

One x One Degree
Climate Change Atlas Tree Species
 Current and Potential Future Habitat, Capability, and Migration

Area of Region sq. km sq. mi FIA Plots
 8,852.3 3,417.9 327

Species Information

The columns below provide brief summaries of the species associated with the region and described in the table on the next pages. Definitions are provided in the Excel file for this region.

| Genus | Species | Abundance | | Model | | Potential Change in Habitat Suitability | | Capability to Cope or Persist | | Migration Potential | | | | | |
|---------|-----------|-----------|-----------|-------------|--------------|---|----------------|-------------------------------|----------------|---------------------|-------------|-----------|---------|---|----|
| | | | | Reliability | Adaptability | Scenario RCP45 | Scenario RCP85 | Scenario RCP45 | Scenario RCP85 | SHIFT RCP45 | SHIFT RCP85 | | | | |
| Ash | 4 | | | High | 12 | 15 | Increase | 18 | 18 | Very Good | 8 | 10 | Likely | 1 | 2 |
| Hickory | 3 | | | Medium | 33 | 44 | No Change | 9 | 8 | Good | 8 | 8 | Infill | 6 | 8 |
| Maple | 1 | Abundant | 3 | Low | 26 | 12 | Decrease | 13 | 14 | Fair | 7 | 5 | Migrate | 1 | 7 |
| Oak | 8 | Common | 18 | FIA | 3 | | New | 10 | 14 | Poor | 8 | 9 | | 8 | 17 |
| Pine | 5 | Rare | 22 | | | | Unknown | 24 | 20 | Very Poor | 7 | 7 | | | |
| Other | 22 | Absent | 28 | | | | | | | FIA Only | 3 | 3 | | | |
| | 43 | | 71 | | 74 | 71 | | 74 | 74 | Unknown | 21 | 17 | | | |
| | | | | | | | | | | | 62 | 59 | | | |

Potential Changes in Climate Variables

Temperature (°F)

| Scenario | 2009 | 2039 | 2069 | 2099 | |
|----------------|------|------|------|------|--|
| Annual | 70.2 | 71.6 | 73.1 | 73.1 | |
| Average | 70.2 | 71.8 | 73.8 | 75.9 | |
| GFDL45 | 70.2 | 72.6 | 74.4 | 75.2 | |
| GFDL85 | 70.2 | 72.6 | 75.5 | 78.8 | |
| HAD45 | 70.2 | 71.8 | 74.0 | 75.2 | |
| HAD85 | 70.2 | 72.4 | 74.8 | 78.2 | |
| Growing Season | 79.7 | 80.8 | 82.0 | 82.2 | |
| May—Sep | 79.7 | 80.9 | 83.0 | 85.4 | |
| GFDL45 | 79.7 | 81.9 | 83.7 | 84.7 | |
| GFDL85 | 79.7 | 82.1 | 84.8 | 88.5 | |
| HAD45 | 79.7 | 81.9 | 83.8 | 85.0 | |
| HAD85 | 79.7 | 82.3 | 85.4 | 88.5 | |
| Coldest Month | 55.0 | 57.2 | 58.1 | 57.8 | |
| Average | 55.0 | 56.6 | 57.6 | 59.0 | |
| GFDL45 | 55.0 | 57.6 | 58.0 | 58.7 | |
| GFDL85 | 55.0 | 57.2 | 58.3 | 59.3 | |
| HAD45 | 55.0 | 54.8 | 56.1 | 56.7 | |
| HAD85 | 55.0 | 55.5 | 56.3 | 58.1 | |
| Warmest Month | 82.1 | 83.3 | 84.1 | 84.1 | |
| Average | 82.1 | 83.3 | 84.6 | 85.9 | |
| GFDL45 | 82.1 | 84.2 | 85.0 | 85.7 | |
| GFDL85 | 82.1 | 84.3 | 85.8 | 87.7 | |
| HAD45 | 82.1 | 84.6 | 85.4 | 86.0 | |
| HAD85 | 82.1 | 84.7 | 86.5 | 87.8 | |

