

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

sq. km sq. mi FIA Plots
 Area of Region 10,066 3,886.5 149

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 | | | |
|---------|-----------|-----------|-----------|--------|-----------|---|----------------|-------------------------------|----------------|---------------------|-------------|-----------|-----------|
| | | Abundant | Common | High | Low | Scenario RCP45 | Scenario RCP85 | Scenario RCP45 | Scenario RCP85 | SHIFT RCP45 | SHIFT RCP85 | | |
| Ash | 3 | | | | | Increase | 19 | 20 | Very Good | 1 | 1 | | |
| Hickory | 4 | | | | | No Change | 8 | 6 | Good | 14 | 13 | | |
| Maple | 1 | Abundant | 1 | High | 11 | 20 | 20 | Decrease | 13 | 14 | Likely | 3 | 3 |
| Oak | 12 | Common | 7 | Medium | 20 | 29 | | New | 9 | 9 | Infill | 11 | 10 |
| Pine | 3 | Rare | 38 | Low | 22 | 7 | | Unknown | 10 | 10 | Migrate | 5 | 5 |
| Other | 23 | Absent | 11 | FIA | 6 | | | | | | | | |
| | 46 | | 57 | | 59 | 56 | | 59 | 59 | | | 19 | 18 |
| | | | | | | | | | | | | 47 | 47 |

Potential Changes in Climate Variables

Temperature (°F)

| | Scenario | 2009 | 2039 | 2069 | 2099 | |
|--------------------------|----------|------|------|------|------|--|
| Annual Average | CCSM45 | 60.8 | 62.7 | 64.3 | 64.9 | |
| | CCSM85 | 60.8 | 63.3 | 65.4 | 68.1 | |
| | GFDL45 | 60.8 | 66.5 | 65.7 | 67.0 | |
| | GFDL85 | 60.8 | 63.8 | 66.6 | 70.5 | |
| | HAD45 | 60.8 | 63.1 | 65.8 | 66.8 | |
| | HAD85 | 60.8 | 63.3 | 67.9 | 71.0 | |
| Growing Season (May—Sep) | CCSM45 | 76.4 | 78.3 | 79.9 | 80.7 | |
| | CCSM85 | 76.4 | 79.2 | 81.3 | 84.6 | |
| | GFDL45 | 76.4 | 84.1 | 82.3 | 84.7 | |
| | GFDL85 | 76.4 | 80.3 | 83.7 | 88.6 | |
| | HAD45 | 76.4 | 78.7 | 81.1 | 81.9 | |
| | HAD85 | 76.4 | 79.1 | 84.3 | 87.0 | |
| Coldest Month (Average) | CCSM45 | 37.1 | 39.5 | 40.5 | 41.2 | |
| | CCSM85 | 37.1 | 39.7 | 40.4 | 42.1 | |
| | GFDL45 | 37.1 | 40.9 | 41.1 | 41.2 | |
| | GFDL85 | 37.1 | 38.2 | 39.7 | 40.3 | |
| | HAD45 | 37.1 | 37.8 | 40.1 | 40.3 | |
| | HAD85 | 37.1 | 40.0 | 41.9 | 43.7 | |
| Warmest Month (Average) | CCSM45 | 82.7 | 84.5 | 85.5 | 86.0 | |
| | CCSM85 | 82.7 | 85.5 | 86.4 | 88.2 | |
| | GFDL45 | 82.7 | 87.6 | 88.5 | 90.4 | |
| | GFDL85 | 82.7 | 87.3 | 89.1 | 93.2 | |
| | HAD45 | 82.7 | 84.8 | 86.4 | 86.7 | |
| | HAD85 | 82.7 | 86.0 | 88.6 | 89.6 | |

