### EcoMap 2007

### 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	18,067	6,975.6	429

### **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								Potentia	l Change i	n Habitat S	uitability	Capability	to Cope o	r Persist	Migratio	n Potent	tial
Asł	n 3					Model				Scenario	Scenario			Scenario	Scenario		SHIFT	SHIFT
Hickor	/ 7		Abu	indance		Reliability	Adaptabili	ty		RCP45	RCP85			RCP45	RCP85		RCP45	RCP85
Maple	e 5	A	Abundant	6	Hi	gh 24	25	1	Increase	24	30		Very Good	12	16	Likely	2	2
Oal	< 11		Common	32	Mediu	m 30	57	No	Change	15	12		Good	15	14	Infill	3	8
Pine	e 6		Rare	43	Lo	w 39	15	D	ecrease	34	31		Fair	11	12	Migrate	3	10
Othe	r 49		Absent	19	F	IA 8			New	15	16		Poor	14	13	-	8	20
	81		_	100		101	97	U	nknown	13	12		Very Poor	19	18			
									_	101	101		FIA Only	5	5			
													Unknown	5	4			
Potent	ial Chang	es in Clin	nate Vai	riables										81	82			
Temperat	ure (°F)						Precipitati	ion (in)										
	Scenario	2009	2039	2069	2099			Scenario	2009	2039	2069	2099						
Annual	CCSM45	57.3	59.2	61.4	61.5 🛶 🔶	<b>◆</b>	Annual	CCSM45	49.7	52.3	55.8	54.7						
Average	CCSM85	57.3	59.6	62.0	64.9	*	Total	CCSM85	49.7	54.2	55.7	59.9	•					
	GFDL45	57.3	60.0	62.5	63.2	•		GFDL45	49.7	55.4	56.7	60.8						
	GFDL85	57.3	60.2	63.6	67.1	•		GFDL85	49.7	54.8	58.3	60.0						
	HAD45	57.3	59.6	62.7	63.9	•		HAD45	49.7	48.5	52.4	53.3 🛶 🔶	•					
	HAD85	57.3	59.9	64.2	68.2	•		HAD85	49.7	52.0	48.0	51.1	•					
Growing	CCSM45	71.9	73.7	75.7	76.3	•	Growing	CCSM45	20.6	21.6	22.8	22.5 + + +	•					
Season	CCSM85	71.9	74.0	76.6	80.4 🛶 🔶	<b>٠</b>	Season	CCSM85	20.6	22.3	21.5	23.3 + + +						
May—Sep	GFDL45	71.9	75.1	78.0	79.3		May—Sep	GFDL45	20.6	23.8	23.7	25.0						
	GFDL85	71.9	75.4	79.5	83.4	•		GFDL85	20.6	22.9	24.4	25.0 + + +						
	HAD45	71.9	75.0	77.9	79.4			HAD45	20.6	20.2	20.1	20.6						
	HAD85	71.9	75.1	81.2	85.0	•		HAD85	20.6	21.7	17.5	19.1 +++++++++++++++++++++++++++++++++++	•					
Coldest	CCSM45	35.4	37.6	38.6	38.8	•												
Month	CCSM85	35.4	38.2	39.0	40.3	•	NOTE: For	the six clir	mate varia	ables, four	30-year pe	eriods are used to	o indicate six	potential	future trajeo	tories. The p	eriod	

39.2

38.9

37.7

39.6

80.1

82.4

82.6

85.3

83.7

87.8

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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Average GFDL45