Precipitation (in)

| Scenario | 2009 | 2039 | 2069 | 2099 | |
|----------------|------|------|------|------|--|
| Annual | 50.6 | 53.8 | 55.3 | 55.9 | |
| Total | 50.6 | 53.2 | 53.9 | 54.1 | |
| GFDL45 | 50.6 | 59.7 | 61.0 | 62.9 | |
| GFDL85 | 50.6 | 55.1 | 63.6 | 61.4 | |
| HAD45 | 50.6 | 48.4 | 46.8 | 50.1 | |
| HAD85 | 50.6 | 46.8 | 46.3 | 44.0 | |
| Growing Season | 30.0 | 32.1 | 31.7 | 32.4 | |
| May—Sep | 30.0 | 31.5 | 32.0 | 30.9 | |
| GFDL45 | 30.0 | 35.8 | 36.3 | 36.7 | |
| GFDL85 | 30.0 | 33.7 | 38.5 | 37.5 | |
| HAD45 | 30.0 | 28.9 | 27.5 | 26.7 | |
| HAD85 | 30.0 | 26.9 | 24.2 | 22.9 | |

NOTE: For the six climate variables, four 30-year periods are used to indicate six potential future trajectories. The period ending in 2009 is based on modeled observations from the PRISM Climate Group and the three future periods were obtained from the NASA NEX-DCP30 dataset. Future climate projections from three models under two emission scenarios show estimates of each climate variable within the region. The three models are CCSM4, GFDL CM3, and HadGEM2-ES and the emission scenarios are the 4.5 and 8.5 RCP. The average value for the region is reported, even though locations within the region may vary substantially based on latitude, elevation, land-use, or other factors.

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Current and Potential Future Habitat, Capability, and Migration

