

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
 9,273.2 3,580.4 29

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 | 6 | 19 | Increase | 9 | 11 | Very Good | 0 | 0 | Likely | 3 | 3 |
| Hickory | 3 | | | Medium | 21 | 25 | No Change | 17 | 15 | Good | 10 | 11 | Infill | 22 | 22 |
| Maple | 4 | Abundant | 0 | Low | 23 | 8 | Decrease | 9 | 9 | Fair | 10 | 10 | Migrate | 2 | 10 |
| Oak | 6 | Common | 7 | FIA | 4 | | New | 12 | 13 | Poor | 8 | 7 | | | |
| Pine | 2 | Rare | 32 | | | | Unknown | 7 | 6 | Very Poor | 7 | 6 | | | |
| Other | 20 | Absent | 14 | | | | | | | FIA Only | 2 | 2 | | | |
| | 39 | | 53 | | 54 | 52 | | 54 | 54 | Unknown | 3 | 2 | | | |
| | | | | | | | | | | | 40 | 38 | | | |

Potential Changes in Climate Variables

Temperature (°F)

| | Scenario | 2009 | 2039 | 2069 | 2099 | |
|--------------------------|----------|------|------|------|------|--|
| Annual Average | CCSM45 | 49.4 | 51.5 | 53.9 | 54.1 | |
| | CCSM85 | 49.4 | 52.2 | 54.8 | 57.6 | |
| | GFDL45 | 49.4 | 55.7 | 54.9 | 55.9 | |
| | GFDL85 | 49.4 | 52.5 | 55.9 | 60.2 | |
| | HAD45 | 49.4 | 52.2 | 55.8 | 57.5 | |
| Growing Season (May-Sep) | CCSM45 | 68.0 | 70.3 | 72.4 | 73.0 | |
| | CCSM85 | 68.0 | 71.3 | 73.7 | 76.9 | |
| | GFDL45 | 68.0 | 75.7 | 74.4 | 76.1 | |
| | GFDL85 | 68.0 | 71.8 | 75.7 | 80.9 | |
| | HAD45 | 68.0 | 71.0 | 73.8 | 76.0 | |
| Coldest Month Average | CCSM45 | 19.2 | 20.9 | 23.3 | 23.3 | |
| | CCSM85 | 19.2 | 22.0 | 23.6 | 25.4 | |
| | GFDL45 | 19.2 | 23.2 | 24.2 | 24.8 | |
| | GFDL85 | 19.2 | 22.8 | 24.5 | 25.9 | |
| | HAD45 | 19.2 | 20.6 | 24.4 | 24.4 | |
| Warmest Month Average | CCSM45 | 73.9 | 76.2 | 77.7 | 78.4 | |
| | CCSM85 | 73.9 | 77.8 | 79.7 | 81.2 | |
| | GFDL45 | 73.9 | 77.1 | 78.7 | 80.0 | |
| | GFDL85 | 73.9 | 78.1 | 79.9 | 83.1 | |
| | HAD45 | 73.9 | 77.1 | 79.1 | 80.1 | |
| HAD85 | 73.9 | 78.3 | 81.6 | 84.6 | | |

Precipitation (in)

| | Scenario | 2009 | 2039 | 2069 | 2099 | |
|--------------------------|----------|------|------|------|------|--|
| Annual Total | CCSM45 | 36.4 | 35.5 | 35.3 | 35.6 | |
| | CCSM85 | 36.4 | 35.4 | 35.3 | 36.0 | |
| | GFDL45 | 36.4 | 39.2 | 42.9 | 43.1 | |
| | GFDL85 | 36.4 | 39.8 | 45.0 | 44.8 | |
| | HAD45 | 36.4 | 38.3 | 39.7 | 39.3 | |
| Growing Season (May-Sep) | CCSM45 | 19.7 | 19.5 | 18.9 | 18.5 | |
| | CCSM85 | 19.7 | 18.4 | 17.9 | 17.6 | |
| | GFDL45 | 19.7 | 20.4 | 22.4 | 22.3 | |
| | GFDL85 | 19.7 | 21.2 | 22.8 | 21.8 | |
| | HAD45 | 19.7 | 20.2 | 18.9 | 19.6 | |
| HAD85 | 19.7 | 20.2 | 17.0 | 17.7 | | |