Warmest CCSM45

Month Average GFDL45

GFDL85

HAD45

HAD85

CCSM85

GFDL85

HAD45

HAD85

35.4

35.4

35.4

35.4

76.8

76.8

76.8

76.8

76.8

76.8

38.8

37.2

35.2

36.5

78.8

79.0

80.2

80.7

80.7

81.6

38.8

38.3

37.3

38.0

79.9

80.6

81.8

83.2

82.9

85.9

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO N	<u> </u>
yellow-poplar	Liriodendron tulipifera	WDH	High	76.4	1006.3	8.7 Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
Virginia pine	Pinus virginiana	NDH	High	69.1	989.6	9.7 Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	2
chestnut oak	Quercus prinus	NDH	High	47.9	687.4	7.7 Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	3
eastern redcedar	Juniperus virginiana	WDH	Medium	56.7	679.7	9.4 Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	4
red maple	Acer rubrum	WDH	High	68.4	679.1	5.9 Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	5
white oak	Quercus alba	WDH	Medium	64.3	528.8	5.5 Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	6
loblolly pine	Pinus taeda	WDH	High	20.3	431.8	12.4 Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	7
pignut hickory	Carya glabra	WDL	Medium	62.4	366.8	3.8 Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	8
mockernut hickory	Carya alba	WDL	Medium	53.9	333.4	4.3 Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	9
sugar maple	Acer saccharum	WDH	High	52	324.1	4.1 Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	10
sourwood	Oxydendrum arboreum	NDL	High	56.4	303.7	3.2 Sm. dec.	Lg. dec.	High	Common	Fair	Fair			1	11
blackgum	Nyssa sylvatica	WDL	Medium	62.6	282.5	3.0 Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	12
southern red oak	Quercus falcata	WDL	Medium	36.2	275.0	6.7 Sm. inc.	Lg. inc.	High	Common	, Very Good	, Very Good			1	13
black cherry	Prunus serotina	WDL	Medium	51.7	273.0	3.7 No change	Sm. inc.	Low	Common	Poor	Fair			1	
black oak	Quercus velutina	WDH	High	54.6	269.0	3.3 Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	_
scarlet oak	Quercus coccinea	WDL	Medium	36.7	244.1	3.3 Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	
sweetgum	Liquidambar styraciflua	WDH	High	27.9	228.3	5.6 Lg. inc.	Lg. inc.	Medium		Very Good	Very Good			1	
sassafras	Sassafras albidum	WSL	Low	42.7	218.8	3.2 Sm. dec.	Sm. dec.	Medium		Poor	Poor			0	
northern red oak	Quercus rubra	WDH	Medium	46.6	216.8	2.9 Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	
shagbark hickory	Carya ovata	WSL	Medium	42.1	213.1	3.9 Sm. dec.	Sm. dec.	Medium		Poor	Poor			0	
black locust	Robinia pseudoacacia	NDH	Low	40.1	209.7	3.5 Sm. dec.	Lg. dec.		Common	Poor	Poor			0	
white ash	Fraxinus americana	WDL	Medium	33.7	195.0	4.5 No change	Sm. inc.	Low	Common	Poor	Fair			1	
flowering dogwood	Cornus florida	WDL	Medium	54.4	193.5	2.3 No change	No change	Medium		Fair	Fair			1	
shortleaf pine	Pinus echinata	WDL	High	34.4	193.5	4.2 Lg. inc.		Medium		Very Good	Very Good				23
		WDL	-		159.0	-	Lg. inc.			,				1	
winged elm	Ulmus alata		Medium	30.8		4.4 Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good				
American beech	Fagus grandifolia	WDH	High	41.4	153.0	2.8 No change	No change	Medium	Common	Fair	Fair	_		1	
black walnut	Juglans nigra	WDH	Low	35.1	137.8	3.2 No change	No change	Medium	Common	Fair	Fair Mary Canad			1	
green ash	Fraxinus pennsylvanica	WSH	Low	26.8	130.0	4.0 Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	
American elm	Ulmus americana	WDH	Medium	22.5	122.0	3.5 Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	
post oak	Quercus stellata	WDH	High	24.5	121.8	3.5 Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	
eastern redbud	Cercis canadensis	NSL	Low	35.5	107.2	2.3 Sm. dec.	Sm. dec.	Medium		Poor	Poor			0	
hackberry	Celtis occidentalis	WDH	Medium	19.6	103.7	4.5 Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	
boxelder	Acer negundo	WSH	Low	13.5	92.8	5.5 No change	Sm. inc.	High	Common	Good	Very Good			1	
eastern white pine	Pinus strobus	WDH	High	5.8	90.1	2.7 No change	No change	Low	Common	Poor	Poor				34
chinkapin oak	Quercus muehlenbergii	NSL	Medium	19.3	89.3	3.6 No change	No change	Medium		Fair	Fair			1	
sycamore	Platanus occidentalis	NSL	Low	12.9	74.3	4.8 Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good				36
bitternut hickory	Carya cordiformis	WSL	Low	15.4	58.6	2.6 No change	No change	High	Common	Good	Good			1	
slippery elm	Ulmus rubra	WSL	Low	17.2	54.8	2.2 No change	Sm. inc.	Medium	Common	Fair	Good			1	38
common persimmon	Diospyros virginiana	NSL	Low	13.8	47.4	2.7 Sm. inc.	Lg. inc.	High	Rare	Good	Good			1	39
eastern hemlock	Tsuga canadensis	NSH	High	5.3	43.9	1.5 No change	No change	Low	Rare	Very Poor	Very Poor			0	40
sweet birch	Betula lenta	NDH	High	10.5	40.0	1.2 Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	41
red mulberry	Morus rubra	NSL	Low	10.6	35.6	2.5 Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	42
American basswood	Tilia americana	WSL	Medium	10.3	33.7	1.7 Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	43
eastern hophornbeam; ironw	v Ostrya virginiana	WSL	Low	10.5	31.1	1.3 Lg. inc.	Lg. inc.	High	Rare	Good	Good			1 -	44
ailanthus	Ailanthus altissima	NSL	FIA	8.1	30.8	1.9 Unknown	Unknown	NA	Rare	NNIS	NNIS			0	45
Osage-orange	Maclura pomifera	NDH	Medium	1.1	28.5	25.8 Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	2	46
cucumbertree	Magnolia acuminata	NSL	Low	13	28.5	1.4 Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	47
						-									



