feller-buncher (wheeled vehicle that grabs, cuts, and lays the trees down), one or two skidders (wheeled vehicles that drag the felled trees to the loading site), and one loader (a hydraulic, articulated claw arm that picks up trees and places them onto transport trailers). A total of 293 acres (119 ha) was clear-cut while 80 acres (32 ha) were left as shelter wood.

In a give-and-take relationship, the National Park Service and Castleton Beverage Corporation worked together to find solutions for a situation that could have easily ended in disputes. Numerous on-site meetings and observations of what both parties wished to gain from the project fostered this cooperative working partnership.

Site preparation

Upon completion of the timber harvest, Castleton had the responsibility of preparing the site for planting. Although the timber harvest resulted in large piles of tree tops and limbs, the 1996 plan did not specify what was to happen to these piles. Burning is not permitted because of the proximity of the site to Jacksonville International Airport and Interstate 95. Furthermore, off-site disposal was considered impractical. Therefore, the piles were scattered with a front-end loader followed by crushing with a roller-chopper. This treatment scattered the brush over the entire clear-cut area and facilitated decomposition and recycling of nutrients back into the soil. Cost for the scattering was $3,000. The 46,000-pound (20,865-kg) heavy-duty roller-chopper, which was pulled across the clear-cut sites with a large bulldozer (D-8), broke up the stumps and mounds (rows) on which the loblolly pines had been planted. Cost of roller chopping was $60 per acre ($148 per ha) or $10,500 total.

Figure 2. Before harvesting, the 275-acre (111-ha) Thomas Creek area contained loblolly pine planted on beds in rows 12 feet (3.7 m) apart, with trees planted approximately 6 feet (1.8 m) apart. The Castleton Beverage Corporation, an inholder at Timucuan Ecological and Historic Preserve at the time of planting, ultimately harvested the trees for pulp. DANIEL R. TARDONA

Tree planting

In addition to historical documentation (Bartrum 1776), analysis of soils and surrounding undisturbed areas suggested longleaf pine savanna as the appropriate habitat for this site (Boyer 1984, Spurr and Barnes 1980). Therefore, the NPS goal was to restore the site to such conditions. The 1996 plan called for the establishment of longleaf pine forest in areas where the loblolly pine was clear-cut. To mimic seed scatter from large longleaf trees throughout the site, workers placed a total of 229 metal fence posts at random locations throughout the clear-cut areas. This guided the "planting hoe," called a dibble, which inserted pine tubules into the ground. Cost of posts and labor was $2,400. Using these posts as visual guides, the planter placed a minimum of 100 seedlings within a 100-foot (30-m) radius of each post. The planter selected "micro-sites" where the seedlings had the highest probability of survival. Cost of the containerized seedlings was $0.135 per tree totaling $3,375 for the 25,000 seedlings planted. Cost of planting was $0.24 per seedling (total $6,000). The first phase of planting was completed in October 2003 (fig. 4).

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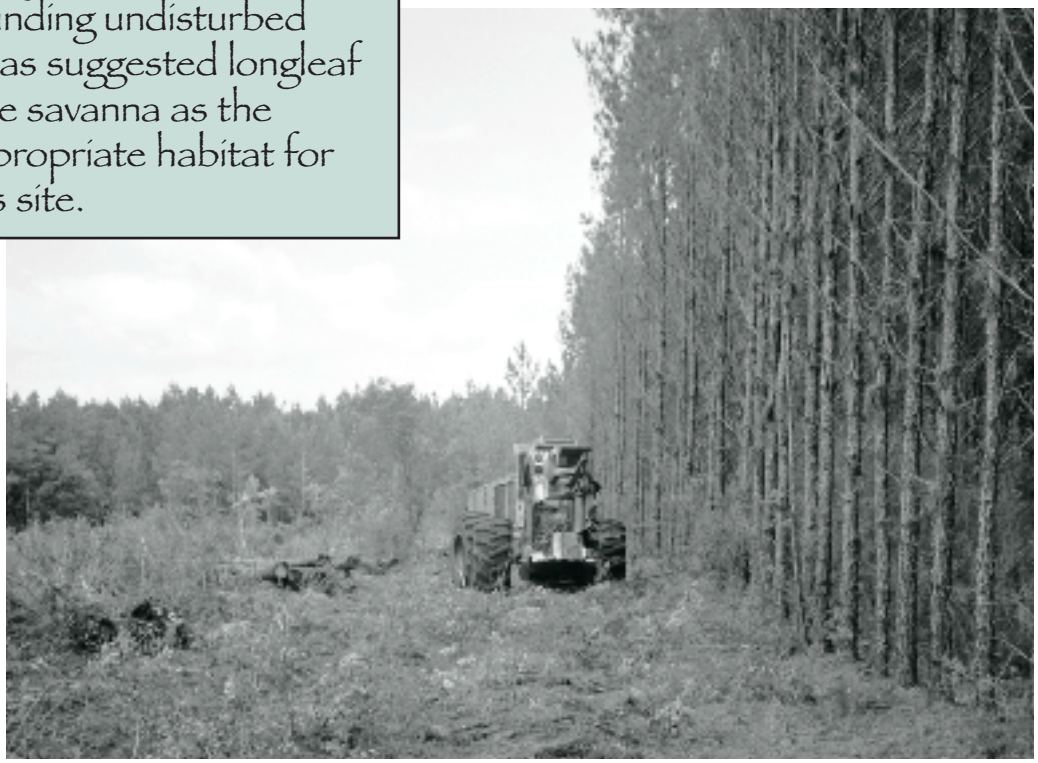

