

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 | 45 |

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 | 1 | | | High | 6 | 10 | Increase | 5 | 8 | Very Good | 0 | 0 |
| Hickory | 1 | | | Medium | 12 | 20 | No Change | 8 | 6 | Good | 3 | 4 |
| Maple | 1 | Abundant | 0 | Low | 15 | 4 | Decrease | 12 | 11 | Fair | 3 | 4 |
| Oak | 6 | Common | 2 | FIA | 3 | | New | 6 | 6 | Poor | 12 | 11 |
| Pine | 0 | Rare | 26 | | | | Unknown | 5 | 5 | Very Poor | 7 | 6 |
| Other | 19 | Absent | 8 | | | | | | | FIA Only | 1 | 1 |
| | 28 | | 36 | | 36 | 34 | | 36 | 36 | Unknown | 2 | 2 |
| | | | | | | | | | | | 12 | 16 |
| | | | | | | | | | | | 28 | 28 |

Potential Changes in Climate Variables

Temperature (°F)

| | Scenario | 2009 | 2039 | 2069 | 2099 | |
|------------------------|----------|------|------|------|------|--|
| Annual Average | CCSM45 | 60.0 | 61.8 | 63.4 | 64.1 | |
| | CCSM85 | 60.0 | 62.4 | 64.3 | 67.1 | |
| | GFDL45 | 60.0 | 66.2 | 64.8 | 66.2 | |
| | GFDL85 | 60.0 | 63.0 | 66.0 | 70.1 | |
| | HAD45 | 60.0 | 62.2 | 64.9 | 65.9 | |
| | HAD85 | 60.0 | 62.5 | 67.0 | 69.9 | |
| Growing Season May—Sep | CCSM45 | 76.4 | 78.5 | 80.2 | 80.9 | |
| | CCSM85 | 76.4 | 79.1 | 81.1 | 84.6 | |
| | GFDL45 | 76.4 | 85.0 | 82.5 | 85.0 | |
| | GFDL85 | 76.4 | 80.6 | 84.2 | 89.5 | |
| | HAD45 | 76.4 | 78.4 | 80.7 | 81.4 | |
| | HAD85 | 76.4 | 79.1 | 83.9 | 86.3 | |
| Coldest Month Average | CCSM45 | 35.8 | 38.0 | 38.9 | 39.7 | |
| | CCSM85 | 35.8 | 38.3 | 38.8 | 40.6 | |
| | GFDL45 | 35.8 | 39.2 | 39.2 | 39.4 | |
| | GFDL85 | 35.8 | 36.6 | 37.9 | 38.6 | |
| | HAD45 | 35.8 | 36.7 | 39.0 | 39.1 | |
| | HAD85 | 35.8 | 38.8 | 40.8 | 42.5 | |
| Warmest Month Average | CCSM45 | 82.9 | 84.9 | 86.3 | 86.8 | |
| | CCSM85 | 82.9 | 85.6 | 86.5 | 88.6 | |
| | GFDL45 | 82.9 | 88.0 | 88.8 | 90.9 | |
| | GFDL85 | 82.9 | 88.1 | 90.1 | 94.6 | |
| | HAD45 | 82.9 | 84.7 | 86.2 | 86.3 | |
| | HAD85 | 82.9 | 86.0 | 88.3 | 89.4 | |

Precipitation (in)

| | Scenario | 2009 | 2039 | 2069 | 2099 | |
|------------------------|----------|------|------|------|------|--|
| Annual Total | CCSM45 | 31.5 | 31.2 | 32.1 | 30.8 | |
| | CCSM85 | 31.5 | 30.7 | 32.5 | 32.1 | |
| | GFDL45 | 31.5 | 32.6 | 36.7 | 33.0 | |
| | GFDL85 | 31.5 | 33.0 | 35.7 | 34.2 | |
| | HAD45 | 31.5 | 33.5 | 32.7 | 33.8 | |
| | HAD85 | 31.5 | 32.4 | 28.4 | 33.3 | |
| Growing Season May—Sep | CCSM45 | 17.4 | 16.1 | 16.5 | 16.3 | |
| | CCSM85 | 17.4 | 16.8 | 16.9 | 16.5 | |
| | GFDL45 | 17.4 | 17.9 | 20.6 | 18.5 | |
| | GFDL85 | 17.4 | 19.2 | 20.7 | 19.2 | |
| | HAD45 | 17.4 | 18.4 | 18.4 | 18.4 | |
| | HAD85 | 17.4 | 17.0 | 14.4 | 17.1 | |