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pith pail period period period period period periodPriod period<	48 49 50 51 52 53 54 55
yellow blockeyeAcsulta fameNS.LowS.121.81719, dec.No.NRRareNew PoorVery PoorVery PoorNSsilver mapleAcer saccharinumNSILow1.01.02.02.0NSL	50 51 52 53 54 55
paulowniatomentosPiolP	51 52 53 54 55
paulowniatomentosPiolP	52 53 54 55
service/servyAnelanchirspp.NSLUw1051501.0 <td>53 54 55</td>	53 54 55
Table Non-train pine     Pinus pungen     NSL     Uw     2.5     1.4.7     4.1.5     m.dec.     High     Race     Poor     Poor     Poor       blackkjack oak     Quercus marilandica     NSL     Mediun     2.1     1.0.1     1.9.5     Mediun     Rare     Good	54 55
blackjack oak mountain or Fraser magnella Magnola fraseriNSL NSLMedium2.11.145.0Lg.inc.Hg.inc. M. BareMediumRare NSLGoodGoodGoodpawpawAsimina trilobaNSLLow3.77.51.8Lg.dec.MediumRarePery PoorVery PoorVery Poormine milberyMorsa albaNSLFIA3.75.8Lg.dec.MediumNARareNINISNINISVery Poorsand hickoryCarya pallidaNSLFIA3.52.91.0UnknownNARareNINISNINISVery PoorVery PoorVery PoorShumad oakQuercus shumardiiNSLLow1.12.82.5Sm.dec.MediumRareVery PoorVery PoorVery PoorShumad oakQuercus shumardiiNSLLow1.12.01.8No.tangeRareNery PoorVery PoorV	55
mountain or fraser magnellaMagnolia fraseriNSLLowAll10.19.1 % n.dec.Sind, ed.LowRareFairGoodAmerican hombeam, muscleCarpinus carolinianaVKLLow4.96.21.6 % n.dec.Lg, inc.MediumRareFairGoodpawpawAsimina trilobarNSLLow1.8 Lg, dec.MediumRareVery PoorVery PoorVery Poorsand hickoryGray aplidiaNSLFiA4.46.51.4 UnknowUnknowNARareFIA OnlyVery PoorVery Poorbile ashFrainus quadranguidaNSLLow1.01.0 UnknowUnknowNARareVery PoorVery PoorVery PoorShumard CakMagnolia macrophylaNSLLow1.12.30.3 Lg, fac.Lg, fac.MediumRareVery PoorVery PoorShumard CakQuercus shumardiaNSLLow1.11.01.8 UnchageLg, fac.MediumRareVery PoorVery Poorvellow backQuercus shumardiaNSLLow1.11.6N.G.MediumRareVery PoorVery PoorVery Poorvellow backQuercus shumardiaNSLLow1.11.6N.G.MediumRareVery PoorVery PoorVery Poorvellow backQuercus shumardiaNSLLow1.11.6N.G.MediumRareVery PoorVery PoorVery Poorback wildow	
American hombeam; muscle Carpinus caroliniana   WSL   Low   4.9   8.2   1.6   Sm. inc.   Lg. inc.   Medium   Rare   Fair   Good     pawpaw   Asimina triloba   NSL   Low   3.7   5.   1.8   Lg. ecc.   Medium   Rare   Verp Poor   <	
pawpawAsimina trilobaNSLLow3.77.51.8 Lg.dec.Lg.dec.MediumRareVery PoorVery Poorwhite mulberryMorus albaNSLFIA4.46.51.4 UnknownUnknownNARareNNLSNNLSNNLSblue ashFraxinus quadrangulataNSLEIA4.46.51.4 UnknownUnknownNARareNNLSNNLSNNLSblue ashFraxinus quadrangulataNSLLow0.72.30.3 Lg.dec.Lg.dec.MediumRareVery PoorVery PoorVery PoorShumard OakQuercus shumardiiNSLLow0.72.30.3 Lg.dec.Lg.dec.MediumRareVery PoorVery PoorVery PoorVellow oakQuercus shumardiiNSLLow0.11.90.6 Sm.dec.Sm.dec.MediumRareVery PoorVery PoorVery Poorwillow oakQuercus spheliosNSLLow0.61.71.6 No changeMediumRareVery PoorVery PoorFairInfill +black willowSalix nigraNSLLow0.61.71.6 No changeMediumRareVery PoorVery PoorVery Poorshelbark hickoryCary alacinosaNSLMedium1.11.11.4 Very Lg.dec.Lg.dec.MediumRareVery PoorVery PoorVery Poorshelbark hickoryGeidtisa triacanthosNSLMedium1.4Very Lg.dec.N.de	56
white mulberry   Morus alba   NSL   FIA   4.4   6.5   1.4   Unknown   NA   Rare   NNIS   NNIS     sand hickory   Carya pallida   NSL   FIA   3.5   2.9   1.0   Unknown   Unknown   NA   Rare   FIA Ohly	57
Sand hickoryCarya pallidaNSLFIA3.52.91.0UnknownNARareFIA OnlyFIA OnlyFIA Onlyblue ashFraxinus quadrangulatNSLLow1.12.82.5Sm. dec.LowRareVery PoorVery	58
blue ash bigleaf magnoliaFraxinus quadrangulataNSLLow1.12.82.5Sm. dec.Sm. dec.LowRareVery PoorVery PoorVery PoorShumard oakQuercus shumardiiNSLLow0.72.30.3Lg. dec.Lg. dec.MediumRareVery PoorVery PoorVery PoorShumard oakQuercus shumardiiNSLLow1.12.01.8No changeLg. dec.HighRareVery PoorVery PoorVery Poorwillow oakQuercus shumardiiNSLLow3.91.81.2No changeMediumRarePoorPoorPoorInfill +Infill +black willowSalix nigraNSHLow1.11.71.6No changeLg. nc.LowRareVery PoorVery PoorVery PoorVery Poorshelbark hickoryCarya lacinicsaNSLLow1.11.51.4Very Lg. dec.MediumRareVery PoorVery PoorV	59
