HUC 111302 Red-Lake Texoma

HUC 6 Watershed
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	28,614	11,048	165

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	4
Maple	2
Oak	9
Pine	1
Other	21
	40

Abundance	
Abundant	0
Common	6
Rare	34
Absent	8
	48

	Model Reliability	Adaptability
High	9	15
Medium	17	27
Low	19	5
FIA	4	
	49	**47**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	7	8
No Change	12	13
Decrease	17	15
New	2	2
Unknown	11	11
	49	**49**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	0	0
Good	7	7
Fair	5	7
Poor	15	14
Very Poor	9	8
FIA Only	3	3
Unknown	7	7
	46	**46**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	1	1
Infill	21	22
Migrate	1	1
	23	**24**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	54.9	56.0	57.1	57.7
	CCSM85	54.9	56.5	57.8	59.8
	GFDL45	54.9	58.1	58.2	59.4
	GFDL85	54.9	57.1	59.3	62.3
	HAD45	54.9	56.5	58.4	59.0
	HAD85	54.9	56.8	59.8	62.0
Growing Season May—Sep	CCSM45	66.3	67.3	68.6	69.1
	CCSM85	66.3	68.0	69.3	71.8
	GFDL45	66.3	70.4	70.4	72.4
	GFDL85	66.3	69.4	72.0	75.8
	HAD45	66.3	67.7	69.4	69.8
	HAD85	66.3	68.2	71.5	73.4
Coldest Month Average	CCSM45	38.0	39.6	40.1	40.7
	CCSM85	38.0	39.6	40.1	41.3
	GFDL45	38.0	40.4	40.4	40.5
	GFDL85	38.0	38.5	39.5	39.8
	HAD45	38.0	38.5	40.1	40.3
	HAD85	38.0	40.4	41.7	42.9
Warmest Month Average	CCSM45	70.8	71.8	72.7	72.9
	CCSM85	70.8	72.5	73.0	74.5
	GFDL45	70.8	74.8	75.0	76.6
	GFDL85	70.8	74.9	76.3	79.6
	HAD45	70.8	72.3	73.2	73.3
	HAD85	70.8	73.0	74.6	75.4

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	23.2	24.0	23.7	23.1
	CCSM85	23.2	22.5	24.4	23.9
	GFDL45	23.2	23.9	27.4	23.0
	GFDL85	23.2	23.7	25.7	24.3
	HAD45	23.2	24.2	23.3	24.6
	HAD85	23.2	24.1	21.2	23.7
Growing Season May—Sep	CCSM45	11.6	11.9	11.2	11.2
	CCSM85	11.6	11.5	11.3	10.8
	GFDL45	11.6	12.1	14.1	11.7
	GFDL85	11.6	12.5	13.3	12.1
	HAD45	11.6	12.0	11.7	12.0
	HAD85	11.6	11.6	9.5	10.9

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.

Cite as: Iverson, L.R.; Prasad, A.M.; Peters, M.P.; Matthews, S.N. 2019. Facilitating Adaptive Forest Management under Climate Change: A Spatially Specific Synthesis of 125 Species for Habitat Changes and Assisted Migration over the Eastern United States. Forests. 10(11): 989. https://doi.org/10.3390/f10110989.

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
post oak	Quercus stellata	WDH	High	41.7	348.1	28.1	No change	Sm. dec.	High	Common	Good	Fair	Infill ++	Infill +	1	1
American elm	Ulmus americana	WDH	Medium	36.2	164.3	17.1	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	2
ashe juniper	Juniperus ashei	NDH	High	2.6	123.8	16.8	No change	No change	Medium	Rare	Poor	Poor			0	3
pecan	Carya illinoinensis	NSH	Low	27.7	85.5	14.9	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	4
eastern redcedar	Juniperus virginiana	WDH	Medium	24.6	76.9	13.3	Sm. dec.	No change	Medium	Common	Poor	Fair	Infill +	Infill +	2	5
blackjack oak	Quercus marilandica	NSL	Medium	24	70.8	9.7	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	6
sugarberry	Celtis laevigata	NDH	Medium	28	62.2	8.6	Sm. dec.	No change	Medium	Common	Poor	Fair	Infill +	Infill +	1	7
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	19.7	39.1	6.6	Lg. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	8
Texas ash	Fraxinus texensis	NDH	FIA	5.9	34.3	18.5	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	9
black willow	Salix nigra	NSH	Low	10.9	27.1	12.4	Lg. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	10
winged elm	Ulmus alata	WDL	Medium	15.2	25.0	7.7	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	11
cedar elm	Ulmus crassifolia	NDH	Medium	11.9	20.8	8.7	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	12
green ash	Fraxinus pennsylvanica	WSH	Low	14	17.4	4.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	13
honeylocust	Gleditsia triacanthos	NSH	Low	17.6	15.2	10.4	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	14
Osage-orange	Maclura pomifera	NDH	Medium	13.5	13.6	3.8	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	15
hackberry	Celtis occidentalis	WDH	Medium	18.5	12.3	2.8	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	16
mockernut hickory	Carya alba	WDL	Medium	0.5	12.2	1.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	17
bur oak	Quercus macrocarpa	NDH	Medium	3.4	11.8	4.0	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	18
slippery elm	Ulmus rubra	WSL	Low	6.6	6.9	6.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	19
chinkapin oak	Quercus muehlenbergii	NSL	Medium	2.6	6.6	4.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	20
common persimmon	Diospyros virginiana	NSL	Low	3.6	6.3	4.5	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	21
Shumard oak	Quercus shumardii	NSL	Low	8.9	4.7	1.4	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	22
eastern cottonwood	Populus deltoides	NSH	Low	5.6	3.5	8.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	23
black walnut	Juglans nigra	WDH	Low	4.6	2.6	5.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	24
sweetgum	Liquidambar styraciflua	WDH	High	0.3	2.4	5.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	25
durand oak	Quercus sinuata var. sinuata	NSL	FIA	2.3	2.4	2.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	26
wild plum	Prunus americana	NSLX	FIA	7.9	1.8	2.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	27
white ash	Fraxinus americana	WDL	Medium	6.9	1.7	1.2	No change	No change	Low	Rare	Very Poor	Very Poor			2	28
sycamore	Platanus occidentalis	NSL	Low	1.8	1.6	3.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	29
red mulberry	Morus rubra	NSL	Low	5.3	1.6	1.3	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	30
black hickory	Carya texana	NDL	High	8.3	1.2	1.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	31
northern red oak	Quercus rubra	WDH	Medium	6.2	1.2	2.0	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	32
eastern redbud	Cercis canadensis	NSL	Low	1.3	1.1	0.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	33
black oak	Quercus velutina	WDH	High	3.9	0.9	1.3	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	34
sugar maple	Acer saccharum	WDH	High	1.5	0.7	7.7	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	35
boxelder	Acer negundo	WSH	Low	3.1	0.5	2.6	No change	Sm. inc.	High	Rare	Fair	Good			2	36
loblolly pine	Pinus taeda	WDH	High	0.2	0.4	0.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			0	37
Siberian elm	Ulmus pumila	NDH	FIA	0.3	0.3	0.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	38
shagbark hickory	Carya ovata	WSL	Medium	1.4	0.3	3.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	39
southern red oak	Quercus falcata	WDL	Medium	1.6	0.1	1.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	40
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	0	0	0	Unknown	Unknown	Low	Modeled	Unknown	Unknown			0	41
jack pine	Pinus banksiana	NSH	Medium	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	42
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	43
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	44
pawpaw	Asimina triloba	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	45
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	46
swamp chestnut oak	Quercus michauxii	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	47

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water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	48
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	49