Precipitation (in)

| | Scenario | 2009 | 2039 | 2069 | 2099 | |
|--------------------------|----------|------|------|------|------|--|
| Annual Total | CCSM45 | 41.2 | 40.0 | 41.8 | 40.5 | |
| | CCSM85 | 41.2 | 40.1 | 41.5 | 42.1 | |
| | GFDL45 | 41.2 | 42.7 | 46.7 | 42.6 | |
| | GFDL85 | 41.2 | 43.3 | 47.7 | 46.6 | |
| | HAD45 | 41.2 | 42.0 | 42.9 | 44.6 | |
| | HAD85 | 41.2 | 43.7 | 38.0 | 42.2 | |
| Growing Season (May—Sep) | CCSM45 | 20.6 | 19.2 | 19.4 | 19.3 | |
| | CCSM85 | 20.6 | 19.8 | 18.7 | 19.4 | |
| | GFDL45 | 20.6 | 21.5 | 23.0 | 21.6 | |
| | GFDL85 | 20.6 | 22.4 | 24.8 | 23.1 | |
| | HAD45 | 20.6 | 20.9 | 21.0 | 21.5 | |
| | HAD85 | 20.6 | 21.5 | 16.9 | 18.9 | |

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 |
|------------------------|------------------------------|-------|--------|-------|--------|-------|---------------|---------------|--------|----------|-------------|-------------|-----------|-----------|-----|----|
| post oak | Quercus stellata | WDH | High | 97 | 895.6 | 23.4 | No change | No change | High | Abundant | Very Good | Very Good | | | 1 | 1 |
| blackjack oak | Quercus marilandica | NSL | Medium | 91.4 | 327.9 | 9.9 | No change | Sm. dec. | High | Common | Good | Fair | | | 1 | 2 |
| eastern redcedar | Juniperus virginiana | WDH | Medium | 77.4 | 229.7 | 9.3 | No change | No change | Medium | Common | Fair | Fair | | | 1 | 3 |
| black hickory | Carya texana | NDL | High | 89.3 | 145.4 | 5.3 | Sm. dec. | Sm. dec. | Medium | Common | Poor | Poor | | | 0 | 4 |
| winged elm | Ulmus alata | WDL | Medium | 71.4 | 136.7 | 7.2 | Sm. inc. | Sm. inc. | Medium | Common | Good | Good | | | 1 | 5 |
| black oak | Quercus velutina | WDH | High | 72.7 | 131.3 | 5.1 | Sm. dec. | Lg. dec. | Medium | Common | Poor | Poor | | | 0 | 6 |
| American elm | Ulmus americana | WDH | Medium | 73.2 | 96.8 | 5.1 | Sm. inc. | Sm. inc. | Medium | Common | Good | Good | | | 1 | 7 |
| common persimmon | Diospyros virginiana | NSL | Low | 45.3 | 82.9 | 7.3 | Sm. dec. | Sm. dec. | High | Common | Fair | Fair | | | 1 | 8 |
| green ash | Fraxinus pennsylvanica | WSH | Low | 55.6 | 48.3 | 4.0 | Sm. inc. | Sm. inc. | Medium | Rare | Fair | Fair | | | 1 | 9 |
| Shumard oak | Quercus shumardii | NSL | Low | 26.7 | 45.7 | 4.9 | No change | No change | High | Rare | Fair | Fair | | | 1 | 10 |
| red mulberry | Morus rubra | NSL | Low | 29.3 | 34.8 | 1.8 | Lg. dec. | Lg. dec. | Medium | Rare | Very Poor | Very Poor | | | 0 | 11 |
| pecan | Carya illinoensis | NSH | Low | 57.6 | 34.0 | 5.2 | Lg. inc. | Lg. inc. | Low | Rare | Fair | Fair | | | 1 | 12 |
| water oak | Quercus nigra | WDH | High | 5 | 32.1 | 9.0 | No change | Sm. inc. | Medium | Rare | Poor | Fair | Infill + | Infill + | 2 | 13 |
| shortleaf pine | Pinus echinata | WDH | High | 0.2 | 27.6 | 5.2 | No change | No change | Medium | Rare | Poor | Poor | Infill + | Infill + | 2 | 14 |
| hackberry | Celtis occidentalis | WDH | Medium | 43 | 20.8 | 3.2 | Sm. inc. | Lg. inc. | High | Rare | Good | Good | | | 1 | 15 |
| sugarberry | Celtis laevigata | NDH | Medium | 40.4 | 19.1 | 2.5 | Lg. inc. | Lg. inc. | Medium | Rare | Good | Good | | | 1 | 16 |
| black willow | Salix nigra | NSH | Low | 22.1 | 16.7 | 3.7 | Sm. inc. | Sm. inc. | Low | Rare | Poor | Poor | | | 1 | 17 |
| white ash | Fraxinus americana | WDL | Medium | 21.8 | 16.2 | 1.9 | Lg. inc. | Lg. inc. | Low | Rare | Fair | Fair | | | 1 | 18 |
| northern red oak | Quercus rubra | WDH | Medium | 22.5 | 15.3 | 2.8 | Sm. dec. | Sm. dec. | High | Rare | Poor | Poor | | | 1 | 19 |
| eastern cottonwood | Populus deltoides | NSH | Low | 11.2 | 14.4 | 4.5 | Sm. inc. | Sm. inc. | Medium | Rare | Fair | Fair | Infill + | Infill + | 1 | 20 |