bigleaf magnoliaMagnolia macrophyllaNSLLow0.72.30.3 Lg.dec.Lg.dec.MediumRareYery PoorVery PoorVery PoorShumard oakQuercus shumardiiNSLLow1.12.01.8 No changeLg.inc.HighRareFairGoodyellow birchBetula alleghaniensisNDLHigh0.11.90.6 Sm. dec.Sm. dec.MediumRareYery PoorVery PoorVery Poorblack willowSalix nigraNSLLow3.91.81.2 No changeLg.inc.LowRareVery PoorFairInfill +Infill +black willowSalix nigraNSLLow1.11.71.6 No changeLg.inc.LowRareVery PoorVery PoorVery Poorshellbark hickoryCarya laciniosaNSLLow1.11.51.4 Very Lg. dec.MediumRareLostVery PoorVery Poorstriped mapleAcer pensylvanicumNSLMedium1.51.40.4 Sm. dec.Sm. dec.MediumRareLostVery PoorVery Poorwild plumPrunus americanaNSLMedium1.11.20.2 Very Lg. dec.No changeMediumRareLostVery PoorVery PoorKentucky coffeetreeGymnocladus dioicusNSLFIA0.60.91.6 UnknownUnknownMediumRareFIA OnlyFIA OnlyFIA OnlyVertucky coffeetreeGymnocladus dioicus	60
Shumard oak yellow birchQuercus shumardiiNSLLow1.12.01.8No change Lg, inc.Lg, inc.High Nace.RareFairGoodyellow birchBetula alleghaniensisNDLHigh High0.11.90.6Sm. dec.Medium Nace.RareVery PoorVery PoorVery PoorVery PoorVery PoorVery PoorVery PoorInfill +Infill	61
yellow birchBetula alleghaniensisNDLHigh0.11.90.6Sm. dec.MediumRareVery PoorVery PoorVery Poorwillow oakQuercus phellosNSLLow3.91.81.2 No changeMediumRarePoorPoorPoorInfill +Infill +black willowSalix nigraNSHLow1.11.6 No changeLg.inc.LowRareVery PoorVery PoorVery PoorVery Poorshellbark hickoryCarya laciniosaNSLLow1.11.51.4 Very Lg.dec.MediumRareVery PoorVery PoorVery PoorVery Poorstriped mapleAcer pensylvanicumNSLMediu1.51.4V.4 Very Lg.dec.MediumRareLostVery PoorVery PoorVery PoorVery PoorAmerican hollyIlex opacaNSLMediu1.11.20.2 Very Lg.dec.No changeMediumRareGoodGoodSoldVery PoorVery PoorVe	62
willow oak blowQuercus phellosNSL LowLow3.91.81.2 No change No changeMedium RareRare PoorPoor PoorPoor PoorInfill +Infill +black willowSalix nigraNSH blockNSH Low111.71.6 No change 1.0 Sondec.LowRareVery PoorFairInfill +Infill +eastern cottonwoodPopulus deltoidesNSH LowNSHLow0.61.73.0 Sm. dec.Medium RareNareVery PoorVery PoorVery Poorshellbark hickoryCarya lacinosaNSLMedium1.51.40.4 Sm. dec.Medium RareRareVery PoorVery PoorVery PoorAmerican hollyIlex opacaNSLMedium1.11.20.2 Very Lg. dec.No change No changeMedium RareRareGoodGoodwild plumPrunus americanaNSLFIA0.60.91.6 UnknownUnknownMedium RareRareGoodGoodriver birchBetula nigraNSLLow0.40.60.9Sn. dec.Sm. dec.Medium RareRareFIA OnlyFIApecanCarya illinoinensisNSHLow0.40.60.9Sn. dec.Medium RareRareFIA OnlyFIAriver birchBetula nigraNSLLow0.40.60.9Sm. dec.Sm. dec.Medium RareRareFIA OnlyFIA<	63
black willowSalix nigraNSHLow1.11.71.6 No changeLg. inc.LowRareVery PoorFairInfill +eastern cottonwoodPopulus deltoidesNSHLow0.61.73.0 Sm. dec.Sm. dec.MediumRareVery PoorVery PoorVery Poorshellbark hickoryCarya laciniosaNSLLow1.11.51.4 Very Lg. dec.Lg. dec.MediumRareLostVery PoorVery Poorstriped mapleAcer pensylvanicumNSLMedium1.11.20.2 Very Lg. dec.No changeMediumRareLostVery PoorInfill +honeylocustGleditsia triacanthosNSHLow0.61.01.8 Lg. inc.Lg. inc.HighRareGoodGoodwild plumPrunus americanaNSLFIA0.60.91.6 UnknownUnknownMediumRareFIA OnlyFIA OnlyFIA Onlyriver birchBetula nigraNSLLow0.30.80.6 Lg. inc.Lg. inc.MediumRareFiarFiarInfill +northern white-cedarThuja occidentalisNSLLow0.20.50.3 Lg. inc.Lg. inc.LowRareFiarFiarInfill +northern white-cedarThuja occidentalisNSHLow0.20.50.3 Lg. inc.Lg. inc.LowRareFiarFiarInfill +northern white-cedarThuja occidentalisNSHLow<	64
