HUC 6 Watershed

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 9,597.9 3,705.8 232

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	al Change	in Habitat Suitability	Capability	to Cope o	Migration Potential			
Ash	3				Model			Scenario	Scenario		Scenario	Scenario		SHIFT	SHIFT
Hickory	5	Abu	ndance		Reliability	Adaptability		RCP45	RCP85		RCP45	RCP85		RCP45	RCP85
Maple	5	Abundant	5	High	21	24	Increase	23	27	Very Good	13	14	Likely	0	0
Oak	12	Common	34	Medium	27	49	No Change	13	10	Good	15	15	Infill	12	13
Pine	4	Rare	33	Low	36	14	Decrease	30	29	Fair	7	11	Migrate	2	5
Other	43	Absent	18	FIA	6		New	11	13	Poor	14	10	·	14	18
•	72	_	90		90	87	Unknown	13	11	Very Poor	15	14			
							-	90	90	FIA Only	3	3			
Unkn												5			
Potential Changes in Climate Variables											7/	72			

Potential Changes in Climate Variables

Temperatu	ıre (°F)				
	Scenario	2009	2039	2069	2099
Annual	CCSM45	47.5	48.7	50.3	50.5
Average	CCSM85	47.5	49.0	50.8	52.9
	GFDL45	47.5	49.4	51.2	51.8
	GFDL85	47.5	49.6	51.9	54.6
	HAD45	47.5	49.3	51.6	52.5
	HAD85	47.5	49.6	52.7	55.6
Growing	CCSM45	58.2	59.4	60.8	61.3
Season	CCSM85	58.2	59.7	61.6	64.3
May—Sep	GFDL45	58.2	60.4	62.8	63.6
.,	GFDL85	58.2	60.8	63.7	66.6
	HAD45	58.2	60.4	62.6	63.9
	HAD85	58.2	60.7	64.9	67.8
C-1-1+	CCCNAAF	20.0	24.0	22.0	22.4
Coldest	CCSM45	30.8	31.8	32.8	33.1
Month	CCSM85	30.8	32.7	33.3	34.5
Average	GFDL45	30.8	33.5	33.7	34.0
	GFDL85	30.8	32.5	33.2	33.7
	HAD45	30.8	31.3	33.0	33.1
	HAD85	30.8	32.2	33.5	34.8
Warmest	CCSM45	61.8	63.0	63.9	64.2
Month	CCSM85	61.8	63.5	64.7	66.0
Average	GFDL45	61.8	64.2	65.6	66.3
	GFDL85	61.8	64.7	66.6	68.3
	HAD45	61.8	64.5	66.4	67.2
	HAD85	61.8	65.7	68.7	70.3

Precipitati	on (in)				
	Scenario	2009	2039	2069	2099
Annual	CCSM45	30.2	31.5	34.0	33.5
Total	CCSM85	30.2	33.1	34.1	36.4
	GFDL45	30.2	33.5	34.5	37.0
	GFDL85	30.2	32.0	35.5	37.5
	HAD45	30.2	31.2	32.4	31.9
	HAD85	30.2	30.9	29.4	31.9
Growing	CCSM45	13.7	13.8	14.7	14.3
Season	CCSM85	13.7	14.0	13.6	14.4
May—Sep	GFDL45	13.7	15.3	14.5	15.3
	GFDL85	13.7	14.2	14.5	14.9
	HAD45	13.7	14.1	12.7	13.0
	HAD85	13.7	13.5	11.2	11.7

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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Current and Potential Future Habitat, Capability, and Migration

Medium Multimark Medium Medium Medium Medium Medium Medium Multimark M	Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO N
When											•	•	31111 1 43	31111103	1 1
Very New Policy New		, ,										•			1 2
Vallow-polptr Linodendron tulipifera WPH wigh 44.1 33.5 7.4 Sm dec. Lg, dec. wigh Abundant Good Good Good Black Valloust Robinia pseudoscale WPH Low 46.6 493.1 8.6 Sm dec. No change Medium Common Poor Fair Fair Smith									_		•				1 3
Mack walnut Juglans nigra WPH Low 547 502.5 6.8 m, dec. Medium Abundant Fair Fair Sir Si	•			•											1 4
		· ·						•	_						0 5
Martie Sah Fraxinus Americana WDI Medium 51, 480, 66 No change No															1 6