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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Northern Research Station
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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 |
|----------------------------|-------------------------|-------|--------|-------|--------|-------|-------------|---------------|--------|---------|-------------|-------------|-----------|------------|-----|----|
| black cherry | Prunus serotina | WDL | Medium | 36.2 | 114.4 | 10.9 | Lg. dec. | Lg. dec. | Low | Common | Very Poor | Very Poor | | | 2 | 1 |
| bur oak | Quercus macrocarpa | NDH | Medium | 6.4 | 92.0 | 22.6 | Sm. dec. | Sm. dec. | High | Common | Fair | Fair | Infill + | Infill + | 2 | 2 |
| black walnut | Juglans nigra | WDH | Low | 30.5 | 82.3 | 11.7 | No change | No change | Medium | Common | Fair | Fair | Infill + | Infill + | 2 | 3 |
| American elm | Ulmus americana | WDH | Medium | 46.3 | 81.5 | 7.0 | Sm. inc. | Sm. inc. | Medium | Common | Good | Good | Infill ++ | Infill ++ | 2 | 4 |
| honeylocust | Gleditsia triacanthos | NSH | Low | 19.6 | 74.4 | 11.4 | No change | No change | High | Common | Good | Good | Infill ++ | Infill ++ | 2 | 5 |
| sugar maple | Acer saccharum | WDH | High | 5.8 | 58.4 | 14.0 | No change | No change | High | Common | Good | Good | | | 2 | 6 |
| white oak | Quercus alba | WDH | Medium | 8.1 | 53.9 | 12.1 | No change | No change | High | Common | Good | Good | Infill ++ | Infill ++ | 2 | 7 |
| boxelder | Acer negundo | WSH | Low | 12.4 | 48.4 | 10.4 | No change | No change | High | Rare | Fair | Fair | Infill + | Infill + | 2 | 8 |
| hackberry | Celtis occidentalis | WDH | Medium | 32.8 | 40.5 | 6.1 | Lg. inc. | Lg. inc. | High | Rare | Good | Good | Infill ++ | Infill ++ | 2 | 9 |
| white ash | Fraxinus americana | WDL | Medium | 8.8 | 38.9 | 3.6 | No change | No change | Low | Rare | Very Poor | Very Poor | | | 2 | 10 |
| northern red oak | Quercus rubra | WDH | Medium | 10.7 | 34.0 | 6.3 | No change | No change | High | Rare | Fair | Fair | Infill + | Infill + | 2 | 11 |
| black willow | Salix nigra | NSH | Low | 11.4 | 29.5 | 16.8 | Sm. dec. | Sm. inc. | Low | Rare | Very Poor | Poor | | Infill + | 2 | 12 |
| American basswood | Tilia americana | WSL | Medium | 5.8 | 29.2 | 9.6 | No change | Sm. dec. | Medium | Rare | Poor | Very Poor | Infill + | | 2 | 13 |
| Osage-orange | Maclura pomifera | NDH | Medium | 4.3 | 24.1 | 7.6 | No change | No change | High | Rare | Fair | Fair | Infill + | Infill + | 2 | 14 |
| silver maple | Acer saccharinum | NSH | Low | 11.2 | 22.5 | 26.2 | Lg. inc. | Lg. inc. | High | Rare | Good | Good | Infill ++ | Infill ++ | 2 | 15 |
| black oak | Quercus velutina | WDH | High | 8 | 21.2 | 6.7 | No change | No change | Medium | Rare | Poor | Poor | Infill + | Infill + | 2 | 16 |
| eastern white pine | Pinus strobus | WDH | High | 11.1 | 19.7 | 19.7 | Lg. dec. | Lg. dec. | Low | Rare | Very Poor | Very Poor | | | 0 | 17 |
| eastern cottonwood | Populus deltoides | NSH | Low | 5.4 | 18.4 | 14.0 | No change | No change | Medium | Rare | Poor | Poor | Infill + | Infill + | 2 | 18 |
| red mulberry | Morus rubra | NSL | Low | 7.3 | 18.2 | 7.4 | No change | No change | Medium | Rare | Poor | Poor | Infill + | Infill + | 2 | 19 |
| shagbark hickory | Carya ovata | WSL | Medium | 10.9 | 17.6 | 2.9 | Sm. inc. | Sm. inc. | Medium | Rare | Fair | Fair | Infill + | Infill + | 2 | 20 |
| slippery elm | Ulmus rubra | WSL | Low | 14.8 | 17.0 | 6.0 | Sm. inc. | Lg. inc. | Medium | Rare | Fair | Good | Infill + | Infill ++ | 2 | 21 |