Figure 3. During the harvest, a feller-buncher cut selected trees. As part of site preparation for restoration, a roller-chopper flattened the high bed rows upon which loblolly trees had been planted. RICHARD BRYANT

The 1996 plan calls for subsequent seedling plantings three and seven years after the initial planting. One of the preliminary concerns of the longleaf pine

restoration was that this species is classified as a sub-climax species dependent upon recurring fires for perpetuation (Spurr and Barnes 1980). Because of the proximity of the property to Interstate 95 and the Jacksonville International Airport, prescribed fire is not a viable option. Therefore, both parties agreed to increase the number of seedlings planted in the first year, from 60 seedlings per "seed-tree site" to 100 seedlings. Castleton has donated sufficient funds to the National Park Service for planting 20,000 additional trees beginning in 2006.

In an effort to establish longleaf pine in the absence of fire, park managers decided to employ two different planting methods. In the smaller eastern area of approximately 49 acres (20 ha), contractors planted longleaf seedlings immediately after harvest and crushing. The larger western cleared area of approximately 244 acres (98 ha), which had also been treated with a roller-chopper, was allowed to lie fallow for six months and then planted with seedlings. Park staff will compare and evaluate survivorship of seedlings in the two areas before subsequent plantings. Depending on the results, mangers will select the method to be used during future plantings. Initial casual observations suggest that seedlings in the eastern area, which were planted immediately after harvest, are having a higher survival rate than those in the western site where land remained fallow for six months prior to planting.

Observations and management challenges

The disturbance of harvesting appears to have resulted in an unexpected benefit. Native wiregrass (*Aristida stricta*) has proliferated. Some important management challenges, nonetheless, exist. Wiregrass will not enter the reproductive phase unless burned, defoliated, or disturbed (Parrott 1967). Exotic plants have also invaded the site, the most prominent being Chinese tallow (*Sapium sebiferum*). Park staff is seeking funding to control the spread of this ornamental, fast-growing, small- to medium-sized tree at the site. The nearby Interstate 95, where mowing often takes place, is a potential source of invasive species, and monitoring for spread into the Thomas Creek area is necessary.

With regard to longleaf pine, the goal is survival of at least 30% of the planted seedlings, ensuring the establishment of longleaf pine and associated native vegetation such as wiregrass. Because widespread use of prescribed fire at the site is not possible, park staff is exploring the use of mowing and herbicide for preventing competing vegetation from overlapping the longleaf pine seedlings. In the future, if longleaf survivability falls below 30%, park staff may treat small plots with prescribed fire on a very limited basis to reduce competing vegetation.

Figure 4. As part of restoration of the Thomas Creek area, contractors planted 25,000 longleaf pine seedlings in October 2003. In order to imitate natural, intermittent regeneration, 10,000 additional trees will be planted in 2006 and another 10,000 in 2010. DANIEL R. TARDONA

Summary

While management challenges remain to ensure healthy reforestation, the project has been a success on many fronts. The National Park Service obtained desired land at a reduced price, and Castleton Beverage Corporation was able to recoup forest development costs. Additionally, the National Park Service did not have to use government funds to initiate the reforestation of a native longleaf pine savanna.

The project has resulted in the development of a positive relationship between the National Park Service and a portion of the local community that could easily have been at odds with the mission of the National Park Service and Timucuan Ecological and Historic Preserve. This very relationship will serve as a model for future partnerships

between the National Park Service and other potential partners in the region. The partnership achieved cost savings for both the government and the community. Moreover, this effort improved natural resources, including vegetation, wildlife, and scenic values, and the opportunity for public enjoyment of the Thomas Creek area. Perhaps unknown cultural resources hidden in the previously disturbed area may come to light.

Staff at Timucuan Ecological and Historic Preserve is accomplishing the goals for the Thomas Creek restoration area by working cooperatively and in partnership with a major local business corporation, which was a former landowner and is a current holder of land adjacent to the preserve. The project clearly demonstrates that partnerships between the National Park Service and private industry can be effective where each partner has a role in the project. The shared goal of harvesting the trees (though for different reasons) encouraged both entities to be committed to working as a team, sharing expertise and resources, and agreeing to clearly defined expectations (fig. 5). Mutual respect and trust for the missions of the park and Castleton Beverage Corporation fostered a spirit of cooperation and sometimes compromise. Ultimately, the result will be accomplishing a specific component of the Timucuan Preserve and NPS mission: to improve and sustain the resource conditions of the Thomas Creek area carried out in accordance with established NPS management policies and standards.

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Figure 5. Staff at Timucuan Ecological and Historic Preserve is working cooperatively with a major local business, Castleton Beverage Corporation, to restore the Thomas Creek area. The corporation was a former landowner and is a current holder of land adjacent to the preserve. Staffs from Castleton and the preserve have conducted many on-site meetings during the reforestation process. DANIEL R. TARDONA

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