Sugar maple Acer saccharum WDI High 90.6 48.1 5.6 No.hange No.hange High Common Good Good Good Infill Infill 1 1 1 1 1 1 1 1 1								- J							0 7
Chestmatic als Quercus printly Mile							_	•	High						1 8
Sementary Praximus pennsylvanica Work More		Quercus prinus	NDH	_	30.4	421.7	9.2 Lg. dec.		_	Common	Fair	Fair	Infill +	Infill +	1 9
Medium Pinus Wignlana MpH High 23.1 291.1 7.5 Eg. dec. Lg. dec. Lg. dec. High Common Poor Poor Poor Secrit Coak Quercus coccinea WpL Medium 35.3 275.4 4.7 Lg. dec. Lg. dec. High Common Poor P	green ash	Fraxinus pennsylvanica	WSH	Low	45.1	323.6	5.2 Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1 10
Nachberry Celtis occidentalis WOH Medium 33.2 2894 6.2 sm. inc. Migh Common Very Good Very Good 2.2 search east Common Very Good Very Good 2.2 search east Common Very Good Very Good 2.2 search east Very Good 2.2 search east Very Good Very G	Virginia pine		NDH	High	23.1	291.1	7.5 Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0 11
American elm Ulmus americana WDH Medium 46.5 222.0 2.8 No change Medium Common Good Very Good Common Co	• .	•	WDH		39.2	289.4	-		High	Common	Very Good	Very Good			1 12
American elm Ulmus americana WDH Medium 46.5 22.9 5.1 Sm., inc. Ig., inc. Medium Common Fair Poor Poor Fair Poor	scarlet oak	Quercus coccinea	WDL	Medium	35.3	275.4	4.7 Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0 13
Northern red oak Quercus rubra WDH Medium MSL	American elm	Ulmus americana	WDH	Medium	40.5	229.9	5.1 Sm. inc.	_	Medium	Common	Good	Very Good			1 14
Chinkapin oak Querus muehlenbergii NSL Medium 30.4 208.6 5.1 No change No change Medium Common Fair Fair 1.2 mockernut hickory Carya alba WDL Medium 43.7 206.8 3.8 Sm. inc. Sm. inc. High Common Very Good Very Good Infill +	pignut hickory	Carya glabra	WDL	Medium	46.1	222.0	2.8 No change	_	Medium	Common	Fair	Poor			1 15
Monckernut hickory Carya alba WDL Medium 43.7 206.8 3.8 Sm. inc. Sm. inc. High Common Very Good Very Good Sm. inc. Medium Common Poor Poor Infill Infill Medium	northern red oak	Quercus rubra	WDH	Medium	33.9	210.4	3.6 Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1 16
American beech Fagus grandifolia WDH High 28.3 189.2 3.3 Sm. dec. Sm. dec. Medium Common Poor Poor Infill + Infill + 0.2	chinkapin oak	Quercus muehlenbergii	NSL	Medium	30.4	208.6	5.1 No change	No change	Medium	Common	Fair	Fair			1 17
Slippery elm Ulmus rubra WSL Low 46.5 18.30 2.9 No change Sm. inc. Medium Common Fair Good 1.2	mockernut hickory	Carya alba	WDL	Medium	43.7	206.8	3.8 Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1 18
black oak Quercus velutina WDH High 34.2 182.4 182.4 182.4 182.4 182.4 182.4 182.4 182.4 182.4 182.5 182.6 182.6 182.5 1	American beech	Fagus grandifolia	WDH	High	28.3	189.2	3.3 Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0 19