| Siberian elm | Ulmus pumila | NDH | FIA | 2.9 | 16.2 | 40.8 | Unknown | Unknown | NA | Rare | NNIS | NNIS | | | 0 | 22 |
| eastern hophornbeam; ironw | Ostrya virginiana | WSL | Low | 10 | 15.7 | 2.6 | No change | No change | High | Rare | Fair | Fair | Infill + | Infill + | 2 | 23 |
| bitternut hickory | Carya cordiformis | WSL | Low | 7 | 15.2 | 4.6 | No change | No change | High | Rare | Fair | Fair | Infill + | Infill + | 2 | 24 |
| jack pine | Pinus banksiana | NSH | Medium | 4.3 | 14.2 | 52.6 | Lg. dec. | Lg. dec. | High | Rare | Poor | Poor | | | 0 | 25 |
| green ash | Fraxinus pennsylvanica | WSH | Low | 10.8 | 14.2 | 3.7 | Lg. inc. | Lg. inc. | Medium | Rare | Good | Good | Infill ++ | Infill ++ | 2 | 26 |
| white mulberry | Morus alba | NSL | FIA | 12.6 | 12.0 | 6.1 | Unknown | Unknown | NA | Rare | NNIS | NNIS | | | 0 | 27 |
| black maple | Acer nigrum | NSH | Low | 9.7 | 9.5 | 9.5 | Lg. dec. | Lg. dec. | High | Rare | Poor | Poor | | | 0 | 28 |
| wild plum | Prunus americana | NSLX | FIA | 1.1 | 8.8 | 8.2 | Unknown | Unknown | Medium | Rare | FIA Only | FIA Only | | | 0 | 29 |
| mockernut hickory | Carya alba | WDL | Medium | 0.3 | 6.0 | 1.3 | No change | No change | High | Rare | Fair | Fair | Infill + | Infill + | 2 | 30 |
| eastern redcedar | Juniperus virginiana | WDH | Medium | 4.1 | 4.7 | 1.8 | Lg. inc. | Lg. inc. | Medium | Rare | Good | Good | | | 2 | 31 |
| black ash | Fraxinus nigra | WSH | Medium | 0.2 | 2.6 | 0.5 | Lg. dec. | Very Lg. dec. | Low | Rare | Very Poor | Lost | | | 0 | 32 |
| post oak | Quercus stellata | WDH | High | 2.9 | 2.6 | 6.7 | Lg. inc. | Lg. inc. | High | Rare | Good | Good | | | 2 | 33 |
| sycamore | Platanus occidentalis | NSL | Low | 1.5 | 2.0 | 2.6 | Lg. inc. | Lg. inc. | Medium | Rare | Good | Good | | | 2 | 34 |
| chinkapin oak | Quercus muehlenbergii | NSL | Medium | 4.3 | 1.9 | 7.0 | No change | No change | Medium | Rare | Poor | Poor | Infill + | Infill + | 2 | 35 |
| blue ash | Fraxinus quadrangulata | NSL | Low | 4.3 | 1.8 | 6.7 | Sm. dec. | Sm. dec. | Low | Rare | Very Poor | Very Poor | | | 0 | 36 |
| flowering dogwood | Cornus florida | WDL | Medium | 0.3 | 1.5 | 0.3 | Sm. dec. | Lg. dec. | Medium | Rare | Very Poor | Very Poor | | | 0 | 37 |
| eastern redbud | Cercis canadensis | NSL | Low | 4.3 | 1.4 | 5.3 | No change | Sm. inc. | Medium | Rare | Poor | Fair | Infill + | Infill + | 2 | 38 |
| northern catalpa | Catalpa speciosa | NSHX | FIA | 0.2 | 0.6 | 0.1 | Unknown | Unknown | Medium | Rare | FIA Only | FIA Only | | | 0 | 39 |
| American hornbeam; musclev | Carpinus caroliniana | WSL | Low | 0 | 0 | 0 | Unknown | Unknown | Medium | Absent | Unknown | Unknown | | | 0 | 40 |
| pignut hickory | Carya glabra | WDL | Medium | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | | Migrate + | 3 | 41 |
| pecan | Carya illinoensis | NSH | Low | 0 | 0 | 0 | New Habitat | New Habitat | Low | Absent | New Habitat | New Habitat | | Migrate ++ | 3 | 42 |
| black hickory | Carya texana | NDL | High | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | | Migrate + | 3 | 43 |
| sugarberry | Celtis laevigata | NDH | Medium | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | | Migrate ++ | 3 | 44 |
| common persimmon | Diospyros virginiana | NSL | Low | 0 | 0 | 0 | New Habitat | New Habitat | High | Absent | New Habitat | New Habitat | | Migrate + | 3 | 45 |
| yellow-poplar | Liriodendron tulipifera | WDH | High | 0 | 0 | 0 | New Habitat | New Habitat | High | Absent | New Habitat | New Habitat | | Migrate + | 3 | 46 |
| blackgum | Nyssa sylvatica | WDL | Medium | 0 | 0 | 0 | Unknown | Unknown | High | Modeled | Unknown | Unknown | | | 0 | 47 |



