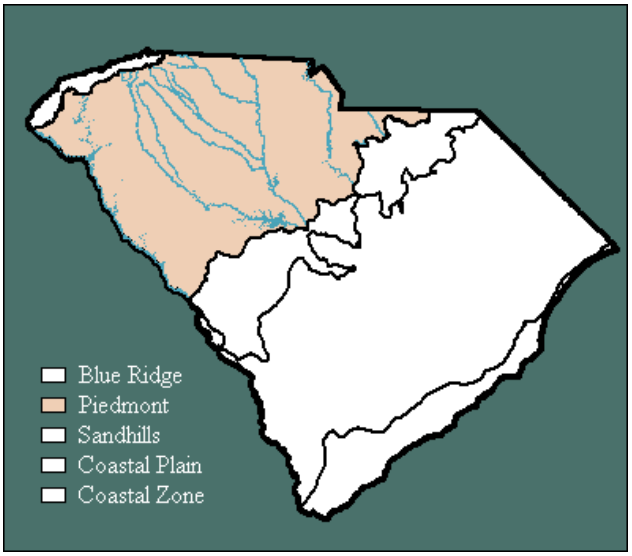
Piedmont Ecoregion Terrestrial Habitats

Description and Location



The Piedmont Ecoregion occupies an area between the Southern Blue Ridge Escarpment and the Sandhills Ecoregion. The northwestern boundary is generally considered to be the base of the Blue Ridge Escarpment; the division between the crystalline rocks of the piedmont and the sedimentary rocks of the sandhills represents the southeastern boundary of this ecoregion. The piedmont-sandhill contact zone is marked in many river channels by shoals and rock ledges that collectively form the fall line. Gently rolling hills with many stream-cut valleys characterize the region with only a few level floodplains. In the lower piedmont, there are relatively few sharp breaks in topography except along major river valleys.

Habitats and Priority Species

The rolling uplands of the piedmont landscape are predominantly a mosaic of agricultural land and managed woodland, with a history of clearing and economic use that dates back to the earliest times of European settlement. Hardwood-dominated forests occupy relatively narrow floodplains and scattered upland sites, while pine and pine-hardwood forests occupy the majority of forested upland sites. The resulting landscape does not constitute suitable habitat for many area-sensitive wildlife species or for species associated with either early-successional or late-successional conditions. Most of the priority species considered in the CWCS that occur in the piedmont fall into one or more of these categories.

Oak-hickory Forest

General Description and Location
Occurring throughout the state but most characteristic of rolling uplands in the piedmont, oak-hickory forest is a widely distributed community that varies from site to site. Occurring in highly fragmented stands, later successional stages tend to be made up of a diverse assemblage of hardwoods, primarily oaks and hickories, as co-dominants in combination with pines. Understory, shrub and herbaceous layers are present in varying degrees, represented by diverse woody and non-woody species. Vegetation on most sites consists of early- to mid-successional managed stands of pine and pine-hardwood forest. The understory in pure pine stands is often open, but in mixed or older stands, it is dominated by the hardwoods characteristic of the site. Common pine species of the piedmont include shortleaf (*Pinus echinata*) and loblolly (*P. taeda*), with the former better adapted to dry, fine textured upland soils and loblolly achieving maximum growth on deep soils with good moisture and drainage.

Associated Species

Highest Priority:	American Kestrel, Eastern Wood Pewee, Red-cockaded Woodpecker, Wood Thrush, Pine Snake
High Priority:	Pine Woods Snake
Moderate Priority:	Scarlet Tanager, Eastern Fox Squirrel

River Bottoms

General Description and Location

River bottoms, or "bottomland forests" consist of hardwood-dominated woodlands with moist soils that are usually associated with major river floodplains. Characteristic trees include sweetgum (*Liquidambar styraciflua*), loblolly pine (*Pinus taeda*), water oak (*Quercus nigra*), willow oak (*Quercus phellos*), laurel oak (*Quercus laurifolia*), cherrybark oak (*Quercus pagoda*) and American holly (*Ilex opaca*). A subtype dominated by bald cypress (*Taxodium distichium*) and water tupelo (*Nyssa aquatica*) occurs on lower elevation sites, but is not as prevalent as in the broader floodplains of the coastal plain. Compared to the coastal plain, the floodplains of major rivers in the piedmont are confined by topography to relatively narrow corridors.