black cherry Prunus serotina WDL Medium 44.6 176.7 3.4 No change No change Low Common Poor Poor Poor Poor Shagbark hickory Carya ovata WSL Medium 32.6 165.4 2.6 Sm. inc. No change Medium Common Good Fair 1.2 Medium 1.2 Medium Nyssa sylvatica WDL Medium 29.5 143.5 2.7 No change Sm. inc. High Common Good Very Good 1.2 Medium 29.5 Medium 2	slippery elm	Ulmus rubra	WSL	Low	46.5	183.0	2.9 No change	Sm. inc.	Medium	Common	Fair	Good			1 20
black cherry Prunus serotina WDL Medium 44,6 176,7 3.4 No change No change Low Common Poor Poor Poor Shagbark hickory Carya ovata WSL Medium 32,6 165,4 3.5 Sm. inc. No change Medium Common Good Fair 1.2 Sm. inc. High Common Very Good Very Good 1.2 Sm. inc. High Common Very Good Very Good 1.2 Sm. inc. High Common Very Good Very Good 1.2 Sm. inc. High Common Very Good Very Good 1.2 Sm. inc. High Common Very Good Very Good Very Good 1.2 Sm. inc. High Common Very Good V	black oak	Quercus velutina	WDH	High	34.2	182.4	3.5 Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1 21
bitternut hickory Carya cordiformis WSL low 37 143.9 3.3 Sm. inc. Sm. inc. High Common Very Good Very Good 1.2 blackgum Nyssa sylvatica WDL Medium 29.5 143.5 2.7 No change Sm. inc. High Common Good Very Good Very Good 1.2 boxelder Acer negundo WSH Low 38.6 135.2 2.5 Sm. dec. No change Medium Common Poor Fair Sassafras Sassafras albidum WSL low 32.9 104.9 1.8 No change No change Medium Common Fair Fair Fair 1.2 sassafras Sassafras albidum WSL low 32.9 104.9 1.8 No change No change Medium Common Fair Fair Fair 1.2 sassafras Sassafras albidum WSL low 32.9 104.9 1.8 No change No change Medium Common Fair Fair Fair 1.2 sassafras Sassafras Acer negundo WSH High 9.3 88.8 4.3 Lg. dec. Lg. dec. High Common Very Good Very Good 1.3 Sassafras NSH High 9.3 88.8 4.3 Lg. dec. Lg. dec. Lg. dec. Low Common Very Good Very Good 1.3 Sassafras NSH High 9.3 88.8 4.3 Lg. dec. Lg. dec. Lg. dec. Low Common Very Good Very Good 1.3 Sassafras NSH High 9.3 88.8 5.0 Very Lg. dec. Ver	black cherry	Prunus serotina	WDL	Medium	44.6	176.7		No change	Low	Common	Poor	Poor			0 22
blackgum Nyssa sylvatica WDL Medium 29.5 143.5 2.7 No change Sm. inc. High Common Good Very Good eastern redbud Cercis canadensis NSL Low 38.6 135.2 2.5 Sm. dec. No change Medium Common Poor Fair 1.2 Sassafras Acre negundo WSH Low 24.5 130.5 4.2 Sm. inc. Sm. inc. High Common Very Good Very Good 1.2 Sassafras Sassafras Sassafras WSL Low 32.9 104.9 1.8 No change No change Medium Common Fair Fair 1.2 Sassafras Sassafras Bidium WSL Low 32.9 104.9 1.8 No change No change Medium Common Fair Fair 1.2 Sassafras Sassafras NSH High 9.3 88.4 4.3 Lg. dec. Lg. dec. Lg. dec. Lg. dec. Low Common Very Good Very Good 1.3 Sassafras Pinus rigida NSH High 11.1 87.5 2.9 Lg. dec. Lg. dec. Lg. dec. Low Common Very Poor Very Poor 0.2 Sastern white pine Pinus strobus WDH High 10.5 85.3 5.0 Very Lg. dec. Very Lg. dec. Low Common Very Poor Poor Infill + Infill + 0.3 Sassafras NSL Low 19.9 81.5 2.6 Lg. dec. Medium Common Poor Poor Poor Norling Norling NSH Low 