| chinkapin oak | Quercus muehlenbergii | NSL | Medium | 20.2 | 14.3 | 0.9 | Lg. dec. | Lg. dec. | Medium | Rare | Very Poor | Very Poor | | | 0 | 21 |
| Osage-orange | Maclura pomifera | NDH | Medium | 23.1 | 13.4 | 6.2 | Lg. inc. | Lg. inc. | High | Rare | Good | Good | | | 1 | 22 |
| cittamwood/gum bumelia | Sideroxylon lanuginosum ssp. | NSL | Low | 36.8 | 9.7 | 1.1 | Lg. inc. | Lg. inc. | High | Rare | Good | Good | | | 1 | 23 |
| honeylocust | Gleditsia triacanthos | NSH | Low | 11.4 | 9.3 | 8.9 | No change | No change | High | Rare | Fair | Fair | | | 1 | 24 |
| bitternut hickory | Carya cordiformis | WSL | Low | 8.9 | 8.6 | 3.1 | Sm. dec. | Sm. dec. | High | Rare | Poor | Poor | Infill + | | 1 | 25 |
| pin oak | Quercus palustris | NSH | Low | 13.1 | 8.1 | 3.5 | Lg. dec. | Lg. dec. | Low | Rare | Very Poor | Very Poor | | | 0 | 26 |
| wild plum | Prunus americana | NSLX | FIA | 7.7 | 8.0 | 0.7 | Unknown | Unknown | Medium | Rare | FIA Only | FIA Only | | | 0 | 27 |
| bur oak | Quercus macrocarpa | NDH | Medium | 20.9 | 7.8 | 2.4 | Lg. dec. | Lg. dec. | High | Rare | Poor | Poor | Infill + | Infill + | 1 | 28 |
| slippery elm | Ulmus rubra | WSL | Low | 33.4 | 7.7 | 2.2 | Lg. inc. | Lg. inc. | Medium | Rare | Good | Good | | | 1 | 29 |
| black walnut | Juglans nigra | WDH | Low | 19.3 | 6.7 | 3.7 | No change | Sm. dec. | Medium | Rare | Poor | Very Poor | | | 1 | 30 |
| white oak | Quercus alba | WDH | Medium | 10.3 | 6.0 | 1.2 | Sm. inc. | Lg. inc. | High | Rare | Good | Good | Infill ++ | Infill ++ | 2 | 31 |
| sycamore | Platanus occidentalis | NSL | Low | 18.3 | 5.6 | 2.5 | Lg. inc. | Lg. inc. | Medium | Rare | Good | Good | Infill ++ | Infill ++ | 1 | 32 |
| loblolly pine | Pinus taeda | WDH | High | 0.8 | 5.4 | 4.3 | Lg. inc. | Lg. inc. | Medium | Rare | Good | Good | | | 2 | 33 |
| black cherry | Prunus serotina | WDL | Medium | 15 | 5.3 | 0.6 | Sm. inc. | Sm. inc. | Low | Rare | Poor | Poor | Infill + | Infill + | 1 | 34 |
| boxelder | Acer negundo | WSH | Low | 19.7 | 3.0 | 1.8 | Sm. inc. | Lg. inc. | High | Rare | Good | Good | Infill ++ | Infill ++ | 1 | 35 |
| mockernut hickory | Carya alba | WDL | Medium | 9.9 | 1.9 | 0.6 | Lg. inc. | Lg. inc. | High | Rare | Good | Good | Infill ++ | Infill ++ | 1 | 36 |
| eastern redbud | Cercis canadensis | NSL | Low | 33.1 | 1.7 | 0.5 | Sm. dec. | No change | Medium | Rare | Very Poor | Poor | | | 1 | 37 |
| flowering dogwood | Cornus florida | WDL | Medium | 1.3 | 1.4 | 0.3 | Sm. dec. | Sm. dec. | Medium | Rare | Very Poor | Very Poor | | | 2 | 38 |
| black locust | Robinia pseudoacacia | NDH | Low | 5.9 | 1.4 | 1.9 | Very Lg. dec. | Very Lg. dec. | Medium | Rare | Lost | Lost | | | 0 | 39 |
| nuttall oak | Quercus texana | NSH | Medium | 1 | 1.4 | 1.4 | Sm. dec. | Sm. dec. | High | Rare | Poor | Poor | | | 0 | 40 |
| northern catalpa | Catalpa speciosa | NSHX | FIA | 1.5 | 1.4 | 2.0 | Unknown | Unknown | Medium | Rare | FIA Only | FIA Only | | | 0 | 41 |
| Scots pine | Pinus sylvestris | NSH | FIA | 4 | 1.2 | 4.7 | Unknown | Unknown | NA | Rare | NNIS | NNIS | | | 0 | 42 |
| southern red oak | Quercus falcata | WDL | Medium | 7.9 | 0.6 | 1.3 | Lg. inc. | Lg. inc. | High | Rare | Good | Good | Infill ++ | Infill ++ | 2 | 43 |
| white mulberry | Morus alba | NSL | FIA | 7.3 | 0.4 | 0.7 | Unknown | Unknown | NA | Rare | NNIS | NNIS | | | 0 | 44 |
| Texas ash | Fraxinus texensis | NDH | FIA | 1.6 | 0.3 | 0.5 | Unknown | Unknown | NA | Rare | FIA Only | FIA Only | | | 0 | 45 |
| Kentucky coffeetree | Gymnocladus dioicus | NSLX | FIA | 4 | 0.1 | 0.5 | Unknown | Unknown | Medium | Rare | FIA Only | FIA Only | | | 0 | 46 |
| ashe juniper | Juniperus ashei | NDH | High | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | | | 0 | 47 |

