

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 9,412.7 3,634.3 106

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 | 2 | | | High | 6 | 19 | Increase | 12 | 13 | Very Good | 3 | 4 | Likely | 1 | 1 |
| Hickory | 4 | | | Medium | 23 | 31 | No Change | 14 | 14 | Good | 9 | 9 | Infill | 12 | 14 |
| Maple | 4 | Abundant | 0 | Low | 28 | 9 | Decrease | 17 | 16 | Fair | 13 | 12 | Migrate | 4 | 8 |
| Oak | 12 | Common | 23 | FIA | 3 | | New | 10 | 10 | Poor | 9 | 10 | | 17 | 23 |
| Pine | 1 | Rare | 23 | | | | Unknown | 7 | 7 | Very Poor | 9 | 8 | | | |
| Other | 23 | Absent | 12 | | | | | | | FIA Only | 2 | 2 | | | |
| | 46 | | 58 | | 60 | 59 | | 60 | 60 | Unknown | 4 | 4 | | | |
| | | | | | | | | | | | 49 | 49 | | | |

Potential Changes in Climate Variables

Temperature (°F)

| Scenario | 2009 | 2039 | 2069 | 2099 | | |
|----------------|--------|------|------|------|------|--|
| Annual | CCSM45 | 52.2 | 54.2 | 56.3 | 56.8 | |
| Average | CCSM85 | 52.2 | 55.0 | 57.5 | 60.4 | |
| | GFDL45 | 52.2 | 57.4 | 57.6 | 58.6 | |
| | GFDL85 | 52.2 | 55.2 | 58.5 | 62.6 | |
| | HAD45 | 52.2 | 55.0 | 58.3 | 60.1 | |
| | HAD85 | 52.2 | 55.4 | 60.1 | 64.4 | |
| Growing Season | CCSM45 | 70.5 | 72.8 | 74.5 | 75.4 | |
| | CCSM85 | 70.5 | 73.9 | 76.2 | 79.5 | |
| May—Sep | GFDL45 | 70.5 | 76.9 | 76.8 | 78.6 | |
| | GFDL85 | 70.5 | 74.3 | 78.0 | 83.2 | |
| | HAD45 | 70.5 | 73.4 | 76.1 | 78.3 | |
| | HAD85 | 70.5 | 73.8 | 79.2 | 83.2 | |
| Coldest Month | CCSM45 | 22.9 | 24.8 | 26.9 | 27.2 | |
| | CCSM85 | 22.9 | 25.9 | 27.3 | 29.0 | |
| Average | GFDL45 | 22.9 | 26.9 | 27.6 | 28.2 | |
| | GFDL85 | 22.9 | 26.2 | 27.7 | 29.0 | |
| | HAD45 | 22.9 | 24.2 | 27.5 | 27.5 | |
| | HAD85 | 22.9 | 26.8 | 29.8 | 32.1 | |
| Warmest Month | CCSM45 | 76.8 | 79.0 | 80.4 | 81.1 | |
| | CCSM85 | 76.8 | 80.7 | 82.3 | 83.8 | |
| Average | GFDL45 | 76.8 | 80.4 | 81.9 | 83.3 | |
| | GFDL85 | 76.8 | 81.0 | 82.6 | 86.1 | |
| | HAD45 | 76.8 | 79.7 | 81.8 | 82.7 | |
| | HAD85 | 76.8 | 81.2 | 84.5 | 86.7 | |

Precipitation (in)

| Scenario | 2009 | 2039 | 2069 | 2099 | | |
|----------------|--------|------|------|------|------|--|
| Annual | CCSM45 | 38.5 | 36.8 | 38.7 | 37.3 | |
| Total | CCSM85 | 38.5 | 36.5 | 38.3 | 38.0 | |
| | GFDL45 | 38.5 | 41.6 | 43.7 | 44.1 | |
| | GFDL85 | 38.5 | 41.6 | 46.7 | 46.5 | |
| | HAD45 | 38.5 | 40.8 | 42.1 | 41.4 | |
| | HAD85 | 38.5 | 40.5 | 39.7 | 42.3 | |
| Growing Season | CCSM45 | 21.4 | 20.6 | 21.4 | 19.5 | |
| | CCSM85 | 21.4 | 19.4 | 20.2 | 19.4 | |
| May—Sep | GFDL45 | 21.4 | 22.3 | 22.7 | 22.9 | |
| | GFDL85 | 21.4 | 22.8 | 24.3 | 23.4 | |
| | HAD45 | 21.4 | 21.8 | 21.1 | 21.4 | |
| | HAD85 | 21.4 | 21.6 | 19.4 | 19.4 | |