19.9 81.5 2.6 Lg. dec. Medium Common Poor Poor Norling NSH Infill + Infill + 1.5 Sassafras NSH Low 19.9 49.0 3.6 Sm. inc. Lg. inc. High Common Very Good Very Good Norling NSH NSH Low 15.7 62.2 3.1 Lg. inc. Lg. inc. High Common Poor Poor Norling NSH Infill + Infill + 1.5 Sassafras NSH Low 15.7 62.2 3.1 Lg. inc. Lg. inc. High Common Poor Poor Norling NSH Infill + Infill + 1.5 Sassafras NSH Low 15.7 62.2 3.1 Lg. inc. Lg. inc. High Common Norling Nery Good Norling NSH Infill + Infill + 1.5 Sassafras NSH Low 15.7 62.2 3.1 Lg. inc. Lg. inc. High Common Norling NSH Norling NSH Low 15.7 62.2 3.1 Lg. inc. Lg. inc. High Common Norling NSH Norling NSH Norling NSH Low 15.7 62.2 Sassafras NSH Low 15.7 62.2 Sassafras NSH Norling NSH	shagbark hickory	Carya ovata	WSL	Medium	32.6	165.4	2.6 Sm. inc.	No change	Medium	Common	Good	Fair			1 23
eastern redbud Cercis canadensis NSL Low 38.6 135.2 2.5 Sm. dec. No change Medium Common Poor Fair 1.2 boxelder Acer negundo WSH Low 24.5 130.5 4.2 Sm. inc. Sm. inc. High Common Very Good Very Good 1.3 sassafras Sassafras albidum WSL Low 32.9 10.49 1.8 No change No change Medium Common Fair Fair 1.2 Coage-orange Maclura pomifera NDH Medium 15 100.9 4.9 Sm. inc. Lg. inc. High Common Fair Fair 1.2 Coage-orange Maclura pomifera NDH Medium 15 100.9 4.9 Sm. inc. Lg. inc. High Common Very Good Very Good 1.3 eastern hemlock Tsuga canadensis NSH High 9.3 88.8 4.3 Lg. dec. Lg. dec. Lg. dec. Low Common Very Poor Very Poor 0.3 pitch pine Pinus rigida NSH High 11.1 87.5 2.9 Lg. dec. Lg. dec. Medium Common Poor Poor Poor 0.3 shellbark hickory Carya laciniosa NSL Low 22.6 83.9 3.2 Sm. dec. Sm. dec. Medium Common Poor Poor Infill + Infill + 0.5 honeyotous Gleditsia triacanthos NSH Low 21.8 81.5 2.8 Sm. inc. Lg. inc. High Common Very Good Very Good Very Good 1.3 shortleaf pine Pinus scilata WDH High 10.6 53.6 3.1 Lg. inc. Lg. inc. High Common Very Good Very Good Infill + Infill + 1.5 sycamore Platanus occidentalis NSL Low 15.7 6.2 Lg. inc. Lg. inc. Lg. inc. Medium Common Very Good Very Good Infill + Infill + 1.5 Shumard oak Quercus shumardii NSL Low 15.7 6.2 3.1 Lg. inc. Lg. inc. High Common Very Good Very Good Infill + Infill + 1.5 Shumard oak Quercus shumardii NSL Low 15.7 6.2 3.1 Lg. inc. Lg. inc. High Common Very Good Very Good Infill + Infill + 1.4 Shumard oak Quercus shumardii NSL Low 15.7 6.2 3.1 Lg. inc. Lg. inc. High Rare Good Good Infill + Infill + 1.4 American hornbeam; musclev Carpinus caroliniana WSL Low 13.5 37.7 1.7 No change Lg. inc. Medium Rare Good Good Infill + Infill + 1.4 American hornbeam; musclev Carpinus caroliniana WSL Low 13.5 37.7 1.7 No change Lg. inc. Medium Rare Poor Good	bitternut hickory	Carya cordiformis	WSL	Low	37	143.9	3.3 Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1 24
