S39 E90

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

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	sq. km	sq. mi	FIA Plots
Area of Region	9,549.4	3,687.0	90

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	3
Hickory	7
Maple	4
Oak	12
Pine	2
Other	29
	57

Abundance	
Abundant	0
Common	23
Rare	34
Absent	16
	73

	Model Reliability	Adaptability
High	14	21
Medium	25	41
Low	30	10
FIA	5	
	74	**72**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	13	22
No Change	16	6
Decrease	23	24
New	13	13
Unknown	9	9
	74	**74**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	3	5
Good	11	14
Fair	14	10
Poor	8	8
Very Poor	14	13
FIA Only	3	3
Unknown	4	4
	57	**57**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	1	1
Infill	10	10
Migrate	5	9
	16	**20**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	53.3	55.2	57.1	57.5
	CCSM85	53.3	55.8	58.1	61.1
	GFDL45	53.3	58.4	58.6	59.5
	GFDL85	53.3	56.2	59.4	63.4
	HAD45	53.3	56.0	59.3	61.0
	HAD85	53.3	56.4	61.1	65.2
Growing Season May—Sep	CCSM45	70.8	73.0	74.5	75.4
	CCSM85	70.8	73.8	76.0	79.6
	GFDL45	70.8	77.1	77.1	78.6
	GFDL85	70.8	74.4	78.2	83.2
	HAD45	70.8	73.8	76.6	78.8
	HAD85	70.8	74.3	80.0	83.9
Coldest Month Average	CCSM45	25.1	27.1	28.8	29.1
	CCSM85	25.1	28.3	29.5	31.0
	GFDL45	25.1	29.7	30.2	30.7
	GFDL85	25.1	28.3	29.7	30.7
	HAD45	25.1	26.8	29.6	29.8
	HAD85	25.1	28.5	31.3	33.3
Warmest Month Average	CCSM45	76.9	79.2	80.3	81.0
	CCSM85	76.9	80.4	82.0	83.6
	GFDL45	76.9	80.2	81.8	82.9
	GFDL85	76.9	80.8	82.5	85.7
	HAD45	76.9	80.1	82.2	83.1
	HAD85	76.9	81.8	85.2	87.4

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	38.9	37.2	40.6	38.9
	CCSM85	38.9	38.5	40.5	40.5
	GFDL45	38.9	43.2	45.2	46.3
	GFDL85	38.9	42.7	48.5	49.1
	HAD45	38.9	40.5	42.1	41.7
	HAD85	38.9	41.2	39.9	43.0
Growing Season May—Sep	CCSM45	19.1	18.2	19.8	17.9
	CCSM85	19.1	17.9	18.7	17.9
	GFDL45	19.1	20.8	20.8	21.4
	GFDL85	19.1	20.8	22.3	21.9
	HAD45	19.1	19.3	18.6	18.6
	HAD85	19.1	19.1	16.7	17.0