One x One Degree
Climate Change Atlas Tree Species

USDA Forest Service
Northern Research Station
Landscape Change Research Group
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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 |
|----------------------------|-------------------------|-------|--------|-------|--------|-------|-------------|-------------|--------|---------|-------------|-------------|------------|------------|-----|----|
| red maple | Acer rubrum | WDH | High | 0 | 0 | 0 | New Habitat | New Habitat | High | Absent | New Habitat | New Habitat | Migrate + | Migrate + | 3 | 48 |
| sugar maple | Acer saccharum | WDH | High | 0 | 0 | 0 | Unknown | Unknown | High | Modeled | Unknown | Unknown | | | 0 | 49 |
| serviceberry | Amelanchier spp. | NSL | Low | 0 | 0 | 0 | Unknown | Unknown | Medium | Absent | Unknown | Unknown | | | 0 | 50 |
| pawpaw | Asimina triloba | NSL | Low | 0 | 0 | 0 | Unknown | Unknown | Medium | Modeled | Unknown | Unknown | | | 0 | 51 |
| river birch | Betula nigra | NSL | Low | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | Likely + | Likely + | 3 | 52 |
| black ash | Fraxinus nigra | WSH | Medium | 0 | 0 | 0 | Unknown | Unknown | Low | Absent | Unknown | Unknown | | | 0 | 53 |
| sweetgum | Liquidambar styraciflua | WDH | High | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | Migrate + | Migrate + | 3 | 54 |
| blackgum | Nyssa sylvatica | WDL | Medium | 0 | 0 | 0 | New Habitat | New Habitat | High | Absent | New Habitat | New Habitat | Migrate + | Migrate ++ | 3 | 55 |
| eastern hophornbeam; ironw | Ostrya virginiana | WSL | Low | 0 | 0 | 0 | New Habitat | New Habitat | High | Absent | New Habitat | New Habitat | Likely + | Likely + | 3 | 56 |
| live oak | Quercus virginiana | NDH | High | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | Migrate ++ | Migrate ++ | 3 | 57 |
| sassafras | Sassafras albidum | WSL | Low | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | Likely + | Likely + | 3 | 58 |
| cedar elm | Ulmus crassifolia | NDH | Medium | 0 | 0 | 0 | New Habitat | New Habitat | Low | Absent | New Habitat | New Habitat | Migrate ++ | Migrate ++ | 3 | 59 |