

Excerpts from **Forestry and Tree Planting in North Carolina**

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Abstract

North Carolina's forests cover more than 18.6 million acres (7.5 million hectares), equaling more than 59 percent of the State's land area. Nearly 97 percent of this forest land is capable of timber production. Forestry contributes more than \$6 billion annually to the State's economy. The State's forests are genetically and commercially diverse and support more than 60 major tree species. Many other species are also important to the State's native forest ecosystems. Major forest types are oak and hickory; loblolly and shortleaf pine; oak, gum, and cypress; oak and pine; and longleaf pine. State forestry programs support these species, other important species, and ecosystem restoration efforts. More than 50 million tree seedlings are planted annually, 16 million of which are produced by State nurseries. While most of these seedlings are softwoods, local hardwood seed is also collected and expansion of container seedling operations continues. Inroads have been made in growing more specialty species for wetland and streambank restoration needs. Understory herbaceous plants are also being grown for longleaf pine ecosystem restoration projects. Support for the State nursery is still strong, and landowners are encouraged to plant and reforest lands as part of their long-term forest management.

Forest Land Ownership

Approximately 14.1 million acres (5.7 million hectares), or about 78 percent of the State's timber land, is owned by non-industrial private forest (NIPF) landowners (figure 5). The proportion of NIPF ownership is 91 percent in the Piedmont, 74 percent across the Coastal Plain, and 70 percent in the Mountains. Ownership by timber investment management organizations has been increasing in the past decade. Forest industry timber land ownership accounts for 8 percent of all timber land (14 percent of Coastal Plain, 3 percent of the Piedmont, and 1 percent of the Mountains).

Timber land ownership by public agencies accounts for 14 percent of all timber land in the State. Public ownership of timber land has increased by about 10 percent since 2002. Public ownership is highest in the mountains, largely due to National Forest System holdings there.

Challenges Facing the State's Forests

Urbanization

As the North Carolina population grows, so does the rural-urban interface. This expanding interface increases demand on forests for water, recreation, and aesthetics, as well as for traditional wood products. Incoming residents in these areas are typically unfamiliar with North Carolina's native forest ecosystems, management practices, and wildfire danger. Green corridors are becoming narrower and disjointed and some forests are becoming smaller. Many of the ownerships in this interface are only a few acres (hectares) in size.

Insects and Diseases

The southern pine beetle (*Dendroctonus frontalis* Zimmerman) is the most destructive forest insect in North Carolina, attacking trees of all age classes. Populations are cyclical; a beetle population-monitoring program is in place. Ips engraver beetle (*Ips* spp.) is the second most destructive insect pest in the State.

Young loblolly pine seedlings are susceptible to pine tip moth (*Rhyacionia* spp.) and to fusiform rust (*Cronartium quercuum* f. sp. *fusiforme* [Hedgc. & N. Hunt] Burdsall & G. Snow), especially when the alternate host is present. Genetic improvement of loblolly pine has made great strides in finding resistant families. These families are now recommended for high rust hazard sites.

Shortleaf pine (*Pinus echinata* Mill.) is susceptible to fusiform rust, pitch canker (*Fusarium subglutinans* (Wollenweb. & Reinking) P.E. Nelson, Toussoun & Marasas f. sp. pini), and littleleaf disease (*Phytophthora cinnamomi* Rands).

Phytophthora is becoming endemic and also kills Fraser fir (*Abies fraseri* [Pursh.] Poir.). Eastern white pine is resistant and is recommended as an alternative species to Fraser fir on those sites, which are infected with Phytophthora. Eastern white pine, however, is susceptible to white pine blister rust, (*Cronartium ribicola* J.C.Fisch.) and white pine weevil (*Pissodes strobi* Peck). Combined, these pests reduce the value of white pine in the State.

Longleaf pine shows a high resistance to fusiform rust, tip moth, and fire (Barnard and Mayfield 2009) but is susceptible to pitch canker. Brown-spot needle blight (*Scirrhia acicola* [Dearn.] Siggers.) is also a problem.

More details regarding North Carolina's current forest health are available in the 2010 Forestry Assessment (Bardon and others 2010).

Drought

Currently, most of the North Carolina Piedmont is in a severe drought (NCDMAC 2011). Surrounding areas are designated as being in moderate drought. In recent years, drought has played a significant role in the occurrence and severity of forest fires.

