Longleaf pine (Pinus palustris P. Mill.) forest ecosystems once encompassed 37 million hectares in the southeastern United States. These vast forests extended from Virginia southward to central Florida and westward to eastern Texas. Today, longleaf pine has all but disappeared as a dominant species. Longleaf forests occupy fewer than 1 million fragmented hectares, less than 3% of its original range, and are one of the most threatened ecosystems in the U.S.

From 1870 to the early 1930s, the southern forest was cut. Some inroads had been made prior to this but the advent of railroads through the South opened the area to extensive logging (Jose et al., 2006). This was followed by regeneration failure of the longleaf pine overstory. Seeds of longleaf pine are irregularly produced and have many predators. In addition, naturally occurring longleaf pine seedlings may stay in the grass stage for several years. When the longleaf forests were harvested, many of the seedlings that did bolt from the grass stage were a favorite food source of the exploding feral hog population (Jose et al., 2006). Wild hogs were at one time so prevalent they supported a meat-packing industry in the South. When fire suppression became common practice, longleaf pine stand regeneration was doomed.

By this time, longleaf pine was considered by many landowners to be inferior; it was perceived as difficult to regenerate, slow growing, unproductive, and chancy. When an economic return on timber investment was the desired end product, why plant longleaf pine when loblolly pine (Pinus taeda L.), fast growing and easy to regenerate, was there to fill the gap?

Current Status

The existing southern landscape is under ever-increasing pressures, with social values, economic demands, and natural events resulting in forest fragmentation, urban sprawl, insect and disease outbreaks, and proliferation of invasive species. In recent years, catastrophic hurricanes have inflicted billions of dollars in damage on southern states; and wildfire represents a constant threat to southern forest resources. Forest managers in the South often face conflicting objectives. Once asked how to best prepare a site, which genetically superior lines to plant, when to thin, when to cut, and how to maximize forest value for landowners, they are now asked how to best defend against invasive species, what can be done to prevent major insect infestations, and when should forests be cut and wood salvaged? How can timber resources be protected from damage or loss when major disturbances, such as wildfires and hurricanes, occur? In some cases, the only answer might be that, if the forest is planted with species vulnerable to insect attack or high winds, damage will occur.

The Case for Longleaf Pine

When deciding what to replant on forested areas, landowners must now consider many risk factors that often favor longleaf pine and its associated communities. Longleaf pine evolved in the southern hurricane zone; its seedlings are uniquely adapted to take advantage of gaps created in the overstory. Longleaf pine trees stand up well to hurricane-force winds, and longleaf pine ecosystems are fire-adapted. Longleaf pine is now recognized as a species with great natural resilience.

Longleaf pine ecosystems are among the most diverse in the continental U.S., often with 40 or more species of higher plants per square meter (Walker and Peet 1984). These ecosystems provide excellent habitat for many game species and are home to numerous threatened and endangered species of animals, including red cockaded woodpeckers, pine snakes, and gopher tortoises. An important attribute of longleaf pine ecosystems is their unique ability to resist and recover from what for other southern pines would be catastrophic events. Adapted to fire, responsive to gaps in the overstory, able to bolt from the grass stage – their unique physiology prepares them for rapid recovery after hurricanes and lightning-caused fires. It was only exploitation and neglect that reduced longleaf pine ecosystems from a dominant to marginal existence.

Now, only our intervention can bring these valuable ecosystems back from obscurity. In the 1930s, it was thought that excluding fire from longleaf pine stands would enable them to recover. Now it is recognized that it is fire that...
species and promoting longleaf pine growth and dominance of the landscape. In the 1930s, longleaf pine was considered too slow to grow, too uneconomical to manage and not productive. So loblolly and slash pine plantations proliferated throughout the South. Now it is known that these species, especially loblolly pine, are more susceptible to wind damage and breakage in hurricane-force winds and are highly vulnerable to insects, disease, and fire.

The resilience of longleaf pine ecosystems is what makes them so attractive to landowners facing recovery from devastating timber losses after Hurricanes Ivan, Katrina, and Rita. In addition to timber products, the landowner can harvest intermediate products, such as pine straw, and draw additional benefits from the wildlife that inhabit these unique forest ecosystems. Further, not only does longleaf pine have a high resistance to the southern pine bark beetle but growth and yield models also show that productivity of planted longleaf pine eventually catches and surpasses that of loblolly pine. Lastly, through intensive research programs, we have overcome many of the difficulties surrounding regeneration of longleaf pine.

In response to the rapidly growing demand for information about longleaf pine ecosystems, the U.S. Forest Service, Southern Research Station, has established a new research work unit, Restoring and Managing Longleaf Pine Ecosystems (SRS-4158). The unit has seven scientists with expertise in plant physiology, ecology, silviculture, and biometrics. Two experimental forests, the Palustris and the Escambia, provide a land base for practical experiments in and demonstrations of longleaf pine establishment, development, and management. Headquartered in Auburn, AL, scientists in the unit are also stationed at Clemson, SC and Pineville, LA, providing broader customer access and research opportunities in a variety of longleaf pine ecosystems. For more information, contact Kristina Connor, Project Leader SRS-4158. Phone (334) 826-8700; fax (334) 821-0037; email kconnor@fs.fed.us

References