eastern cottonwoodPopulus deltoidesNSHLow0.61.73.0 Sm. dec.Sm. dec.MediumRareVery PoorVery Poorshellbark hickoryCarya laciniosaNSLLow1.11.51.4 Very Lg. dec.Lg. dec.MediumRareLostVery Poorstriped mapleAcer pensylvanicumNSLMedium1.51.40.4 Sm. dec.Sm. dec.MediumRareVery PoorVery PoorAmerican hollyIlex opacaNSLMedium1.11.20.2 Very Lg. dec.No changeMediumRareLostPoorInfill +honeylocustGleditsia triacanthosNSLFIA0.60.91.6 UnknownUnknownMediumRareFIA OnlyFIA OnlyFIA Onlykentucky coffeetreeGymnocladus dioicusNSLFIA0.60.81.4 UnknownUnknownMediumRareFIA OnlyFIA OnlyFIA Onlyriver birchBetula nigraNSLLow0.30.80.6 Lg. inc.Lg. inc.MediumRareGoodGoodpecanCarya illinoinensisNSHUow0.20.40.2 Sm. dec.Sm. dec.MediumRareVery PoorVery PoorbutternutJuglans cinereaNSLFIA0.60.30.5 UnknownUnknownLowRareFIA OnlyFIA OnlyFIAorther white-cedarThuja occidentalisWSHHigh0.20.40.2 Sm. dec.Sm. dec. </td <td>65</td>	65
shellbark hickoryCarya laciniosaNSLLow1.11.51.4 Very Lg. dec.Lg. dec.MediumRareLostVery Poorstriped mapleAcer pensylvanicumNSLMedium1.51.40.4 Sm. dec.Sm. dec.MediumRareLostVery PoorVery PoorAmerican hollyIlex opacaNSLMedium1.11.20.2Very Lg. dec.No changeMediumRareLostPoorInfill +honeylocustGleditsia triacanthosNSHLow0.61.01.8Lg. inc.Lg. inc.HighRareGoodGoodKentucky coffeetreeGymnocladus dioicusNSLFIA0.60.91.6Ich NnownMediumRareFIA OnlyFIA Onlyriver birchBetula nigraNSLLow0.30.80.6Lg. inc.Lg. inc.MediumRareGoodGoodpecanCarya illinoinensisNSHLow0.40.60.9Sm. dec.Sm. dec.MediumRareFiA OnlyFIA OnlybutternutJuglans cinereaNSLLow0.30.80.6Lg. inc.Lg. inc.MediumRareFiA OnlyFIA Onlyriver birchBetula nigraNSLLow0.40.5O.3Lg. inc.Lg. inc.MediumRareFia OnlyFia OnlyFiapecanCarya illinoinensisNSHLow0.20.40.2Sm. dec.Sm. dec.	66
striped mapleAcer pensylvanicumNSLMedium1.51.40.4Sm. dec.Sm. dec.MediumRareVery PoorVery PoorVery PoorAmerican hollyIlex opacaNSLMedium1.11.20.2Very Lg. dec.No changeMediumRareLostPoorInfill +honeylocustGleditsia triacanthosNSHLow0.61.01.8Lg. inc.Lg. inc.HighRareGoodGoodwild plumPrunus americanaNSLXFIA0.60.91.6UnknownUnknownMediumRareFIA OnlyFIA OnlyFIA OnlyKentucky coffeetreeGymnocladus dioicusNSLXFIA0.60.9Sm. dec.Sm. dec.MediumRareFIA OnlyFIA OnlyFIA Onlyriver birchBetula nigraNSLLow0.30.80.6Lg. inc.Lg. inc.MediumRareYery PoorYery PoorYery PoorpecanCarya illinoinensisNSHLow0.20.50.3Lg. inc.Lg. inc.MediumRareFIA OnlyFIA Onlynorthern white-cedarThuja occidentalisWSHHigh0.20.40.2Sm. dec.Sm. dec.MediumRareFiA OnlyFIA Onlyriver birchJuglans cinereaNSLXFIA0.60.30.5UnknownUnknownLowRareFiA OnlyFIAInfill +northern white-cedarThuja occid	67
American hollyIlex opacaNSLMedium1.11.20.2Very Lg. dec.No changeMediumRareLostPoorInfill +honeylocustGleditsia triacanthosNSHLow0.61.01.8Lg. inc.Lg. inc.HighRareGoodGoodwild plumPrunus americanaNSLXFIA0.60.91.6UnknownMediumRareFIA OnlyFIA OnlyFIA OnlyKentucky coffeetreeGymnocladus dioicusNSLXFIA0.60.81.4UnknownUnknownMediumRareFIA OnlyFIA OnlyFIA Onlyriver birchBetula nigraNSLLow0.30.80.6Lg. inc.Lg. inc.MediumRareGoodGoodpecanCarya illinoinensisNSLLow0.40.60.9Sm. dec.Sm. dec.MediumRareFia OnlyFIA OnlyFIA Onlynorthern white-cedarThuja occidentalisWSHHigh0.20.50.3Lg. inc.LowRareFia OnlyFIA OnlyFIA OnlyJultaronJulgans cinereaNSLKIA0.60.3Sm. dec.Sm. dec.MediumRareFIA OnlyFIA OnlyJultaronJulgans cinereaNSLFIA0.60.3Sm. dec.Sm. dec.MediumRareFIA OnlyFIA Only	68
honeylocustGleditisia triacanthosNSHLow0.61.01.8Lg. inc.Lg. inc.HighRareGoodGoodwild plumPrunus americanaNSLXFIA0.60.91.6UnknownMediumRareFIA OnlyFIA OnlyKentucky coffeetreeGymnocladus dioicusNSLXFIA0.60.81.4UnknownMediumRareFIA OnlyFIA Onlyriver birchBetula nigraNSLLow0.30.80.6Lg. inc.Lg. inc.MediumRareGoodGoodpin cherryPrunus pensylvanicaNSLLow0.40.60.9Sm. dec.Sm. dec.MediumRareVery PoorVery PoorpecanCarya illinoinensisNSHLow0.20.50.3Lg. inc.Lg. inc.MediumRareFiarFairInfill +northern white-cedarThuja occidentalisWSHHigh0.20.40.5Sm. dec.MediumRareVery PoorVery Poorred sprucePicea rubensNDHHigh0.60.30.5Sm. dec.Sm. dec.LowRareFIA OnlyFIA Onlyred sprucePicea rubensNDHHigh0.60.30.5Sm. dec.LowRareFIA OnlyFIA OnlysilverbellHalesia spp.NSLFIA0.60.30.5Sm. dec.LowRareFIA OnlyFIA OnlysilverbellH	69