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 |
|------------------------|------------------------------|-------|--------|-------|--------|-------|-------------|-------------|--------|--------|-------------|-------------|------------|------------|-----|----|
| eastern redcedar | Juniperus virginiana | WDH | Medium | 68.6 | 242.0 | 31.7 | Lg. dec. | Lg. dec. | Medium | Common | Poor | Poor | Infill + | Infill + | 0 | 1 |
| American elm | Ulmus americana | WDH | Medium | 46.6 | 89.8 | 19.4 | Sm. dec. | Sm. dec. | Medium | Common | Poor | Poor | Infill + | Infill + | 0 | 2 |
| black locust | Robinia pseudoacacia | NDH | Low | 16 | 38.4 | 16.7 | Lg. dec. | Lg. dec. | Medium | Rare | Very Poor | Very Poor | | | 2 | 3 |
| post oak | Quercus stellata | WDH | High | 24.4 | 34.5 | 14.0 | Lg. inc. | Lg. inc. | High | Rare | Good | Good | Infill ++ | Infill ++ | 2 | 4 |
| blackjack oak | Quercus marilandica | NSL | Medium | 28.4 | 28.9 | 11.0 | No change | Sm. inc. | High | Rare | Fair | Good | Infill + | Infill ++ | 2 | 5 |
| eastern cottonwood | Populus deltoides | NSH | Low | 12.6 | 27.8 | 18.6 | No change | No change | Medium | Rare | Poor | Poor | Infill + | Infill + | 2 | 6 |
| ashe juniper | Juniperus ashei | NDH | High | 0.1 | 24.8 | 3.1 | No change | Sm. inc. | Medium | Rare | Poor | Fair | | | 0 | 7 |
| Siberian elm | Ulmus pumila | NDH | FIA | 5.6 | 12.0 | 19.8 | Unknown | Unknown | NA | Rare | NNIS | NNIS | | | 0 | 8 |
| boxelder | Acer negundo | WSH | Low | 4 | 11.7 | 3.5 | Lg. dec. | Sm. dec. | High | Rare | Poor | Poor | | Infill + | 2 | 9 |
| bur oak | Quercus macrocarpa | NDH | Medium | 5.6 | 11.1 | 13.1 | Sm. dec. | Sm. dec. | High | Rare | Poor | Poor | | | 0 | 10 |
| hackberry | Celtis occidentalis | WDH | Medium | 15.6 | 10.3 | 3.2 | Sm. inc. | Lg. inc. | High | Rare | Good | Good | | | 2 | 11 |
| black willow | Salix nigra | NSH | Low | 10.1 | 8.7 | 4.4 | Sm. inc. | Sm. inc. | Low | Rare | Poor | Poor | Infill + | Infill + | 2 | 12 |
| black walnut | Juglans nigra | WDH | Low | 18.5 | 8.6 | 4.6 | Sm. dec. | Sm. dec. | Medium | Rare | Very Poor | Very Poor | | | 2 | 13 |
| sugarberry | Celtis laevigata | NDH | Medium | 9.8 | 3.9 | 4.6 | No change | Sm. inc. | Medium | Rare | Poor | Fair | Infill + | Infill + | 2 | 14 |
| pecan | Carya illinoensis | NSH | Low | 7.9 | 3.5 | 7.0 | Sm. inc. | Sm. inc. | Low | Rare | Poor | Poor | Infill + | Infill + | 2 | 15 |
| green ash | Fraxinus pennsylvanica | WSH | Low | 5.4 | 2.9 | 5.0 | No change | No change | Medium | Rare | Poor | Poor | Infill + | Infill + | 2 | 16 |
| white mulberry | Morus alba | NSL | FIA | 11.8 | 2.9 | 3.9 | Unknown | Unknown | NA | Rare | NNIS | NNIS | | | 0 | 17 |