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 |
|----------------------------|------------------------------|-------|--------|-------|--------|-------|-------------|-------------|--------|--------|-------------|-------------|-----------|-----------|-----|----|
| white oak | Quercus alba | WDH | Medium | 57.3 | 494.8 | 14.5 | Lg. dec. | Lg. dec. | High | Common | Fair | Fair | | | 1 | 1 |
| shagbark hickory | Carya ovata | WSL | Medium | 69.6 | 386.1 | 9.3 | Lg. dec. | Lg. dec. | Medium | Common | Poor | Poor | | | 0 | 2 |
| American elm | Ulmus americana | WDH | Medium | 89.5 | 303.3 | 6.4 | No change | No change | Medium | Common | Fair | Fair | | | 1 | 3 |
| eastern redcedar | Juniperus virginiana | WDH | Medium | 56.2 | 281.5 | 10.5 | No change | No change | Medium | Common | Fair | Fair | | | 1 | 4 |
| honeylocust | Gleditsia triacanthos | NSH | Low | 62.7 | 223.9 | 8.7 | Sm. dec. | No change | High | Common | Fair | Good | | | 1 | 5 |
| black oak | Quercus velutina | WDH | High | 56 | 209.9 | 6.6 | No change | No change | Medium | Common | Fair | Fair | | | 1 | 6 |
| silver maple | Acer saccharinum | NSH | Low | 22.2 | 193.2 | 12.9 | No change | No change | High | Common | Good | Good | | | 1 | 7 |
| black walnut | Juglans nigra | WDH | Low | 65.9 | 183.2 | 7.0 | Sm. inc. | Sm. inc. | Medium | Common | Good | Good | | | 1 | 8 |
| Osage-orange | Maclura pomifera | NDH | Medium | 56.6 | 169.6 | 11.1 | No change | Sm. inc. | High | Common | Good | Very Good | | | 1 | 9 |
| shingle oak | Quercus imbricaria | NDH | Medium | 61.2 | 155.5 | 6.4 | No change | Sm. dec. | Medium | Common | Fair | Poor | | | 1 | 10 |
| black cherry | Prunus serotina | WDL | Medium | 63.8 | 108.7 | 3.5 | No change | Sm. dec. | Low | Common | Poor | Poor | | | 0 | 11 |
| hackberry | Celtis occidentalis | WDH | Medium | 39.4 | 104.6 | 4.9 | Lg. inc. | Lg. inc. | High | Common | Very Good | Very Good | | | 1 | 12 |
| northern red oak | Quercus rubra | WDH | Medium | 37.6 | 103.1 | 6.6 | No change | Lg. dec. | High | Common | Good | Fair | | | 1 | 13 |
| pin oak | Quercus palustris | NSH | Low | 16.2 | 101.2 | 10.4 | No change | No change | Low | Common | Poor | Poor | Infill + | Infill + | 0 | 14 |
| bitternut hickory | Carya cordiformis | WSL | Low | 42.9 | 79.0 | 3.9 | Sm. inc. | Sm. inc. | High | Common | Very Good | Very Good | | | 1 | 15 |
| black locust | Robinia pseudoacacia | NDH | Low | 18.7 | 78.1 | 9.5 | Sm. dec. | No change | Medium | Common | Poor | Fair | Infill + | Infill + | 1 | 16 |
| black willow | Salix nigra | NSH | Low | 21 | 77.1 | 4.9 | Lg. dec. | No change | Low | Common | Very Poor | Poor | | Infill + | 0 | 17 |
| white ash | Fraxinus americana | WDL | Medium | 48.8 | 74.3 | 4.0 | Sm. inc. | Sm. inc. | Low | Common | Fair | Fair | | | 1 | 18 |
| eastern cottonwood | Populus deltoides | NSH | Low | 11 | 74.3 | 12.4 | No change | No change | Medium | Common | Fair | Fair | Infill + | Infill + | 1 | 19 |
| slippery elm | Ulmus rubra | WSL | Low | 46.2 | 71.8 | 3.1 | No change | Sm. inc. | Medium | Common | Fair | Good | | | 1 | 20 |
| boxelder | Acer negundo | WSH | Low | 11.7 | 55.3 | 6.6 | No change | Sm. inc. | High | Common | Good | Very Good | Infill ++ | Infill ++ | 1 | 21 |
| bur oak | Quercus macrocarpa | NDH | Medium | 27.8 | 51.5 | 4.3 | Sm. inc. | No change | High | Common | Very Good | Good | Infill ++ | Infill ++ | 1 | 22 |
| eastern hophornbeam; ironw | Ostrya virginiana | WSL | Low | 34 | 50.7 | 3.5 | Sm. dec. | Sm. dec. | High | Common | Fair | Fair | | | 1 | 23 |