Wildfire

North Carolina has a distinct forest fire season. This season has been extended due to the recent drought conditions affecting the State. In addition, fires have become more serious due to the increase in the number of residents living in the rural-urban interface. This situation is problematic due to the extent of fire-dependent ecosystems that are present.

Tree Production and Planting in North Carolina

Across the State, trees are typically planted for traditional forest products such as poles, timber, pulpwood, pine straw, watershed, wildlife, aesthetics, as well as for ecosystem restoration, biomass production, landscape plants, and Christmas trees. Older, natural hardwood stands are usually harvested to supply lumber to the furniture industry and pulpwood.

The most planted species in North Carolina is loblolly pine, which is the economic forestry giant in the State. Essentially all of these seedlings are genetically improved. The next most planted species is longleaf pine. More than 50 million forest tree seedlings are typically planted in North Carolina each year (table 3). These quantities are expected to remain at this level during the next few years.

For stand establishment, weed control is one of the most important cultural practices undertaken before planting (site preparation) and during early stand establishment. If weed control is not vigorously undertaken, an entire young stand can be lost.

Stand spacing depends on site and species. Pine stand spacing ranges from 400 to 600 trees per acre (tpa), while hardwoods are typically planted at 350 to 500 tpa. AWC seedlings are typically planted at closer spacings (1,500 to 1,700 tpa). Third cycle loblolly pine require wider spacing to allow the trees to grow more freely.

Restoration Projects

Longleaf Pine Restoration

Recognizing the declining longleaf forest acreage, the NCDNR implemented the Longleaf Pine Restoration Initiative. The initiative focuses on artificial forest regeneration as the primary means to restore longleaf pine to sites where it was historically found and adapted to, especially in the southern Piedmont

and Coastal Plain (figure 9). An average of 5,000 acres (2,023 hectares) of longleaf pine seedlings are now planted annually (NCDNR 2009b). Longleaf pine ecosystem restoration has also gained importance in recent years with increased production of seedlings and seeds of understory species.

Shortleaf Pine Restoration

For a variety of reasons, artificial regeneration of shortleaf pine has lagged behind other species. An average of 110 acres (44.5 hectares) of shortleaf was planted each year between 2005 and 2009 on NIPF land (NCDNR 2009a). A number of cost-share assistance programs support shortleaf pine establishment on private lands. North Carolina's FDP is the primary State-administered financial assistance program supporting shortleaf establishment, although the federally funded Environmental Quality Incentives Program, a program of the U.S. Department of Agriculture, Natural Resources Conservation Service, also funds the planting of shortleaf pine. NCDNR helps to develop management plans and provide technical expertise for these programs.

Atlantic White Cedar Restoration

Atlantic white cedar (AWC) was once a common forest type in North Carolina coastal wetlands, but has decreased to less than 10 percent of its original range. Most of the estimated 10,583 acres (4,283 hectares) remaining in North Carolina are on public lands. Exploitive logging, natural regeneration failure, absence of artificial regeneration, drainage effects, fire exclusion, and lack of competition control are cited as reasons behind the decline of AWC forests. North Carolina has identified AWC as a species of concern. NCDNR promotes conservation, restoration, and planting of AWC by providing forest management advice, conducting applied forest management research, and providing workshops and inhouse training.

Future Outlook for Tree Planting in North Carolina

As in most Southern States, urbanization is reducing the land area available for producing traditional forestry products in North Carolina. The acreage of the rural-urban interface is also growing resulting in more people living within native fire ecosystems. Risks to these residents from wildfire have increased. Demand for forest resources is also changing. While the demand for traditional products like pulp, timber, and poles is increasing, more residents also believe more forests are needed to provide clean water, wildlife, aesthetic value, and recreational environments.

More efficient use of North Carolina's forest land base is required. Use of more productive and disease-resistant, genetically improved trees is necessary. The best forest lands must be planted with the best trees and intensively managed with the most appropriate cultural practices. The number of acres planted annually has declined during the past few years. Productivity on every acre has increased, however. Potential productivity of forest land in the State is lost when a site is planted without using appropriate long-term stand management practices.

Some Southern States have closed their nurseries, but support in North Carolina is still strong. In fact, demand for seedlings from the two State nurseries appears to be increasing.