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| Common Name | Scientific Name | Range | MR | %Cell | FIAsum | FIAiv | ChngCl45 | ChngCl85 | Adap | Abund | Capabil45 | Capabil85 | SHIFT45 | SHIFT85 | SSO | N |
|-----------------|----------------------|-------|--------|-------|--------|-------|-------------|-------------|--------|--------|-------------|-------------|------------|------------|-----|----|
| swamp white oak | Quercus bicolor | NSL | Low | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | Migrate + | Migrate + | 3 | 48 |
| shingle oak | Quercus imbricaria | NDH | Medium | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | Likely + | Likely + | 3 | 49 |
| pin oak | Quercus palustris | NSH | Low | 0 | 0 | 0 | New Habitat | New Habitat | Low | Absent | New Habitat | New Habitat | Likely + | Likely + | 3 | 50 |
| Shumard oak | Quercus shumardii | NSL | Low | 0 | 0 | 0 | Unknown | New Habitat | High | Absent | Unknown | New Habitat | | Migrate + | 3 | 51 |
| black locust | Robinia pseudoacacia | NDH | Low | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | Likely + | Likely + | 3 | 52 |
| sassafras | Sassafras albidum | WSL | Low | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | Migrate ++ | Migrate ++ | 3 | 53 |
| winged elm | Ulmus alata | WDL | Medium | 0 | 0 | 0 | New Habitat | New Habitat | Medium | Absent | New Habitat | New Habitat | | Migrate ++ | 3 | 54 |