wild plumPrunus americanaNSLXFIA0.60.91.6UnknownMediumRareFIA OnlyFIA OnlyKentucky coffeetreeGymnocladus dioicusNSLXFIA0.60.91.4UnknownUnknownMediumRareFIA OnlyFIA OnlyFIA Onlyriver birchBetula nigraNSLLow0.30.80.6Lg.inc.Lg.inc.MediumRareGoodGoodpin cherryPrunus pensylvanicaNSLLow0.40.60.9Sm. dec.Sm. dec.MediumRareFairFairInfill +northern white-cedarThuja occidentalisWSHHigh0.20.40.2Sm. dec.Sm. dec.MediumRareFIA OnlyFIA OnlybutternutJuglans cinereaNSLXFIA0.60.30.5Sm. dec.Sm. dec.MediumRareFIA OnlyFIA Onlyred sprucePicea rubensNDHHigh0.60.30.5Sm. dec.Sm. dec.LowRareFIA OnlyFIA OnlysilverbellHalesia spp.NDLLow0.60.30.5Sm. dec.Sm. dec.LowRareFIA OnlyFIA OnlysilverbellHalesia spp.NDLHigh0.60.30.5Sm. dec.Sm. dec.KeitumRareFIA OnlyFIA OnlysilverbellHalesia spp.NDLLow0.60.10.2Sm. dec.Sm. dec.Medium <td>70</td>	70
Kentucky coffeetreeGymnocladus dioicusNSLXFIA0.60.81.4UnknownMediumRareFIA OnlyFIA OnlyFIA Onlyriver birchBetula nigraNSLLow0.30.80.6Lg. inc.Lg. inc.MediumRareGoodGoodpin cherryPrunus pensylvanicaNSLLow0.40.60.9Sm. dec.Sm. dec.MediumRareVery PoorVery PoorpecanCarya illinoinensisNSHLow0.20.50.3Lg. inc.Lg. inc.LowRareFiarFairFairInfill +northern white-cedarThuja occidentalisWSHHigh0.20.40.2Sm. dec.Sm. dec.MediumRareVery PoorVery PoorVery PoorbutternutJuglans cinereaNSLXFIA0.60.30.5Sm. dec.Sm. dec.LowRareFIA OnlyFIA OnlyFIA Onlyred sprucePicea rubensNDHHigh0.60.30.5Sm. dec.Sm. dec.LowRareFIA OnlyFIA OnlyFIA OnlysilverbellHalesia spp.NSLLow0.60.30.5Sm. dec.Sm. dec.LowRareFIA OnlyFIA OnlyFIA OnlysilverbellHalesia spp.NSLFIA0.60.10.2Sm. dec.Sm. dec.MediumRareFIA OnlyFIA OnlyFIA OnlysilverbellHalesia spp.NSL <td>71</td>	71
river birchBetula nigraNSLLow0.30.80.6Lg. inc.Lg. inc.MediumRareGoodGoodpin cherryPrunus pensylvanicaNSLLow0.40.60.9Sm. dec.Sm. dec.MediumRareVery PoorVery PoorpecanCarya illinoinensisNSHLow0.20.50.3Lg. inc.Lg. inc.LowRareFairFairInfill +northern white-cedarThuja occidentalisWSHHigh0.20.40.2Sm. dec.Sm. dec.MediumRareVery PoorVery PoorbutternutJuglans cinereaNSLXFIA0.60.30.5UnknownUnknownLowRareFIA OnlyFIA Onlyred sprucePicea rubensNDHHigh0.60.30.5Sm. dec.Sm. dec.Sm. dec.RareFIA OnlyFIA OnlysilverbellHalesia spp.NDHHigh0.60.30.5Sm. dec.Sm. dec.MediumRareFIA OnlyFIA OnlysilverbellHalesia spp.NSLLow0.60.10.5Sm. dec.Sm. dec.MediumRareVery PoorVery Poorashe juniperJuniperus asheiNDHHigh0.60.10.5Sm. dec.Sm. dec.MediumRareVery PoorVery Poorsilseh pinePinus elliottiiNDHHigh0.60.10.5Sm. dec.Sm. dec.Mediu	72
pin cherryPrunus pensylvanicaNSLLow0.40.60.9Sm. dec.Sm. dec.MediumRareVery PoorVery PoorpecanCarya illinoinensisNSHLow0.20.50.3Lg. inc.Lg. inc.LowRareFairFairInfill +northern white-cedarThuja occidentalisWSHHigh0.20.40.2Sm. dec.Sm. dec.MediumRareVery PoorVery PoorbutternutJuglans cinereaNSLXFIA0.60.30.5UnknownUnknownLowRareFIA OnlyFIA Onlyred sprucePicea rubensNDHHigh0.60.30.5Sm. dec.Sm. dec.LowRareFIA OnlyFIA OnlysilverbellHalesia spp.NSLFIA0.60.30.5Sm. dec.Sm. dec.MediumRareFIA OnlyFIA OnlysilverbellHalesia spp.NSLFIA0.60.30.5Sm. dec.Sm. dec.MediumRareFIA OnlyFIA OnlysilverbellHalesia spp.NSLLow0.60.10.2Sm. dec.Sm. dec.MediumRareVery PoorVery Poorashe juniperJuniperus asheiNDHHigh000New HabitatMediumAbsentNew HabitatNew HabitatNew HabitatNew HabitatNew HabitatNew HabitatMediumAbsentNew HabitatNew HabitatMigrate ++<	73
pecanCarya illinoinensisNSHLow0.20.50.3Lg. inc.Lg. inc.LowRareFairFairInfill +northern white-cedarThuja occidentalisWSHHigh0.20.40.2Sm. dec.Sm. dec.MediumRareVery PoorVery PoorbutternutJuglans cinereaNSLXFIA0.60.30.5UnknownLowRareFIA OnlyFIA Onlyred sprucePicea rubensNDHHigh0.60.30.5Sm. dec.Sm. dec.LowRareFIA OnlyFIA OnlyAmerican chestnutCastanea dentataNSLXFIA0.60.10.5Sm. dec.Sm. dec.MediumRareFIA OnlyFIA OnlysilverbellHalesia spp.NSLLow0.60.10.2Sm. dec.Sm. dec.MediumRareVery PoorVery Poorashe juniperJuniperus asheiNDHHigh00New HabitatMediumAbsentNew HabitatNew Habitat <td< td=""><td>74</td></td<>	74