boxelder Acer negundo WSH Low 24.5 130.5 4.2 Sm. inc. Sm. inc. High Common Very Good Very Good Sourwood Oxydendrum arboreum NDL High 31.1 122.9 2.4 Lg. dec. Lg. dec. High Common Fair Fair 1.2 sassafras Sassafras albidum WSL Low 32.9 104.9 1.8 No change No change Medium Common Fair Fair 1.2 Sassafras Sassafras albidum WSL Low 32.9 104.9 1.8 No change No change Medium Common Fair Fair 1.2 Sassafras Sassafras albidum WSL Low 32.9 104.9 1.8 No change No change Medium Common Fair Fair 1.2 Sassafras Sassafr	blackgum	Nyssa sylvatica	WDL	Medium	29.5	143.5	2.7 No change	Sm. inc.	High	Common	Good	Very Good			1 25
sourwood Oxydendrum arboreum NDL High 31.1 122.9 2.4 Lg. dec. Lg. dec. High Common Fair Fair 1.2 sassafras Sassafras albidum WSL Low 32.9 104.9 1.8 No change No change Medium Common Fair Fair 1.2 Sassafras Sassafras albidum WSL Low 32.9 104.9 1.8 No change No change Medium Common Fair Fair 1.2 Sassafras Sassafras albidum WSL Low 32.9 104.9 1.8 No change No change Medium Common Very Good Very Good 1.3 Sassafras Sassafras albidum WSL Low 15 100.9 4.9 Sm. inc. Lg. inc. High Common Very Good Very Good 1.3 Sassafras Sassafras albidum WSL Low 19.9 81.5 2.6 Lg. dec. Low Common Very Poor Very Poor Very Poor 1.3 Sassafras Sassafras albidum WSL Low 19.9 81.5 2.6 Lg. dec. Wery Lg. dec. Low Common Poor Poor Poor 1.3 Sassafras Sassafras Sassafras albidum WSL Low 19.9 81.5 2.8 Sm. inc. Lg. inc. High Common Poor Poor Poor 1.4 Sassafras Sassafras Sassafras albidum WSL Low 19.9 41.5 Sassafras Albidum WSL Low 19.9 81.5 Sassafras S	eastern redbud	Cercis canadensis	NSL	Low	38.6	135.2	2.5 Sm. dec.	No change	Medium	Common	Poor	Fair			1 26
Sassafras Sassafras Sassafras albidum WSL Low 32.9 104.9 1.8 No change Medium Common Fair Fair Osage-orange Maclura pomifera NDH Medium 15 100.9 4.9 Sm. inc. Lg. inc. High Common Very Good Very Good Pitch pine Pinus rigida NSH High 11.1 87.5 2.9 Lg. dec. Lg. dec. Low Common Very Poor Very Poor Poor Poor Poor Poor Poor Poor Po	boxelder	Acer negundo	WSH	Low	24.5	130.5	4.2 Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1 27
Osage-orange Maclura pomifera NDH Medium 15 100.9 4.9 Sm. inc. Lg. inc. High Common Very Good Very Good Pitch pine Pinus rigida NSH High 9.3 88.8 4.3 Lg. dec. Lg. dec. Low Common Very Poor Very Poor Poor Poor eastern white pine Pinus strobus WDH High 10.5 85.3 5.0 Very Lg. dec. Very Lg. dec. Low Common Poor Poor Poor Infill + Infill + 0.3 NSL Low 22.6 83.9 3.2 Sm. dec. Sm. dec. Medium Common Poor Poor Poor Infill + Infill + 0.5 NSH Low 19.9 81.5 2.6 Lg. dec. Lg. dec. Medium Common Poor Poor Poor Infill + Infill + 1.5 NSC Agrangere Platanus occidentalis NSL Low 19.9 81.5 2.8 Sm. inc. Lg. inc. High Common Very Good Very Good Very Good Very Good Infill + Infill + 1.5 NSC Agrangere Platanus occidentalis NSL Low 15.7 62.2 3.1 Lg. inc. Lg. inc. Medium Common Very Good Very Good Very Good Infill + Infill + 1.5 NSC NSC Agrangere Pinus echinata WDH High 10.6 53.6 3.1 Lg. inc. Lg. inc. Lg. inc. Medium Common Very Good Very Good Infill + Infill + 1.5 NSC	sourwood	Oxydendrum arboreum	NDL	High	31.1	122.9	2.4 Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1 28
