

## **Restoring a Longleaf Pine Ecosystem at Allatoona Lake (Georgia)**

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The longleaf pine (*Pinus palustris*) ecosystem in the southeastern United States has been reduced to less than 3 million acres (1,200,000 ha) from its historic range of more than 60 million acres (24 million ha) (Boyer 1990) as a result of decreased exposure to a regular fire regime, a slow growth rate, and increased urbanization (Alliance 2002). The U.S. Army Corps of Engineers (USACE) has begun restoring this ecosystem to a 400-acre (160-ha) site that is part of a 24,000-acre (9,600-ha), USACE-managed property along Allatoona Lake, about 30 miles (48 km) northwest of Atlanta, Georgia. This site is located at the northern tip of the central portion of the longleaf pine's original documented range (Boyer 1990) in a region where few forests still contain longleaf pine components. Through our efforts, we hope to revive and maintain this once-dominant, highly diverse ecosystem, even if only on a small scale.

In 2002, USACE foresters began planning the restoration of a 60-acre (24-ha) forested tract on a remote site in the heart of the Allatoona Wildlife Management Area. We chose this site because a small number of longleaf pine trees were still present, showing that the site at one time contained a longleaf population. In addition, this site had the sandy clay, acidic soil with which longleaf pine is associated. (Boyer 1990).

In March 2003, the site was planted with container longleaf seedlings from a nearby nursery in Center, Alabama. After one year, it was clear that the seedlings were thriving and would successfully reestablish. In winter 2003, we evaluated the area and determined that the

project could be expanded to about 350 acres (140 ha) on an area to the east of the original site with the same soil type.

When clearing each location for site preparation, we were forced to consider not only what would benefit longleaf seedlings, but also what would benefit the area wildlife. Removal of all competition is generally the best option for longleaf regeneration, but the wildlife population at Allatoona Lake Project required some hardwood, particularly oak (*Quercus* spp.). We chose to thin small stands of oak within the planting area, which left a large portion of the canopy intact on those sites but still allowed sunlight to reach the ground. In the streamside management zones, we removed only competing pines and sweetgum (*Liquidambar styraciflua*) trees, leaving more trees in place for cover, food, and more diversity on the site. In addition, when we expanded the project, we decided to leave a majority of the remaining mature longleaf pine overstory intact and attempt natural regeneration of a small (roughly 10 acres or 4 ha) portion of the project area.

Although herbicides are generally used in site preparation for longleaf pine planting, we decided against applying a chemical treatment in order to preserve the natural regeneration of grasses, shrubs, and other native plants. Instead, we conducted a prescribed fire after allowing vegetation to regenerate for one year. This proved to be a positive step. During the first year, several native plant species regenerated that may have been damaged or lost if herbicides had been applied, including post oak (*Quercus stellata*), blackjack oak (*Q. marilandica*), little bluestem (*Schizachyrium scoparium*), goat's rue (*Tephrosia virginiana*), blueberry (*Vaccinium* spp.), and bracken fern (*Pteridium aquilinum*). All of these species are indicators of a regular fire regime and are often associated with the longleaf pine understory (Boyer 1990). Prior to restoration, blueberry (*Vaccinium* spp.) was the only species among these that could be found on

the site. It only occurred in small areas on ridge tops. Weedy species, such as sweetgum (*Liquidambar styraciflua*) and black cherry (*Prunus serotina*), dominated the site prior to restoration.

Contractors hand-planted longleaf seedlings at a density of 400 trees per acre (160 trees/ha) shortly after the burn. This open planting density was used in order to preserve the understory grass component of the site and to mimic the more-open patterns of natural longleaf stands (Alliance 2002). The result will be a savanna-type, grassland understory with an open forest canopy allowing large quantities of sunlight to reach the forest floor. Future plantings may be necessary to replace areas of tree mortality.

Future management tools for the project site include prescribed fire and some mechanical thinning of competing pines so that we can achieve the goal of restoring a forest dominated by longleaf pine. Our greatest challenge will be controlling invasive species. The site has a large population of Russian olive (*Elaeagnus angustifolia*), tree-of-heaven (*Ailanthus altissima*), Chinese privet (*Ligustrum sinense*), and some Japanese stilt grass (*Microstegium vimineum*). These species may be controlled by herbicide application in the future. Development of neighboring areas poses another, ongoing challenge. The continued expansion and development of the metro Atlanta area has put considerable pressure on USACE land and makes conducting prescribed fire operations increasingly difficult.

Burn plans must account for any smoke sensitive areas nearby. As more subdivisions are built in the vicinity of Allatoona Lake, burning windows become smaller as conditions must be perfect for a given site before burning can take place. Prescribed fires play an essential role in maintaining the longleaf pine forest and its understory and without them more competitive volunteer pines and hardwoods will likely choke out less competitive longleaf seedlings.

With continued management, we hope this site will serve as an opportunity to showcase a diverse and important ecosystem in the heart of one of the fastest growing areas of the country.

#### **REFERENCES**

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