| cittamwood/gum bumelia | Sideroxylon lanuginosum ssp. | NSL | Low | 14.7 | 2.6 | 1.7 | Lg. inc. | Lg. inc. | High | Rare | Good | Good | Infill ++ | Infill ++ | 2 | 18 |
| Kentucky coffeetree | Gymnocladus dioicus | NSLX | FIA | 11.9 | 2.6 | 3.4 | Unknown | Unknown | Medium | Rare | FIA Only | FIA Only | | | 0 | 19 |
| chinkapin oak | Quercus muehlenbergii | NSL | Medium | 5.9 | 2.5 | 5.0 | Sm. dec. | Sm. dec. | Medium | Rare | Very Poor | Very Poor | | | 0 | 20 |
| Osage-orange | Maclura pomifera | NDH | Medium | 8.2 | 2.1 | 1.9 | No change | No change | High | Rare | Fair | Fair | | Infill + | 2 | 21 |
| red mulberry | Morus rubra | NSL | Low | 11.9 | 1.7 | 2.3 | Lg. dec. | Lg. dec. | Medium | Rare | Very Poor | Very Poor | | | 0 | 22 |
| honeylocust | Gleditsia triacanthos | NSH | Low | 4 | 1.5 | 6.2 | No change | No change | High | Rare | Fair | Fair | | Infill + | 2 | 23 |
| winged elm | Ulmus alata | WDL | Medium | 9.7 | 1.5 | 1.1 | Sm. dec. | Sm. dec. | Medium | Rare | Very Poor | Very Poor | | | 0 | 24 |
| eastern redbud | Cercis canadensis | NSL | Low | 4 | 1.0 | 4.0 | Sm. dec. | Sm. dec. | Medium | Rare | Very Poor | Very Poor | | | 0 | 25 |
| Shumard oak | Quercus shumardii | NSL | Low | 4 | 0.6 | 2.4 | Sm. dec. | Sm. dec. | High | Rare | Poor | Poor | | | 0 | 26 |
| black oak | Quercus velutina | WDH | High | 4 | 0.3 | 1.3 | No change | No change | Medium | Rare | Poor | Poor | | | 0 | 27 |
| slippery elm | Ulmus rubra | WSL | Low | 4 | 0.3 | 1.2 | Lg. dec. | No change | Medium | Rare | Very Poor | Poor | | | 0 | 28 |
| spruce pine | Pinus glabra | NSL | Low | 0 | 0 | 0 | Unknown | Unknown | Medium | Absent | Unknown | Unknown | | | 0 | 29 |
| serviceberry | Amelanchier spp. | NSL | Low | 0 | 0 | 0 | Unknown | Unknown | Medium | Absent | Unknown | Unknown | | | 0 | 30 |
| black hickory | Carya texana | NDL | High | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | | | 3 | 31 |
| white ash | Fraxinus americana | WDL | Medium | 0 | 0 | 0 | New Habitat | New Habitat | Low | Absent | New Habitat | New Habitat | | | 3 | 32 |
| water oak | Quercus nigra | WDH | High | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | | Migrate + | 3 | 33 |
| northern red oak | Quercus rubra | WDH | Medium | 0 | 0 | 0 | New Habitat | New Habitat | High | Absent | New Habitat | New Habitat | | | 3 | 34 |
| live oak | Quercus virginiana | NDH | High | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | Migrate ++ | Migrate ++ | 3 | 35 |
| cedar elm | Ulmus crassifolia | NDH | Medium | 0 | 0 | 0 | New Habitat | New Habitat | Low | Absent | New Habitat | New Habitat | Migrate ++ | Migrate ++ | 3 | 36 |