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

USDA Forest Service
Northern Research Station
Landscape Change Research Group
Iverson, Peters, Prasad, Matthews

	sq. km	sq. mi	FIA Plots
Area of Region	2,766.0	1,067.9	1

Species Information

The columns below provide breif 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
Ash	0
Hickory	1
Maple	1
Oak	4
Pine	1
Other	6
	13

Abundance	
Abundant	0
Common	3
Rare	10
Absent	18
	31

	Model Reliability	Adaptability
High	6	6
Medium	14	19
Low	11	6
FIA	0	
	31	**31**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	4	4
No Change	5	5
Decrease	4	4
New	12	13
Unknown	6	5
	31	**31**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	0	0
Good	3	3
Fair	3	3
Poor	4	4
Very Poor	3	3
FIA Only	0	0
Unknown	6	5
	19	**18**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	4	4
Infill	5	5
Migrate	4	6
	13	**15**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	68.6	70.0	71.6	71.8
	CCSM85	68.6	70.3	72.5	74.5
	GFDL45	68.6	73.5	72.6	73.6
	GFDL85	68.6	70.9	73.8	77.0
	HAD45	68.6	70.6	73.0	74.0
	HAD85	68.6	70.8	73.8	77.1
Growing Season May—Sep	CCSM45	80.2	81.4	82.5	82.7
	CCSM85	80.2	81.6	83.6	85.8
	GFDL45	80.2	86.1	84.3	86.1
	GFDL85	80.2	82.9	85.9	89.6
	HAD45	80.2	82.4	84.5	85.1
	HAD85	80.2	82.6	85.9	88.7
Coldest Month Average	CCSM45	50.6	52.7	53.7	53.7
	CCSM85	50.6	53.1	54.2	55.5
	GFDL45	50.6	53.7	53.8	53.9
	GFDL85	50.6	51.7	52.7	53.3
	HAD45	50.6	51.4	53.1	53.8
	HAD85	50.6	53.0	54.2	56.0
Warmest Month Average	CCSM45	83.4	84.4	84.8	84.9
	CCSM85	83.4	84.7	85.4	86.5
	GFDL45	83.4	86.5	86.8	88.1
	GFDL85	83.4	86.5	87.9	90.1
	HAD45	83.4	85.8	86.7	86.8
	HAD85	83.4	86.0	87.9	88.8

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	58.4	60.8	66.5	64.2
	CCSM85	58.4	61.3	63.9	63.0
	GFDL45	58.4	62.5	71.3	61.2
	GFDL85	58.4	60.7	62.6	61.2
	HAD45	58.4	56.9	57.2	63.1
	HAD85	58.4	61.8	56.0	58.6
Growing Season May—Sep	CCSM45	28.3	30.4	32.0	30.6
	CCSM85	28.3	29.4	29.7	28.1
	GFDL45	28.3	31.9	38.2	30.9
	GFDL85	28.3	30.7	32.5	33.0
	HAD45	28.3	27.6	27.3	30.4
	HAD85	28.3	28.2	25.6	25.6

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
water oak	Quercus nigra	WDH	High	2	230.1	8.9	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	2	1
sweetgum	Liquidambar styraciflua	WDH	High	2	83.3	3.2	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	2	2
American elm	Ulmus americana	WDH	Medium	15.1	52.7	4.8	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	2	3
loblolly pine	Pinus taeda	WDH	High	2	28.5	1.1	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	4
sugarberry	Celtis laevigata	NDH	Medium	13.1	24.3	24.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	5
black willow	Salix nigra	NSH	Low	1	20.3	1.6	No change	No change	Low	Rare	Very Poor	Very Poor			2	6
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	1	3.9	0.3	No change	No change	Medium	Rare	Poor	Poor		Infill +	2	7
live oak	Quercus virginiana	NDH	High	1	2.5	0.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	8
bitternut hickory	Carya cordiformis	WSL	Low	1	2.0	0.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	9
laurel oak	Quercus laurifolia	NDH	Medium	1	2.0	0.1	No change	No change	Medium	Rare	Poor	Poor	Infill +		2	10
red maple	Acer rubrum	WDH	High	1	1.5	0.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	11
black cherry	Prunus serotina	WDL	Medium	1	0.9	0.1	Sm. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	12
American holly	Ilex opaca	NSL	Medium	1	0.6	0.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	13
bald cypress	Taxodium distichum	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	14
boxelder	Acer negundo	WSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	15
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	16
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	17
water hickory	Carya aquatica	NSL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	18
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	19
green ash	Fraxinus pennsylvanica	WSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	20
silverbell	Halesia spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	21
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	22
water tupelo	Nyssa aquatica	NSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +		3	23
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	24
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	25
overcup oak	Quercus lyrata	NSL	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3	26
swamp chestnut oak	Quercus michauxii	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	27
willow oak	Quercus phellos	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	28
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	29
cabbage palmetto	Sabal palmetto	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	30
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	31