| red mulberry | Morus rubra | NSL | Low | 34 | 46.9 | 3.6 | Sm. inc. | Sm. inc. | Medium | Rare | Fair | Fair | | | 1 | 24 |
| American basswood | Tilia americana | WSL | Medium | 19.7 | 45.2 | 6.4 | Lg. dec. | Lg. dec. | Medium | Rare | Very Poor | Very Poor | | | 0 | 25 |
| green ash | Fraxinus pennsylvanica | WSH | Low | 22 | 41.8 | 3.3 | Lg. inc. | Lg. inc. | Medium | Rare | Good | Good | Infill ++ | Infill ++ | 1 | 26 |
| Ohio buckeye | Aesculus glabra | NSL | Low | 5.9 | 41.4 | 7.9 | Sm. dec. | Sm. dec. | Medium | Rare | Very Poor | Very Poor | | | 0 | 27 |
| swamp white oak | Quercus bicolor | NSL | Low | 27.6 | 37.2 | 4.2 | Lg. dec. | Lg. dec. | Medium | Rare | Very Poor | Very Poor | | | 0 | 28 |
| post oak | Quercus stellata | WDH | High | 7.8 | 33.0 | 3.9 | Lg. inc. | Lg. inc. | High | Rare | Good | Good | Infill ++ | Infill ++ | 2 | 29 |
| river birch | Betula nigra | NSL | Low | 16.4 | 28.3 | 4.4 | Lg. dec. | Lg. dec. | Medium | Rare | Very Poor | Very Poor | | | 0 | 30 |
| northern pin oak | Quercus ellipsoidalis | NSH | Medium | 2.8 | 27.3 | 8.4 | Lg. dec. | Lg. dec. | High | Rare | Poor | Poor | | | 0 | 31 |
| northern catalpa | Catalpa speciosa | NSHX | FIA | 2.1 | 23.3 | 11.0 | Unknown | Unknown | Medium | Rare | FIA Only | FIA Only | | | 0 | 32 |
| black maple | Acer nigrum | NSH | Low | 13.3 | 18.4 | 4.2 | Lg. dec. | Lg. dec. | High | Rare | Poor | Poor | | | 0 | 33 |
| white mulberry | Morus alba | NSL | FIA | 6.1 | 17.8 | 5.8 | Unknown | Unknown | NA | Rare | NNIS | NNIS | | | 0 | 34 |
| sycamore | Platanus occidentalis | NSL | Low | 2.1 | 12.2 | 5.8 | Sm. inc. | Sm. inc. | Medium | Rare | Fair | Fair | Infill + | Infill + | 2 | 35 |
| mockernut hickory | Carya alba | WDL | Medium | 19.2 | 6.7 | 1.5 | Lg. inc. | Lg. inc. | High | Rare | Good | Good | Infill ++ | Infill ++ | 1 | 36 |
| scarlet oak | Quercus coccinea | WDL | Medium | 1.1 | 5.6 | 5.2 | Lg. dec. | Lg. dec. | Medium | Rare | Very Poor | Very Poor | | | 0 | 37 |
| eastern redbud | Cercis canadensis | NSL | Low | 3.9 | 5.1 | 1.1 | No change | No change | Medium | Rare | Poor | Poor | Infill + | Infill + | 2 | 38 |
| sugar maple | Acer saccharum | WDH | High | 14.2 | 4.5 | 3.7 | Lg. inc. | Lg. inc. | High | Rare | Good | Good | Infill ++ | Infill ++ | 2 | 39 |
| Shumard oak | Quercus shumardii | NSL | Low | 1.1 | 4.3 | 4.0 | Sm. dec. | No change | High | Rare | Poor | Fair | | Infill + | 2 | 40 |
| pignut hickory | Carya glabra | WDL | Medium | 5.3 | 2.6 | 2.1 | Sm. dec. | Lg. dec. | Medium | Rare | Very Poor | Very Poor | | | 2 | 41 |
| sassafras | Sassafras albidum | WSL | Low | 6.6 | 2.3 | 1.2 | Sm. inc. | No change | Medium | Rare | Fair | Poor | Infill + | Infill + | 2 | 42 |
| serviceberry | Amelanchier spp. | NSL | Low | 1.1 | 1.0 | 1.0 | Lg. dec. | Lg. dec. | Medium | Rare | Very Poor | Very Poor | | | 0 | 43 |
| chinkapin oak | Quercus muehlenbergii | NSL | Medium | 0.9 | 0.6 | 0.5 | No change | No change | Medium | Rare | Poor | Poor | | | 0 | 44 |
| red pine | Pinus resinosa | NSH | Medium | 4.2 | 0.2 | 0.9 | Lg. dec. | Lg. dec. | Low | Rare | Very Poor | Very Poor | | | 0 | 45 |
| butternut | Juglans cinerea | NSLX | FIA | 4.2 | 0.2 | 0.8 | Unknown | Unknown | Low | Rare | FIA Only | FIA Only | | | 0 | 46 |
| cittamwood/gum bumelia | Sideroxylon lanuginosum ssp. | NSL | Low | 0 | 0 | 0 | New Habitat | New Habitat | High | Absent | New Habitat | New Habitat | | Migrate + | 3 | 47 |