eastern hemlock Tsuga canadensis NSH High 9.3 88.8 4.3 Lg. dec. Lg. dec. Low Common Very Poor Very Poor 0.3 pitch pine Pinus rigida NSH High 11.1 87.5 2.9 Lg. dec. Lg. dec. Medium Common Poor Poor 0.3 eastern white pine Pinus strobus WDH High 10.5 85.3 5.0 Very Lg. dec. Very Lg. dec. Low Common Lost Lost 0.3 shellbark hickory Carya laciniosa NSL Low 22.6 83.9 3.2 Sm. dec. Sm. dec. Medium Common Poor Poor Poor Infill + Infill + 0.3 Ohio buckeye Aesculus glabra NSL Low 19.9 81.5 2.6 Lg. dec. Lg. dec. Medium Common Poor Poor Poor 1.6 Infill + Infill + 0.3 Ohio buckeye Aesculus glabra NSL Low 19.9 81.5 2.8 Sm. inc. Lg. inc. High Common Very Good Very Good Very Good Noneylocust Gleditsia triacanthos NSH Low 21.8 81.5 2.8 Sm. inc. Lg. inc. High Common Very Good Very Good Infill + Infill + 1.3 Sycamore Platanus occidentalis NSL Low 15.7 62.2 3.1 Lg. inc. Lg. inc. Medium Common Very Good Very Good Very Good Infill + Infill + 1.3 Shumard oak Quercus shumardii NSL Low 10.9 49.0 3.6 Sm. inc. Lg. inc. Lg. inc. Medium Common Very Good Very Good Infill + Infill + 1.4 Shumard oak Quercus shumardii NSL Low 3.6 44.6 3.1 Lg. dec. Lg. dec. Lg. dec. Low Rare Very Poor Very Poor Very Poor Sweetgum Liquidambar styraciflua WDH High 8.5 37.9 3.9 Lg. inc. Lg. inc. Medium Rare Good Good Infill + Infill + 1.4 American hornbeam; muscle\(\) Carpinus caroliniana WSL Low 13.5 37.7 1.7 No change Lg. inc. Medium Rare Poor Good	sassafras	Sassafras albidum	WSL	Low	32.9	104.9	1.8 No change	No change	Medium	Common	Fair	Fair			1 29
pitch pine Pinus rigida NSH High 11.1 87.5 2.9 Lg. dec. Lg. dec. Medium Common Poor Poor Poor 0 seatern white pine Pinus strobus WDH High 10.5 85.3 5.0 Very Lg. dec. Low Common Lost Lost 0 shellbark hickory Carya laciniosa NSL Low 22.6 83.9 3.2 Sm. dec. Sm. dec. Medium Common Poor Poor Poor Infill + Infill + 0 shellbark hickory Carya laciniosa NSL Low 19.9 81.5 2.6 Lg. dec. Lg. dec. Medium Common Poor Poor Poor Infill + Infill + 0 shellbark hickory Carya laciniosa NSH Low 19.9 81.5 2.6 Lg. dec. Lg. dec. Medium Common Poor Poor Poor Infill + Infill + 0 shellbark hickory Carya laciniosa NSH Low 19.9 81.5 2.6 Lg. dec. Lg. dec. Medium Common Poor Poor Poor Infill + Infill + 0 shellbark hickory Common Poor Poor Poor Poor Poor Poor Poor Po	Osage-orange	Maclura pomifera	NDH	Medium	15	100.9	4.9 Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1 30
eastern white pine Pinus strobus WDH High 10.5 85.3 5.0 Very Lg. dec. Very Lg. dec. Low Common Lost Lost 0 shellbark hickory Carya laciniosa NSL Low 22.6 83.9 3.2 Sm. dec. Sm. dec. Medium Common Poor Poor Infill + Infill + 0 shellbark hickory Aesculus glabra NSL Low 19.9 81.5 2.6 Lg. dec. Lg. dec. Medium Common Poor Poor Poor 0 shoneylocust Gleditsia triacanthos NSH Low 21.8 81.5 2.8 Sm. inc. Lg. inc. High Common Very Good Very Good Very Good Very