

Harriet Tubman Underground Railroad

National Park 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

	sq. km	sq. mi	FIA Plots
Area of Region	8,189.4	3,161.9	155

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	19	21	Increase	16	19	Very Good	4	6	Likely	6	6
Hickory	3			Medium	34	50	No Change	10	8	Good	10	9	Infill	14	18
Maple	1	Abundant	4	Low	29	12	Decrease	18	17	Fair	9	11	Migrate	8	13
Oak	13	Common	13	FIA	4		New	29	30	Poor	12	9			
Pine	4	Rare	31				Unknown	13	12	Very Poor	6	4			
Other	25	Absent	36							FIA Only	2	2			
	48		84		86	83		86	86	Unknown	9	8			
											52	49			

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099	
Annual	57.1	58.6	60.5	60.8	
Average	57.1	59.0	61.2	63.9	
GFDL45	57.1	61.1	62.2	63.3	
GFDL85	57.1	60.1	63.4	67.2	
HAD45	57.1	59.2	62.3	63.6	
HAD85	57.1	59.4	63.0	67.0	
Growing Season	72.3	73.8	75.4	75.8	
May—Sep	72.3	74.0	76.3	79.5	
GFDL45	72.3	76.9	78.1	79.6	
GFDL85	72.3	75.9	79.6	83.8	
HAD45	72.3	74.7	77.4	78.9	
HAD85	72.3	74.5	78.5	82.6	
Coldest Month	34.3	36.5	37.7	38.2	
Average	34.3	36.9	38.0	39.5	
GFDL45	34.3	37.3	37.9	38.5	
GFDL85	34.3	36.8	37.9	39.3	
HAD45	34.3	35.6	37.5	37.8	
HAD85	34.3	36.2	37.7	39.6	
Warmest Month	78.1	79.8	80.6	80.7	
Average	78.1	79.9	81.6	82.7	
GFDL45	78.1	80.9	82.3	83.5	
GFDL85	78.1	82.1	84.0	86.5	
HAD45	78.1	80.8	82.4	83.0	
HAD85	78.1	80.9	83.1	85.7	

Precipitation (in)