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
white oak	Quercus alba	WDH	Medium	49	368.9	9.4	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	1
sugar maple	Acer saccharum	WDH	High	35.9	294.5	7.9	No change	No change	High	Common	Good	Good			1	2
American elm	Ulmus americana	WDH	Medium	71.6	293.3	7.4	No change	No change	Medium	Common	Fair	Fair			1	3
black oak	Quercus velutina	WDH	High	43.8	268.4	8.9	No change	Sm. dec.	Medium	Common	Fair	Poor			1	4
shingle oak	Quercus imbricaria	NDH	Medium	38.2	224.4	7.8	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	5
hackberry	Celtis occidentalis	WDH	Medium	47.4	170.9	4.9	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	6
silver maple	Acer saccharinum	NSH	Low	23.9	159.4	18.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	7
green ash	Fraxinus pennsylvanica	WSH	Low	21.6	151.7	8.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	8
northern red oak	Quercus rubra	WDH	Medium	32.1	134.8	4.7	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	9
honeylocust	Gleditsia triacanthos	NSH	Low	26.5	134.4	10.0	No change	Sm. inc.	High	Common	Good	Very Good			1	10
black cherry	Prunus serotina	WDL	Medium	43.9	121.4	4.0	No change	Sm. dec.	Low	Common	Poor	Poor			0	11
sassafras	Sassafras albidum	WSL	Low	32.3	119.0	4.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	12
shagbark hickory	Carya ovata	WSL	Medium	36.9	116.4	4.0	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	13
black walnut	Juglans nigra	WDH	Low	44.7	113.6	5.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	14
bitternut hickory	Carya cordiformis	WSL	Low	39.7	111.0	7.1	No change	No change	High	Common	Good	Good			1	15
white ash	Fraxinus americana	WDL	Medium	26.4	108.5	4.1	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	16
pignut hickory	Carya glabra	WDL	Medium	21.1	97.4	5.6	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	17
slippery elm	Ulmus rubra	WSL	Low	43.6	96.2	3.6	No change	Sm. inc.	Medium	Common	Fair	Good			1	18
eastern cottonwood	Populus deltoides	NSH	Low	12.1	72.6	11.7	No change	Sm. inc.	Medium	Common	Fair	Good	Infill +	Infill ++	1	19
sycamore	Platanus occidentalis	NSL	Low	21.3	69.4	11.9	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	20
boxelder	Acer negundo	WSH	Low	21.9	60.9	5.6	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	21
bur oak	Quercus macrocarpa	NDH	Medium	5.3	51.8	12.7	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	2	22
mockernut hickory	Carya alba	WDL	Medium	28.7	50.2	2.7	No change	Sm. inc.	High	Common	Good	Very Good			1	23
red mulberry	Morus rubra	NSL	Low	26.3	48.0	3.4	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	24
pin oak	Quercus palustris	NSH	Low	11.3	45.0	10.5	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	25
post oak	Quercus stellata	WDH	High	9.5	43.8	2.3	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	26
eastern redbud	Cercis canadensis	NSL	Low	12.5	43.6	4.4	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	27
chinkapin oak	Quercus muehlenbergii	NSL	Medium	12.8	42.8	2.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	28
Osage-orange	Maclura pomifera	NDH	Medium	31	41.6	8.6	Sm. inc.	Lg. inc.	High	Rare	Good	Good			1	29
swamp white oak	Quercus bicolor	NSL	Low	7.7	39.0	8.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	30
American basswood	Tilia americana	WSL	Medium	14.4	38.0	3.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	31
blue ash	Fraxinus quadrangulata	NSL	Low	0.3	37.2	10.0	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	32
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	18.4	28.2	2.0	No change	No change	High	Rare	Fair	Fair			1	33
black willow	Salix nigra	NSH	Low	5.1	24.2	3.8	No change	No change	Low	Rare	Very Poor	Very Poor			2	34
flowering dogwood	Cornus florida	WDL	Medium	22.9	23.4	1.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	35
black locust	Robinia pseudoacacia	NDH	Low	2.8	20.8	6.4	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	36
white mulberry	Morus alba	NSL	FIA	12.2	20.4	4.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	37
common persimmon	Diospyros virginiana	NSL	Low	5.7	20.2	2.3	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1	38
eastern redcedar	Juniperus virginiana	WDH	Medium	1.8	8.6	3.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	39
southern red oak	Quercus falcata	WDL	Medium	0.8	8.3	6.0	No change	Sm. inc.	High	Rare	Fair	Good			2	40
northern catalpa	Catalpa speciosa	NSHX	FIA	4.2	7.4	28.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	41
black hickory	Carya texana	NDL	High	3.4	7.3	1.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	42
pecan	Carya illinoinensis	NSH	Low	9.4	5.7	2.5	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	43
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	0.4	5.1	1.8	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	44
pawpaw	Asimina triloba	NSL	Low	5.2	5.0	3.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	45
red pine	Pinus resinosa	NSH	Medium	4.2	4.8	18.3	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	46
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	6.2	4.2	1.5	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	47

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Ohio buckeye	Aesculus glabra	NSL	Low	13.6	4.1	2.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	48
eastern white pine	Pinus strobus	WDH	High	4.2	3.8	14.3	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	49
river birch	Betula nigra	NSL	Low	3.7	3.1	10.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	50
wild plum	Prunus americana	NSLX	FIA	1	2.4	2.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	51
Shumard oak	Quercus shumardii	NSL	Low	0.4	2.3	0.8	No change	Lg. inc.	High	Rare	Fair	Good			2	52
butternut	Juglans cinerea	NSLX	FIA	0.4	1.5	0.5	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	53
serviceberry	Amelanchier spp.	NSL	Low	0.7	1.0	0.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	54
Siberian elm	Ulmus pumila	NDH	FIA	4.2	0.6	2.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	55
shellbark hickory	Carya laciniosa	NSL	Low	1	0.4	0.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	56
black maple	Acer nigrum	NSH	Low	4.2	0.3	1.2	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	57
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	58
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	59
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	60
red maple	Acer rubrum	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	61
yellow birch	Betula alleghaniensis	NDL	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	62
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	63
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	64
American beech	Fagus grandifolia	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	65
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	66
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	67
bigtooth aspen	Populus grandidentata	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	68
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	69
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	70
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	71
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	72
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	73
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	74