| Common Name | Scientific Name | Range | MR | %Cell | FIAsum | FIAiv | ChngCl45 | ChngCl85 | Adap | Abund | Capabil45 | Capabil85 | SHIFT45 | SHIFT85 | SSO | N |
|----------------------------|-------------------------|-------|--------|-------|--------|-------|---------------|---------------|--------|----------|-------------|-------------|-----------|-----------|-----|----|
| slash pine | Pinus elliottii | NDH | High | 87.3 | 4393.8 | 35.8 | Sm. dec. | Sm. dec. | Medium | Abundant | Fair | Fair | | | 0 | 1 |
| sand pine | Pinus clausa | NDH | High | 32.4 | 1491.3 | 31.6 | No change | Sm. dec. | Low | Abundant | Fair | Fair | | | 0 | 2 |
| longleaf pine | Pinus palustris | NSH | Medium | 31.6 | 645.5 | 12.8 | Sm. inc. | Sm. inc. | Medium | Abundant | Very Good | Very Good | | | 1 | 3 |
| live oak | Quercus virginiana | NDH | High | 46.9 | 481.2 | 6.1 | Lg. inc. | Lg. inc. | Medium | Common | Very Good | Very Good | | | 1 | 4 |
| laurel oak | Quercus laurifolia | NDH | Medium | 53.9 | 472.1 | 5.1 | Sm. inc. | Sm. inc. | Medium | Common | Good | Good | | | 1 | 5 |
| pond cypress | Taxodium ascendens | NSH | Medium | 33.2 | 450.7 | 10.7 | Lg. inc. | Lg. inc. | Medium | Common | Very Good | Very Good | | | 1 | 6 |
| loblolly-bay | Gordonia lasianthus | NSH | Medium | 45.6 | 449.2 | 7.3 | No change | No change | Medium | Common | Fair | Fair | | | 1 | 7 |
| red maple | Acer rubrum | WDH | High | 38.5 | 437.1 | 7.1 | Sm. inc. | Sm. inc. | High | Common | Very Good | Very Good | | | 1 | 8 |
| cabbage palmetto | Sabal palmetto | NDH | Medium | 27.9 | 426.6 | 10.5 | Lg. inc. | Lg. inc. | Medium | Common | Very Good | Very Good | | | 0 | 9 |
| loblolly pine | Pinus taeda | WDH | High | 27.2 | 305.7 | 8.5 | Sm. inc. | Lg. inc. | Medium | Common | Good | Very Good | | | 1 | 10 |
| swamp tupelo | Nyssa biflora | NDH | Medium | 40 | 299.8 | 5.2 | Sm. inc. | Lg. inc. | Low | Common | Fair | Good | | | 1 | 11 |
| sweetgum | Liquidambar styraciflua | WDH | High | 34.1 | 226.2 | 4.6 | Sm. inc. | Sm. inc. | Medium | Common | Good | Good | | | 1 | 12 |
| turkey oak | Quercus laevis | NSH | Medium | 18.1 | 203.1 | 6.6 | No change | No change | High | Common | Good | Good | | | 1 | 13 |
| water oak | Quercus nigra | WDH | High | 25.2 | 198.7 | 4.9 | Sm. inc. | Lg. inc. | Medium | Common | Good | Very Good | | | 1 | 14 |
| pond pine | Pinus serotina | NSH | Medium | 14.4 | 172.8 | 8.0 | Sm. inc. | Sm. inc. | Low | Common | Fair | Fair | | | 1 | 15 |
| sweetbay | Magnolia virginiana | NSL | Medium | 30.2 | 141.9 | 3.2 | Lg. inc. | Lg. inc. | Medium | Common | Very Good | Very Good | | | 1 | 16 |
| redbay | Persea borbonia | NSL | Low | 39.6 | 132.4 | 2.0 | Sm. inc. | Sm. inc. | High | Common | Very Good | Very Good | | | 1 | 17 |
| bald cypress | Taxodium distichum | NSH | Medium | 12.3 | 98.4 | 5.4 | Lg. inc. | Lg. inc. | Medium | Common | Very Good | Very Good | Infill ++ | Infill ++ | 1 | 18 |
| green ash | Fraxinus pennsylvanica | WSH | Low | 7.7 | 97.3 | 6.4 | No change | No change | Medium | Common | Fair | Fair | | | 1 | 19 |
| pumpkin ash | Fraxinus profunda | NSH | FIA | 8.9 | 56.9 | 5.9 | Unknown | Unknown | NA | Common | FIA Only | FIA Only | | | 0 | 20 |
| black cherry | Prunus serotina | WDL | Medium | 9.4 | 53.4 | 4.2 | No change | No change | Low | Common | Poor | Poor | | | 0 | 21 |
| American elm | Ulmus americana | WDH | Medium | 16.7 | 34.2 | 1.0 | Lg. inc. | Lg. inc. | Medium | Rare | Good | Good | Infill ++ | Infill ++ | 1 | 22 |