Scenario	2009	2039	2069	2099	
Annual	44.3	48.1	50.7	50.9	
Total	44.3	49.6	50.0	56.8	
GFDL45	44.3	49.7	53.5	54.5	
GFDL85	44.3	47.2	53.4	54.5	
HAD45	44.3	47.4	48.3	46.7	
HAD85	44.3	51.9	46.4	48.6	
Growing Season	19.8	24.1	25.1	25.8	
May—Sep	19.8	24.2	24.0	27.3	
GFDL45	19.8	21.6	24.2	25.0	
GFDL85	19.8	20.7	23.9	24.4	
HAD45	19.8	22.1	20.9	18.6	
HAD85	19.8	22.9	19.1	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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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N	
loblolly pine	Pinus taeda	WDH	High	69.7	1938.8	33.9	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	1	
red maple	Acer rubrum	WDH	High	87.1	950.0	14.2	No change	No change	High	Abundant	Very Good	Very Good			1	2	
sweetgum	Liquidambar styraciflua	WDH	High	87.6	680.0	10.1	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	3	
yellow-poplar	Liriodendron tulipifera	WDH	High	48.2	587.6	14.3	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	4	
white oak	Quercus alba	WDH	Medium	59.2	386.3	8.8	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	5	
American holly	Ilex opaca	NSL	Medium	64.9	291.7	5.9	No change	Sm. dec.	Medium	Common	Fair	Poor			1	6	
blackgum	Nyssa sylvatica	WDL	Medium	73.1	209.0	4.0	No change	Sm. inc.	High	Common	Good	Very Good			1	7	
American beech	Fagus grandifolia	WDH	High	34.2	208.6	7.4	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	8	
Virginia pine	Pinus virginiana	NDH	High	25.5	183.6	7.4	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	9	
sassafras	Sassafras albidum	WSL	Low	34.4	122.3	4.4	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	10	
black cherry	Prunus serotina	WDL	Medium	36.3	110.9	4.0	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	11	
southern red oak	Quercus falcata	WDL	Medium	44.3	110.9	3.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	12	
scarlet oak	Quercus coccinea	WDL	Medium	25.3	82.4	3.7	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	13	
willow oak	Quercus phellos	NSL	Low	28.3	69.6	3.9	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	14	
swamp chestnut oak	Quercus michauxii	NSL	Low	21.8	65.9	3.7	No change	No change	Medium	Common	Fair	Fair			1	15	
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	14.5	63.6	4.7	Sm. dec.	No change	Medium	Common	Poor	Fair	Infill +	Infill +	1	16	
mockernut hickory	Carya alba	WDL	Medium	9.2	59.2	6.8	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	17	
northern red oak	Quercus rubra	WDH	Medium	18	44.6	3.2	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor	Infill +		2	18	
water oak	Quercus nigra	WDH	High	24.6	43.4	2.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	19	
black oak	Quercus velutina	WDH	High	19.3	42.6	2.9	Lg. inc.	Sm. inc.	Medium	Rare	Good	Fair	Infill ++	Infill +	1	20	
pignut hickory	Carya glabra	WDL	Medium	13.2	33.3	2.8	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			Infill +	2	21
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	16.5	32.4	2.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	22	
sycamore	Platanus occidentalis	NSL	Low	7.1	27.9	4.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	23	
white ash	Fraxinus americana	WDL	Medium	9.6	27.3	8.2	Lg. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	24	
green ash	Fraxinus pennsylvanica	WSH	Low	4.9	27.3	5.6	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	25	
sweetbay	Magnolia virginiana	NSL	Medium	20.1	18.7	1.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	26	
flowering dogwood	Cornus florida	WDL	Medium	11.2	15.4	1.6	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	27	
eastern redcedar	Juniperus virginiana	WDH	Medium	6.3	13.9	2.2	No change	No change	Medium	Rare	Poor	Poor			Infill +	2	28
shortleaf pine	Pinus echinata	WDH	High	3.6	13.1	3.6	No change	Sm. inc.	Medium	Rare	Poor	Fair			Infill +	2	29
black locust	Robinia pseudoacacia	NDH	Low	8.7	11.1	1.5	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	30	
ailanthus	Ailanthus altissima	NSL	FIA	2.1	9.7	3.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	31	
bald cypress	Taxodium distichum	NSH	Medium	1.2	9.7	8.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	32	
pin oak	Quercus palustris	NSH	Low	6.5	8.7	1.9	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	33	
chestnut oak	Quercus prinus	NDH	High	3.3	8.4	4.4	Lg. dec.	Very Lg. dec.	High	Rare	Poor	Lost			0	34	
white mulberry	Morus alba	NSL	FIA	1	8.1	5.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	35	
wild plum	Prunus americana	NSLX	FIA	1.2	6.6	5.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	36	
American elm	Ulmus americana	WDH	Medium	6	6.4	9.2	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	37	
river birch	Betula nigra	NSL	Low	2.4	6.1	2.5	No change	Lg. inc.	Medium	Rare	Poor	Good			2	38	
overcup oak	Quercus lyrata	NSL	Medium	2.4	3.7	1.5	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair			Infill +	2	39
swamp white oak	Quercus bicolor	NSL	Low	2.2	2.8	1.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	40	
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	2.4	2.7	1.1	Lg. dec.	Very Lg. dec.	Low	Rare	Very Poor	Lost			0	41	
black willow	Salix nigra	NSH	Low	1.2	2.5	2.0	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	42	
red mulberry	Morus rubra	NSL	Low	1.2	2.1	1.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	43	
pitch pine	Pinus rigida	NSH	High	1.2	2.1	1.7	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	44	
sand hickory	Carya pallida	NSL	FIA	1.2	2.0	1.6	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	45	
common persimmon	Diospyros virginiana	NSL	Low	3	0.9	0.4	Sm. inc.	No change	High	Rare	Good	Fair			Infill +	2	46
pawpaw	Asimina triloba	NSL	Low	5.7	0.8	0.6	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	47	



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slippery elm	Ulmus rubra	WSL	Low	2.5	0.5	0.9	No change	Lg. inc.	Medium	Rare	Poor	Good				2 48
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 49
slash pine	Pinus elliptii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3 50
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++		3 51
pond pine	Pinus serotina	NSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate ++	Migrate +		3 52
eastern white pine	Pinus strobus	WDH	High	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown				0 53
pond cypress	Taxodium ascendens	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3 54
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0 55
silver maple	Acer saccharinum	NSH	Low	0	0	0	New Habitat	Unknown	High	Absent	New Habitat	Unknown				3 56
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown				0 57
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown				0 58
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				0 59
water hickory	Carya aquatica	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3 60
bitternut hickory	Carya cordiformis	WSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +		3 61
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++		3 62
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3 63
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 64
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		3 65
hackberry	Celtis occidentalis	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +		3 66
loblolly-bay	Gordonia lasianthus	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3 67
black walnut	Juglans nigra	WDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +		3 68
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown				0 69
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0 70
water tupelo	Nyssa aquatica	NSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3 71
swamp tupelo	Nyssa biflora	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Likely +	Likely +		3 72
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		3 73
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +		3 74
redbay	Persea borbonia	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3 75
water elm	Planera aquatica	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3 76
quaking aspen	Populus tremuloides	WDH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0 77
turkey oak	Quercus laevis	NSH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		3 78
laurel oak	Quercus laurifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		3 79
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat		Migrate +		3 80
Nuttall oak	Quercus texana	NSH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				0 81
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +		3 82
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3 83
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat				3 84
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3 85
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				0 86