northern white-cedarThuja occidentalisWSHHigh0.20.40.2Sm. dec.MediumRareVery PoorVery PoorbutternutJuglans cinereaNSLXFIA0.60.30.5Sm. dec.MediumRareFIA OnlyFIA Onlyred sprucePicea rubensNDHHigh0.60.30.5Sm. dec.Sm. dec.LowRareVery PoorVery PoorAmerican chestnutCastanea dentataNSLXFIA0.20.10.1UnknownUnknownMediumRareFIA OnlyFIA OnlysilverbellHalesia spp.NSLLow0.60.10.2Sm. dec.Sm. dec.MediumRareVery PoorVery Poorashe juniperJuniperus asheiNDHHigh000New HabitatMediumAbsentNew HabitatNew HabitatNew HabitatMediumslash pinePinus elliottiiNDHHigh000New HabitatMediumAbsentNew HabitatNew HabitatMediumAbsentNew HabitatMedium	75
butternutJuglans cinereaNSLXFIA0.60.30.5UnknownUnknownLowRareFIA OnlyFIA Onlyred sprucePicea rubensNDHHigh0.60.30.5Sm. dec.Sm. dec.LowRareVery PoorVery PoorAmerican chestnutCastanea dentataNSLXFIA0.20.10.1UnknownUnknownMediumRareFIA OnlyFIA OnlysilverbellHalesia spp.NSLLow0.60.10.2Sm. dec.Sm. dec.MediumRareVery PoorVery Poorashe juniperJuniperus asheiNDHHigh000New HabitatMediumAbsentNew HabitatNew HabitatMediumslash pinePinus elliottiiNDHHigh00New HabitatNew HabitatNew HabitatNew HabitatNew HabitatNew HabitatNew HabitatNew Habitat <t< td=""><td>76</td></t<>	76
red sprucePice rubensNDHHigh0.60.30.5Sm. dec.Sm. dec.LowRareVery PoorVery PoorAmerican chestnutCastanea dentataNSLXFIA0.20.10.1UnknownUnknownMediumRareFIA OnlyFIA OnlysilverbellHalesia spp.NSLLow0.60.10.2Sm. dec.Sm. dec.MediumRareVery PoorVery Poorashe juniperJuniperus asheiNDHHigh000New HabitatMediumAbsentNew HabitatNew HabitatNew Habitatslash pinePinus elliottiiNDHHigh000New HabitatMediumAbsentNew HabitatNew HabitatMediumNew HabitatNew HabitatMediumNew HabitatNew HabitatMediumNew HabitatNew HabitatNew HabitatNew HabitatMediumNew HabitatNew HabitatMediumNe	77
American chestnutCastanea dentataNSLXFIA0.20.10.1UnknownUnknownMediumRareFIA OnlyFIA OnlysilverbellHalesia spp.NSLLow0.60.10.2Sm. dec.Sm. dec.MediumRareVery PoorVery Poorashe juniperJuniperus asheiNDHHigh000New HabitatMediumAbsentNew HabitatNew HabitatNew Habitatslash pinePinus elliottiiNDHHigh000New HabitatMediumAbsentNew HabitatNew HabitatNew Habitat	78
silverbellHalesia spp.NSLLow0.60.10.2Sm. dec.Sm. dec.Medium Medium New HabitatNew ForVery Poorashe juniperJuniperus asheiNDHHigh000New HabitatNew HabitatMedium New HabitatAbsentNew HabitatNew H	79
ashe juniper Juniperus ashei NDH High 0 0 0 New Habitat New Habitat Medium Absent New Habitat New Habi	80
slash pine Pinus elliottii NDH High 0 0 0 New Habitat New Habitat Medium Absent New Habitat New Habitat Migrate ++	81
	82
	83
longleaf pine Pinus palustris NSH Medium 0 0 0 New Habitat New Habitat Medium Absent New Habitat New Habitat Migrate + Migrate +	84
florida maple Acer barbatum NSL Low 0 0 New Habitat New Habitat High Absent New Habitat New Habitat Likely + Likely +	85
mountain maple Acer spicatum NSL Low 0 0 0 Unknown Unknown High Absent Unknown Unknown	86
Ohio buckeye Aesculus glabra NSL Low 0 0 0 Unknown Unknown Medium Absent Unknown Unknown	87
cittamwood/gum bumelia Sideroxylon lanuginosum ssp. NSL Low 0 0 0 New Habitat New Habitat High Absent New Habitat New Habitat Migrate ++	88
black hickory Carya texana NDL High 0 0 0 New Habitat New Habitat Medium Absent New Habitat New Habitat Migrate ++ Migrate ++	89
black ash Fraxinus nigra WSH Medium 0 0 0 New Habitat New Habitat Low Absent New Habitat New Habitat	90
southern magnolia Magnolia grandiflora NSL Low 0 0 0 New Habitat New Habitat Medium Absent New Habitat New Habitat Migrate +	91
sweetbay Magnolia virginiana NSL Medium 0 0 0 New Habitat New Habitat Medium Absent New Habitat New Habitat Migrate +	92
swamp tupelo Nyssa biflora NDH Medium 0 0 0 New Habitat New Habitat Low Absent New Habitat New Habitat	93
cherrybark oak; swamp red o Quercus pagoda NSL Medium 0 0 0 New Habitat New Habitat Medium Absent New Habitat New Habitat Migrate + Migrate +	94