| American hornbeam; muscle | Carpinus caroliniana | WSL | Low | 6.7 | 29.2 | 1.8 | Sm. dec. | Sm. dec. | Medium | Rare | Very Poor | Very Poor | | | 0 | 23 |
| blackgum | Nyssa sylvatica | WDL | Medium | 9.3 | 23.6 | 1.5 | Sm. inc. | Sm. inc. | High | Rare | Good | Good | Infill ++ | Infill ++ | 1 | 24 |
| eastern redcedar | Juniperus virginiana | WDH | Medium | 3.4 | 23.3 | 6.9 | Sm. dec. | Sm. dec. | Medium | Rare | Very Poor | Very Poor | | | 0 | 25 |
| sugarberry | Celtis laevigata | NDH | Medium | 3 | 21.4 | 5.5 | Sm. inc. | Lg. inc. | Medium | Rare | Fair | Good | | Infill ++ | 2 | 26 |
| southern magnolia | Magnolia grandiflora | NSL | Low | 3.7 | 20.1 | 2.3 | No change | No change | Medium | Rare | Poor | Poor | Infill + | Infill + | 1 | 27 |
| pignut hickory | Carya glabra | WDL | Medium | 5.1 | 18.7 | 2.0 | No change | No change | Medium | Rare | Poor | Poor | Infill + | Infill + | 1 | 28 |
| bluejack oak | Quercus incana | NSL | Low | 5.8 | 18.1 | 1.7 | No change | No change | Medium | Rare | Poor | Poor | Infill + | Infill + | 1 | 29 |
| Carolina ash | Fraxinus caroliniana | NSL | FIA | 5.5 | 14.9 | 2.6 | Unknown | Unknown | NA | Rare | FIA Only | FIA Only | | | 0 | 30 |
| sand hickory | Carya pallida | NSL | FIA | 2.2 | 13.8 | 6.1 | Unknown | Unknown | NA | Rare | FIA Only | FIA Only | | | 0 | 31 |
| hackberry | Celtis occidentalis | WDH | Medium | 1.6 | 10.7 | 3.3 | Sm. dec. | Sm. dec. | High | Rare | Poor | Poor | | | 0 | 32 |
| American holly | Ilex opaca | NSL | Medium | 6.5 | 6.5 | 0.6 | Sm. dec. | Sm. dec. | Medium | Rare | Very Poor | Very Poor | | | 0 | 33 |
| common persimmon | Diospyros virginiana | NSL | Low | 3.5 | 5.5 | 0.6 | Sm. dec. | Lg. dec. | High | Rare | Poor | Poor | | | 1 | 34 |
| water tupelo | Nyssa aquatica | NSH | Medium | 1.1 | 5.1 | 4.5 | No change | No change | Low | Rare | Very Poor | Very Poor | | | 0 | 35 |
| white ash | Fraxinus americana | WDL | Medium | 0.8 | 4.8 | 2.9 | Sm. dec. | Sm. dec. | Low | Rare | Very Poor | Very Poor | | | 0 | 36 |
| yellow-poplar | Liriodendron tulipifera | WDH | High | 1.4 | 4.3 | 1.1 | Sm. dec. | Sm. dec. | High | Rare | Poor | Poor | | | 0 | 37 |
| swamp chestnut oak | Quercus michauxii | NSL | Low | 1.9 | 2.9 | 1.2 | Sm. dec. | Sm. dec. | Medium | Rare | Very Poor | Very Poor | | | 0 | 38 |
| eastern hophornbeam; ironw | Ostrya virginiana | WSL | Low | 0.7 | 2.8 | 1.6 | Sm. dec. | Sm. dec. | High | Rare | Poor | Poor | | | 0 | 39 |
| blackjack oak | Quercus marilandica | NSL | Medium | 1.4 | 1.8 | 0.6 | Very Lg. dec. | Sm. dec. | High | Rare | Lost | Poor | | Infill + | 2 | 40 |
| water hickory | Carya aquatica | NSL | Medium | 1.5 | 1.3 | 0.4 | Very Lg. dec. | Very Lg. dec. | Medium | Rare | Lost | Lost | | | 0 | 41 |
| southern red oak | Quercus falcata | WDL | Medium | 0.7 | 0.7 | 0.4 | Sm. inc. | Lg. inc. | High | Rare | Good | Good | | | 2 | 42 |
| pawpaw | Asimina triloba | NSL | Low | 1.1 | 0.3 | 0.3 | Sm. dec. | Lg. dec. | Medium | Rare | Very Poor | Very Poor | | | 0 | 43 |
| shortleaf pine | Pinus echinata | WDH | High | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | Migrate + | Migrate + | 3 | 44 |
| striped maple | Acer pensylvanicum | NSL | Medium | 0 | 0 | 0 | Unknown | Unknown | Medium | Absent | Unknown | Unknown | | | 0 | 45 |
| serviceberry | Amelanchier spp. | NSL | Low | 0 | 0 | 0 | Unknown | New Habitat | Medium | Absent | Unknown | New Habitat | | | 3 | 46 |
| sweet birch | Betula lenta | NDH | High | 0 | 0 | 0 | Unknown | Unknown | Low | Absent | Unknown | Unknown | | | 0 | 47 |