Associated Species

Highest Priority:	Black-throated Green Warbler, Kentucky Warbler, Little Blue Heron, Rusty Blackbird, Swainson's Warbler, Yellow-crowned Night Heron, Black Bear, Northern Yellow Bat
High Priority:	Acadian Flycatcher, American Alligator, Black Swamp Snake, Gulf Coast Mud Salamander, River Cooter, Spiny Softshell Turtle, Striped Mud Turtle, Mink, Rafinesque's Big-eared Bat, Southeastern Bat, Star-nosed Mole
Moderate Priority:	American Woodcock, Great Blue Heron, Great Egret, Louisiana Waterthrush, Wood Duck, Bird-voiced Treefrog, Common Snapping Turtle, Spotted Turtle, Eastern Woodrat, Eastern Fox Squirrel

Piedmont Small Stream Forest

General Description and Location

Piedmont small stream forests are distinguished from forest communities on larger floodplains because of differences between the scales of the ecosystems. In smaller floodplains, the levees, sloughs and ridges are largely absent or poorly developed. Flooding regime is also more variable between small watersheds than larger ones. Soils are various alluvial types that are seasonally or intermittently flooded. The forest has an open to dense understory or shrub layer and a sparse to dense herb layer. The canopy has a mixture of bottomland and mesophytic trees including river birch (*Betula nigra*), sycamore (*Platanus occidentalis*), sweetgum (*Liquidambar styraciflua*), tulip tree (*Liriodendron tulipifera*), American elm (*Ulmus americana*), hackberry (*Celtis laevigata*), green ash (*Fraxinus pennsylvanica*) and red maple (*Acer rubrum*).

Associated Species

Highest Priority:	Kentucky Warbler, Little Blue Heron, Rusty Blackbird, Wood Thrush, Yellow-crowned Night Heron, Tiger Salamander

High Priority: Acadian Flycatcher, River Cooter, Spiny Softshell Turtle, Yellowbelly Turtle, Mink, Swamp Rabbit
Moderate Priority: Great Blue Heron, Great Egret, Louisiana Waterthrush

Cove Forest

General Description and Location
Cove forests are botanically diverse, well-developed hardwood forests occurring on scattered rich and generally small sites (less than 200 acre). Usually, these forests occur on protected bluffs in association with small stream forests or river bottoms. No single species tends to dominate. Shrub species are usually numerous and the herbaceous flora is fairly rich, with many spring ephemerals. Canopy and understory is composed of hardwoods including beech (*Fagus grandifolia*), tulip tree (*Liriodendron tulipifera*), black gum (*Nyssa sylvatica*), sourwood (*Oxydendrum arboreum*), white oak (*Quercus alba*), northern red oak (*Q. rubra*), black oak (*Q. velutina*), sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), southern sugar maple (*A. saccharum*), basswood (*Tilia heterophylla*), ironwood (*Carpinus caroliniana*), flowering dogwood (*Cornus florida*), American holly (*Ilex opaca)*, witch-hazel (*Hamamelis virginiana)* and hop-hornbeam (*Ostrya virginiana*).

Associated Species
Highest Priority: Eastern Wood Pewee, Kentucky Warbler, Wood Thrush, Webster's Salamander
High Priority: Four-toed Salamander
Moderate Priority: Scarlet Tanager

Grassland and Early Successional Habitats

General Description and Location
A variety of open habitats occupies a considerable portion of upland sites in the piedmont, including agricultural land, recently abandoned farmland, recently cleared land and a matrix of managed open pine forest and grassland. Golf courses, urban yards and open spaces are also included in this habitat type. The vegetation on most sites is oak-hickory forest, although many sites are maintained in early successional stages.

Associated Priority Species
Highest Priority: Eastern Meadowlark, Field Sparrow, Grasshopper Sparrow, Loggerhead Shrike, Northern Bobwhite, Southern Hognose Snake
High Priority: Barn Owl, Meadow Vole
Moderate Priority: American Woodcock, Bewick's Wren

General Condition of Habitats

To a greater degree than in other regions, the vegetation in the piedmont has been altered by human activity. Cotton agriculture changed much of the original hardwood and shortleaf pine (*Pinus echinata*) forests into fields. Fields eroded, often losing all topsoil. By the 1930's various

factors including the Great Depression and boll weevil outbreaks as well as severe erosion led to widespread farmland abandonment in the piedmont.

