Section 332C

EcoMap 2007
Climate Change Atlas Tree Species
Current and Potential Future Habitat, Capability, and Migration

USDA Forest Service
Northern Research Station
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Iverson, Peters, Prasad, Matthews

	sq. km	sq. mi	FIA Plots
Area of Region	44,761	17,282	49

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	1
Hickory	0
Maple	2
Oak	1
Pine	1
Other	14
	19

Abundance	
Abundant	0
Common	1
Rare	18
Absent	20
	39

	Model Reliability	Adaptability
High	8	14
Medium	14	23
Low	18	5
FIA	3	
	43	**42**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	4	5
No Change	9	8
Decrease	3	3
New	16	16
Unknown	11	11
	43	**43**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	0	0
Good	2	4
Fair	6	5
Poor	7	5
Very Poor	1	2
FIA Only	2	2
Unknown	8	8
	26	**26**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	0	0
Infill	9	7
Migrate	2	3
	11	**10**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	49.1	50.8	52.9	53.7
	CCSM85	49.1	51.4	53.8	56.9
	GFDL45	49.1	55.0	53.6	55.0
	GFDL85	49.1	51.7	54.8	59.2
	HAD45	49.1	51.9	55.4	56.4
	HAD85	49.1	52.3	57.3	60.8
Growing Season May—Sep	CCSM45	67.6	69.7	72.2	72.9
	CCSM85	67.6	70.4	72.9	76.8
	GFDL45	67.6	75.6	73.5	75.6
	GFDL85	67.6	71.1	74.7	80.2
	HAD45	67.6	70.0	72.9	74.0
	HAD85	67.6	70.6	75.3	78.7
Coldest Month Average	CCSM45	21.2	23.3	24.3	25.5
	CCSM85	21.2	23.5	24.4	26.3
	GFDL45	21.2	24.4	24.7	25.1
	GFDL85	21.2	23.6	25.1	26.5
	HAD45	21.2	23.8	27.1	26.5
	HAD85	21.2	26.7	30.4	32.3
Warmest Month Average	CCSM45	74.6	77.1	79.0	79.7
	CCSM85	74.6	78.5	80.0	82.8
	GFDL45	74.6	78.2	79.6	80.9
	GFDL85	74.6	79.1	80.5	84.2
	HAD45	74.6	76.9	78.9	79.5
	HAD85	74.6	78.3	80.9	83.1

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	25.7	27.4	26.1	25.8
	CCSM85	25.7	26.6	27.1	27.0
	GFDL45	25.7	29.1	31.8	30.5
	GFDL85	25.7	29.1	32.3	31.1
	HAD45	25.7	29.2	28.1	29.1
	HAD85	25.7	27.6	27.7	29.6
Growing Season May—Sep	CCSM45	16.6	17.0	15.5	15.4
	CCSM85	16.6	15.9	16.1	15.5
	GFDL45	16.6	19.2	20.8	19.0
	GFDL85	16.6	19.0	20.6	19.2
	HAD45	16.6	18.0	17.3	17.6
	HAD85	16.6	17.0	16.0	15.3

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
eastern redcedar	Juniperus virginiana	WDH	Medium	24.2	86.0	34.4	Sm. dec.	No change	Medium	Common	Poor	Fair	Infill +	Infill +	2	1
green ash	Fraxinus pennsylvanica	WSH	Low	14.3	38.5	21.4	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		2	2
bur oak	Quercus macrocarpa	NDH	Medium	5.8	24.2	25.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	3
eastern cottonwood	Populus deltoides	NSH	Low	10.5	22.7	25.5	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	4
red mulberry	Morus rubra	NSL	Low	11.2	20.7	21.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	5
American elm	Ulmus americana	WDH	Medium	15.4	17.3	10.9	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	6
Siberian elm	Ulmus pumila	NDH	FIA	6.9	12.8	19.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	7
hackberry	Celtis occidentalis	WDH	Medium	10.1	9.7	9.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	8
boxelder	Acer negundo	WSH	Low	6.7	8.5	15.0	No change	Sm. dec.	High	Rare	Fair	Poor	Infill +	Infill +	2	9
peachleaf willow	Salix amygdaloides	NSLX	FIA	4.6	8.3	20.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	10
black willow	Salix nigra	NSH	Low	1.9	6.8	32.8	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	11
black walnut	Juglans nigra	WDH	Low	0.9	3.4	61.2	No change	No change	Medium	Rare	Poor	Poor		Infill +	2	12
honeylocust	Gleditsia triacanthos	NSH	Low	3.8	2.9	13.0	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	13
jack pine	Pinus banksiana	NSH	Medium	1.9	2.8	25.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	14
black locust	Robinia pseudoacacia	NDH	Low	0.7	2.5	32.2	No change	Lg. inc.	Medium	Rare	Poor	Good	Infill +		2	15
silver maple	Acer saccharinum	NSH	Low	1.1	1.1	6.8	No change	No change	High	Rare	Fair	Fair			0	16
northern catalpa	Catalpa speciosa	NSHX	FIA	1.6	1.0	6.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	17
slippery elm	Ulmus rubra	WSL	Low	1.4	0.2	1.1	No change	No change	Medium	Rare	Poor	Poor			0	18
Osage-orange	Maclura pomifera	NDH	Medium	0	0.1	0.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	19
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	20
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	21
eastern white pine	Pinus strobus	WDH	High	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	22
Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	23
red maple	Acer rubrum	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	24
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	25
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	26
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	27
pecan	Carya illinoinensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	28
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	29
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	30
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	31
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	32
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	33
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	34
balsam poplar	Populus balsamifera	NSH	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	35
black cherry	Prunus serotina	WDL	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	36
white oak	Quercus alba	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	37
scarlet oak	Quercus coccinea	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	38
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	39
northern red oak	Quercus rubra	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	40
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	41
black oak	Quercus velutina	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	42
American mountain-ash	Sorbus americana	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	43