## EcoMap 2007

## 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

Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	Ν
Quercus imbricaria	NDH	Medium	0	) C	) (	) Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	95
Quercus laurifolia	NDH	Medium	0	) C	) (	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	96
Quercus michauxii	NSL	Low	0	) C	) (	) Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	97
Quercus nigra	WDH	High	0	) C	) (	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	98
Quercus virginiana	NDH	High	0	) C	) (	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	99
Quercus incana	NSL	Low	0	) C	) (	) Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	100
Ulmus crassifolia	NDH	Medium	0	) C	) (	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	101
	Quercus imbricaria Quercus laurifolia Quercus michauxii Quercus nigra Quercus virginiana Quercus incana	Quercus imbricaria NDH   Quercus laurifolia NDH   Quercus michauxii NSL   Quercus nigra WDH   Quercus virginiana NDH   Quercus incana NSL	Quercus imbricaria NDH Medium   Quercus laurifolia NDH Medium   Quercus michauxii NSL Low   Quercus nigra WDH High   Quercus virginiana NDH High   Quercus incana NSL Low	Quercus imbricariaNDHMediumOQuercus laurifoliaNDHMediumOQuercus michauxiiNSLLowOQuercus nigraWDHHighOQuercus virginianaNDHHighOQuercus incanaNSLLowO	Quercus imbricariaNDHMedium0CQuercus laurifoliaNDHMedium0CQuercus michauxiiNSLLow0CQuercus nigraWDHHigh0CQuercus virginianaNDHHigh0CQuercus incanaNSLLow0C	Quercus imbricariaNDHMedium000Quercus laurifoliaNDHMedium000Quercus michauxiiNSLLow000Quercus nigraWDHHigh000Quercus virginianaNDHHigh000Quercus incanaNSLLow000	Quercus imbricariaNDHMedium000UnknownQuercus laurifoliaNDHMedium000New HabitatQuercus michauxiiNSLLow000UnknownQuercus nigraWDHHigh000New HabitatQuercus virginianaNDHHigh000New HabitatQuercus incanaNSLLow000Unknown	Quercus imbricariaNDHMedium000UnknownQuercus laurifoliaNDHMedium000New HabitatNew HabitatQuercus michauxiiNSLLow000UnknownUnknownQuercus nigraWDHHigh000New HabitatNew HabitatQuercus virginianaNDHHigh000New HabitatNew HabitatQuercus incanaNSLLow000UnknownNew Habitat	Quercus imbricariaNDHMedium000UnknownMediumQuercus laurifoliaNDHMedium000New HabitatNew HabitatMediumQuercus michauxiiNSLLow000UnknownUnknownMediumQuercus nigraWDHHigh000New HabitatNew HabitatMediumQuercus virginianaNDHHigh000New HabitatMediumQuercus incanaNSLLow000UnknownNew HabitatMedium	Quercus imbricariaNDHMedium000UnknownUnknownMediumAbsentQuercus laurifoliaNDHMedium000New HabitatMediumAbsentQuercus michauxiiNSLLow000UnknownUnknownMediumModeledQuercus nigraWDHHigh000New HabitatNew HabitatMediumAbsentQuercus virginianaNDHHigh000New HabitatMediumAbsentQuercus incanaNSLLow000UnknownNew HabitatMediumAbsent	Quercus imbricariaNDHMedium000UnknownUnknownMediumAbsentUnknownQuercus laurifoliaNDHMedium000New HabitatNew HabitatMediumAbsentNew HabitatQuercus michauxiiNSLLow000UnknownUnknownMediumModeledUnknownQuercus nigraWDHHigh000New HabitatNew HabitatMediumAbsentNew HabitatQuercus virginianaNDHHigh000New HabitatMediumAbsentNew HabitatQuercus incanaNSLLow000UnknownNew HabitatMediumAbsentUnknown	Quercus imbricariaNDHMedium000UnknownUnknownMediumAbsentUnknownUnknownQuercus laurifoliaNDHMedium000New HabitatNew HabitatMediumAbsentNew HabitatNew HabitatQuercus michauxiiNSLLow000UnknownUnknownMediumModeledUnknownUnknownQuercus nigraWDHHigh000New HabitatMediumAbsentNew HabitatNew HabitatQuercus virginianaNDHHigh000New HabitatMediumAbsentNew HabitatNew HabitatQuercus incanaNSLLow000UnknownNew HabitatMediumAbsentUnknownNew HabitatQuercus incanaNSLLow000UnknownNew HabitatMediumAbsentUnknownNew Habitat	Quercus imbricariaNDHMedium000UnknownUnknownMediumAbsentUnknownUnknownQuercus laurifoliaNDHMedium000New HabitatNew Habitat <td< td=""><td>Quercus imbricariaNDHMedium000UnknownUnknownMediumAbsentUnknownUnknownUnknownQuercus laurifoliaNDHMedium000New HabitatNew HabitatMediumAbsentNew HabitatNew HabitatMigrate ++Quercus incanaNSLLow000UnknownNew HabitatNew HabitatMediumAbsentUnknownNew HabitatMigrate +</td><td>Quercus imbricariaNDHMedium000UnknownUnknownMediumAbsentUnknownUnknownUnknown0Quercus laurifoliaNDHMedium000New HabitatNew Habitat<!--</td--></td></td<>	Quercus imbricariaNDHMedium000UnknownUnknownMediumAbsentUnknownUnknownUnknownQuercus laurifoliaNDHMedium000New HabitatNew HabitatMediumAbsentNew HabitatNew HabitatMigrate ++Quercus incanaNSLLow000UnknownNew HabitatNew HabitatMediumAbsentUnknownNew HabitatMigrate +	Quercus imbricariaNDHMedium000UnknownUnknownMediumAbsentUnknownUnknownUnknown0Quercus laurifoliaNDHMedium000New HabitatNew Habitat </td