One x One Degree
Climate Change Atlas Tree Species

USDA Forest Service
Northern Research Station
Landscape Change Research Group
Iverson, Peters, Prasad, Matthews

Current and Potential Future Habitat, Capability, and Migration

| Common Name | Scientific Name | Range | MR | %Cell | FIAsum | FIAiv | ChngCl45 | ChngCl85 | Adap | Abund | Capabil45 | Capabil85 | SHIFT45 | SHIFT85 | SSO | N |
|------------------------|------------------------------|-------|--------|-------|--------|-------|-------------|-------------|--------|---------|-------------|-------------|----------|------------|-----|------|
| river birch | Betula nigra | NSL | Low | 0 | 0 | 0 | Unknown | New Habitat | Medium | Absent | Unknown | New Habitat | | Migrate + | 3 | 48 |
| gray birch | Betula populifolia | NSL | Low | 0 | 0 | 0 | Unknown | Unknown | Medium | Absent | Unknown | Unknown | | | | 0 49 |
| cittamwood/gum bumelia | Sideroxylon lanuginosum ssp. | NSL | Low | 0 | 0 | 0 | New Habitat | New Habitat | High | Absent | New Habitat | New Habitat | | | | 0 50 |
| pecan | Carya illinoensis | NSH | Low | 0 | 0 | 0 | New Habitat | New Habitat | Low | Absent | New Habitat | New Habitat | | Migrate + | 3 | 51 |
| shellbark hickory | Carya laciniosa | NSL | Low | 0 | 0 | 0 | Unknown | Unknown | Medium | Absent | Unknown | Unknown | | | | 0 52 |
| shagbark hickory | Carya ovata | WSL | Medium | 0 | 0 | 0 | Unknown | Unknown | Medium | Absent | Unknown | Unknown | | | | 0 53 |
| black hickory | Carya texana | NDL | High | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | | | | 0 54 |
| mockernut hickory | Carya alba | WDL | Medium | 0 | 0 | 0 | Unknown | New Habitat | High | Absent | Unknown | New Habitat | | Migrate ++ | 3 | 55 |
| eastern redbud | Cercis canadensis | NSL | Low | 0 | 0 | 0 | Unknown | Unknown | Medium | Absent | Unknown | Unknown | | | | 0 56 |
| flowering dogwood | Cornus florida | WDL | Medium | 0 | 0 | 0 | Unknown | New Habitat | Medium | Absent | Unknown | New Habitat | | Likely + | 3 | 57 |
| black ash | Fraxinus nigra | WSH | Medium | 0 | 0 | 0 | Unknown | Unknown | Low | Absent | Unknown | Unknown | | | | 0 58 |
| silverbell | Halesia spp. | NSL | Low | 0 | 0 | 0 | Unknown | Unknown | Medium | Absent | Unknown | Unknown | | | | 0 59 |
| cucumbertree | Magnolia acuminata | NSL | Low | 0 | 0 | 0 | Unknown | Unknown | Medium | Absent | Unknown | Unknown | | | | 0 60 |
| bigleaf magnolia | Magnolia macrophylla | NSL | Low | 0 | 0 | 0 | Unknown | Unknown | Medium | Absent | Unknown | Unknown | | | | 0 61 |
| water elm | Planera aquatica | NSL | Low | 0 | 0 | 0 | Unknown | Unknown | Medium | Absent | Unknown | Unknown | | | | 0 62 |
| sycamore | Platanus occidentalis | NSL | Low | 0 | 0 | 0 | Unknown | Unknown | Medium | Modeled | Unknown | Unknown | | | | 0 63 |
| white oak | Quercus alba | WDH | Medium | 0 | 0 | 0 | Unknown | Unknown | High | Modeled | Unknown | Unknown | | | | 0 64 |
| chinkapin oak | Quercus muehlenbergii | NSL | Medium | 0 | 0 | 0 | Unknown | Unknown | Medium | Absent | Unknown | Unknown | | | | 0 65 |
| willow oak | Quercus phellos | NSL | Low | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | | Migrate + | 3 | 66 |
| Shumard oak | Quercus shumardii | NSL | Low | 0 | 0 | 0 | Unknown | Unknown | High | Absent | Unknown | Unknown | | | | 0 67 |
| post oak | Quercus stellata | WDH | High | 0 | 0 | 0 | New Habitat | New Habitat | High | Absent | New Habitat | New Habitat | Likely + | Likely + | 3 | 68 |
| black locust | Robinia pseudoacacia | NDH | Low | 0 | 0 | 0 | New Habitat | Unknown | Medium | Absent | New Habitat | Unknown | | | | 3 69 |
| black willow | Salix nigra | NSH | Low | 0 | 0 | 0 | New Habitat | New Habitat | Low | Absent | New Habitat | New Habitat | | Migrate + | 3 | 70 |
| American mountain-ash | Sorbus americana | NSL | Low | 0 | 0 | 0 | Unknown | New Habitat | Low | Absent | Unknown | New Habitat | | | | 0 71 |
| American basswood | Tilia americana | WSL | Medium | 0 | 0 | 0 | Unknown | Unknown | Medium | Modeled | Unknown | Unknown | | | | 0 72 |
| winged elm | Ulmus alata | WDL | Medium | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | | Migrate + | 3 | 73 |
| cedar elm | Ulmus crassifolia | NDH | Medium | 0 | 0 | 0 | New Habitat | New Habitat | Low | Absent | New Habitat | New Habitat | | | | 3 74 |