One x One Degree
Climate Change Atlas Tree Species

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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 |
|---------------------------|-------------------------|-------|--------|-------|--------|-------|-------------|-------------|--------|---------|-------------|-------------|-----------|------------|-----|----|
| American hornbeam; muscle | Carpinus caroliniana | WSL | Low | 0 | 0 | 0 | Unknown | Unknown | Medium | Modeled | Unknown | Unknown | | | 0 | 48 |
| pecan | Carya illinoensis | NSH | Low | 0 | 0 | 0 | New Habitat | New Habitat | Low | Absent | New Habitat | New Habitat | Migrate + | Migrate ++ | 3 | 49 |
| black hickory | Carya texana | NDL | High | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | | Migrate + | | 3 |
| sugarberry | Celtis laevigata | NDH | Medium | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | Migrate + | Migrate ++ | 3 | 51 |
| flowering dogwood | Cornus florida | WDL | Medium | 0 | 0 | 0 | Unknown | Unknown | Medium | Absent | Unknown | Unknown | | | 2 | 52 |
| common persimmon | Diospyros virginiana | NSL | Low | 0 | 0 | 0 | New Habitat | New Habitat | High | Absent | New Habitat | New Habitat | Migrate + | Migrate ++ | 3 | 53 |
| blue ash | Fraxinus quadrangulata | NSL | Low | 0 | 0 | 0 | Unknown | Unknown | Low | Modeled | Unknown | Unknown | | | 0 | 54 |
| sweetgum | Liquidambar styraciflua | WDH | High | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | | Migrate + | 3 | 55 |
| pin cherry | Prunus pensylvanica | NSL | Low | 0 | 0 | 0 | Unknown | Unknown | Medium | Absent | Unknown | Unknown | | | 0 | 56 |
| blackjack oak | Quercus marilandica | NSL | Medium | 0 | 0 | 0 | New Habitat | New Habitat | High | Absent | New Habitat | New Habitat | Likely + | Likely + | 3 | 57 |
| water oak | Quercus nigra | WDH | High | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | | Migrate + | 3 | 58 |
| winged elm | Ulmus alata | WDL | Medium | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | Migrate + | Migrate ++ | 3 | 59 |
| cedar elm | Ulmus crassifolia | NDH | Medium | 0 | 0 | 0 | New Habitat | New Habitat | Low | Absent | New Habitat | New Habitat | | | 3 | 60 |