Loblolly pine (*Pinus taeda*) was introduced to the piedmont during the nineteenth century as a cash lumber crop; this pine now dominates much of the region. According to a U.S. Forest Service survey, loblolly-dominated pine forests occupy over two million acres in South Carolina's piedmont (Conner and Sheffield 2000). However, pine plantations are generally poor wildlife habitat, lacking in both food and cover needed by native wildlife.

FOREST TYPE	AREA (acres x 1000)
White-red-jack pine	9.8
Loblolly-shortleaf	2074.0
Oak-pine	668.0
Oak-hickory	1466.5
Oak-gum-cypress	63.2
Elm-ash-cottonwood	145.2
Non-stocked	2.0

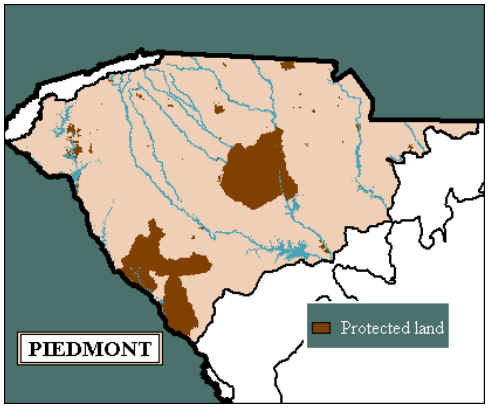
Although loblolly pine plantations are found throughout the region, they are much more prevalent in some areas, in particular the southwestern piedmont. By contrast, habitat in the vicinity of York County retains substantial, if fragmented, acreage of hardwood forest. Kings Mountain State Park features a good example of piedmont upland hardwood forest.

By definition, early successional habitats have a limited longevity without repeated disturbance. The habitat structure and vegetative composition changes as succession progresses; many wildlife and plant species are adapted to different stages within the early successional continuum from bare earth through mature forestland. Managing for species dependent upon early successional habitats presents several management challenges, including the need to identify which successional stage is most appropriate for the species or assemblage of interest, and the need for repeated management actions to maintain suitable habitat.

The extent and quality of early successional habitats has been greatly dependent upon human land use patterns. While there is some uncertainty as to the extent of early successional habitats prior to European settlement, it is likely that many early successional species' populations peaked in the early 1900's with extensive forest clearing and low-intensity agricultural operations. In the second half of the 20th century, the quantity and quality of early successional habitats diminished due to fire reduction, increasing development, encroachment of exotic vegetation, changing agricultural and forestry practices and fragmentation of habitat patches into small isolated units (Cobb et al. 2002; Johnson and Igl 2001; Thompson and DeGraaf 2001; Warner 1994). Populations of many species that depend on these habitats have also declined during this time period (Hunter et al. 2001).

Historically, the piedmont in York County contained some prairie-type habitats (Barden 1997) with high plant and insect diversity. Around the time of colonization, these piedmont prairies were maintained through fire and herbivore grazing. Today, remnant tracts of prairie are found primarily along powerline right-of-ways and sites managed specifically for prairie restoration and maintenance.

A considerably smaller portion of forestland is in public ownership in the piedmont than in the Blue Ridge region. The U.S. Forest Service is the primary agent of land protection in the piedmont, with two large Ranger Districts of the Sumter National Forest, the Long Cane and the Enoree, located within the region. However, actual public ownership within the authorized National Forest boundaries is extremely fragmented. Most of the land in the piedmont is held by corporate or other private ownerships not associated with the forest product industry (Conner and Sheffield 2000).



Public holdings and private conservation lands in the Piedmont. The two large brown areas in the central and western portions of the region represent U.S. Forest Service "proclamation boundaries", not actual Forest Service ownership.

OWNER	AREA (ha)
Clemson University	9823.94
John De La Howe School	558.15
National Park Service	2324.33
South Carolina Department of Natural Resources	3587.76
South Carolina Department of Parks, Recreation & Tourism	7517.27
South Carolina Forestry Commission	1227.21
United States Army Corps of Engineers	8142.62
United States Forest Service	114456.61
Other	3291.43
Total	**150929.33**

Severe soil erosion during the 19th and early 20th centuries has had lasting effects beyond the obvious changes to piedmont uplands. When large quantities of soil were carried down from cotton fields and denuded forests, a portion of the soil was deposited onto piedmont floodplains (Fox 2000). Today, there is an average of 1.2 meters of surficial sediments, not present prior to European colonization, in the floodplains of most piedmont streams. Streams typically continue to flow at the original level; therefore, many modern streams are deeply entrenched with one or both banks rising abruptly to about 1.2 meters above the streambed.

Even though agricultural land use practices improved and farming declined during the 20th century, floodplain sediments persist, overlying former piedmont wetlands. These wetlands probably featured numerous depressions of swamp tupelo (*Nyssa biflora)* and willow oak (*Quercus phellos)* that served as natural green-tree reservoirs for ducks and other wildlife (Ron Ahle, SCDNR, pers. comm.). Over time, floodplain sediments will be transported downstream as meandering streams erode and re-deposit sediments, but this is a slow process and is hampered, in some cases, by stream channelization.

Region-wide Challenges

The primary factor influencing habitat quality and quantity in the piedmont is urban sprawl. Since World War II, population growth in the piedmont has been rapid, outpacing growth in the United States as a whole. Migration from other regions of the United States as well as international immigration has fueled this growth. Both population growth and the land use patterns that have accompanied it have contributed to sprawl (Rusk 2003).

Urbanized Area	Urbanized Acreage Per New Resident
USA (396 areas)	0.18
Spartanburg	0.88
Greenville	0.93
Anderson	0.99
Rock Hill	1.01

Low-density development contributes to habitat fragmentation, which impacts many fish and wildlife species. In the piedmont, development has been particularly rapid in association with the interstate highway system. Habitat fragmentation also hinders the use of prescribed fire. Most of the priority species for this habitat decline as development encroaches. While most birds can rapidly find and colonize early successional habitat patches, some bird species (grassland birds in particular) are area sensitive and will not use small patches of habitat surrounded by forest or developed areas. The northern bobwhite may require large areas of contiguous habitat (greater than 5,000 acres) for long-term population viability (Guthery et al. 2000). The isolation of suitable early successional habitats may be most problematic for mammals, reptiles and amphibians that have limited dispersal ability and may suffer high mortality when traveling through unsuitable habitats.

The U.S. Forest Service has identified invasive species as one of the top threats to forests in the United States in the twenty-first century (Oswalt, 2004). All parts of South Carolina are affected by invasive exotics, but data from the Forest Inventory Analysis (FIA) indicates that the forests of the piedmont, where 72 percent of sampled plots contained at least one exotic plant, have been highly impacted. The South Carolina Exotic Pest Plant Council (2004) identifies the following plants as severe exotic plant pest species in the Piedmont Ecoregion:

- Shrubs: Russian Olive (*Elaeagnus angustifolia*), Thorny Olive (*Elaeagnus pungens*), Autumn Olive (*Elaeagnus umbellata*), Japanese Privet (*Ligustrum japonicum*), Multiflora Rose (*Rosa multiflora*)
- Vines: Kudzu (*Pueraria lobata*), Chinese Wisteria (*Wisteria sinensis*), Asian Wisteria (*Wisteria floribunda*),
- Herbs: Wart Removing Herb (*Murdannia keisak),*
- Grasses: Japanese stilt grass (*Microstegium vimineum*), Bahia grass (*Paspalum notatum*)

Concerns about liability, air quality, social acceptance and smoke management, as well as lack of landowners with experience and equipment to conduct prescribed burns has limited the use of fire on private lands. Similar to the coastal regions, fire once was an important natural feature of

the piedmont (Frost 1998). Pre-settlement oak-hickory forests experienced surface fires that were frequent and of low intensity, sustained by fine grass, pine needles and hardwood litter. Absence of fire leads to forest stands dominated by fire- intolerant species such as maple, beech and sweet gum. The pre-settlement mean fire return interval was four to six years in many parts of the piedmont, while in certain places fires burned almost every year. Early European explorers described small, open prairies on the upper piedmont maintained by annual fall burns conducted by Native Americans.

Piedmont prairies contain highly diverse and specialized plant and insect communities and only small remnant tracts remain in South Carolina. Fire and/or other low intensity soil disturbances such as light discing at the proper time of year are necessary to maintain prairie communities. Current restoration efforts are focused on plant conservation and have been implemented on small acreages that have limited value for area-sensitive grassland species such as the grasshopper sparrow and the eastern meadowlark.