Good Noneylocust Quercus stellata WDH High 7.6 64.1 6.2 Lg. inc. Lg. inc. High Common Very Good Very Good Noneylocust Shortleaf pine Pinus echinata WDH High 10.6 53.6 3.1 Lg. inc. Lg. inc. Medium Common Very Good Very Good Noneylocust NSL Low 10.9 49.0 3.6 Sm. inc. Lg. inc. Medium Common Very Good Very Good Noneylocust NSL Low 10.9 49.0 3.6 Sm. inc. Lg. inc. High Rare Good Good Infill + Infill + 1 shumard oak Quercus shumardii NSL Low 3.6 44.6 3.1 Lg. dec. Lg. dec. Lg. dec. Low Rare Very Poor Very Poor Very Poor Sweetgum Liquidambar styraciflua WDH High 8.5 37.9 3.9 Lg. inc. Lg. inc. Medium Rare Good Good Infill + Infill + 1 Infill + 2 American hornbeam; muscle\Carpinus caroliniana WSL Low 13.5 37.7 1.7 No change Lg. inc. Medium Rare Poor Good 1.4	eastern hemlock	Tsuga canadensis	NSH	High	9.3	88.8	4.3 Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0 31
shellbark hickory Carya laciniosa NSL Low 22.6 83.9 3.2 Sm. dec. Sm. dec. Medium Common Poor Poor Infill + Infill + 0.3 Ohio buckeye Aesculus glabra NSL Low 19.9 81.5 2.6 Lg. dec. Lg. dec. Medium Common Poor Poor Poor Noneylocust Gleditsia triacanthos NSH Low 21.8 81.5 2.8 Sm. inc. Lg. inc. High Common Very Good Very Good Very Good Infill + Infill + 1.3 Sycamore Platanus occidentalis NSL Low 15.7 62.2 3.1 Lg. inc. Lg. inc. Medium Common Very Good Very Good Infill + Infill + 1.3 Shumard oak Quercus shumardii NSL Low 10.9 49.0 3.6 Sm. inc. Lg. inc. Medium Common Very Good Very Good Infill + Infill + 1.4 Shumard oak Quercus shumardii NSL Low 3.6 44.6 3.1 Lg. dec. Lg. inc. High Rare Good Good Infill + Infill + 1.4 Sweetgum Liquidambar styraciflua WDH High 8.5 37.9 3.9 Lg. inc. Lg. inc. Medium Rare Good Good Infill + Infill + 2.4 American hornbeam; musclev Carpinus caroliniana WSL Low 13.5 37.7 1.7 No change Lg. inc. Medium Rare Poor Good 1.4	pitch pine	Pinus rigida	NSH	High	11.1	87.5	2.9 Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0 32
Ohio buckeye Aesculus glabra NSL Low 19.9 81.5 2.6 Lg. dec. Lg. dec. Medium Common Poor Poor Poor 0 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	eastern white pine	Pinus strobus	WDH	High	10.5	85.3	5.0 Very Lg. dec.	Very Lg. dec.	Low	Common	Lost	Lost			0 33
honeylocust Gleditsia triacanthos NSH Low 21.8 81.5 2.8 Sm. inc. Lg. inc. High Common Very Good Very Good Infill ++ Infill ++ 1 sycamore Platanus occidentalis NSL Low 15.7 62.2 3.1 Lg. inc. Lg. inc. Medium Common Very Good Very Good Very Good Infill ++ Infill ++ 1 shortleaf pine Pinus echinata WDH High 10.6 53.6 3.1 Lg. inc. Lg. inc. Medium Common Very Good Very Good Infill ++ Infill ++ 1 shortleaf pine Pinus echinata WDH High 10.6 53.6 3.1 Lg. inc. Lg. inc. Medium Common Very Good Very Good Infill ++ Infill ++ 1 shortleaf pine Pinus echinata WDH Low 10.9 49.0 3.6 Sm. inc. Lg. inc. High Rare Good Good Infill ++ Infill ++ 1 syellow buckeye Aesculus flava NSL Low 3.6 44.6 3.1 Lg. dec. Lg. dec. Low Rare Very Poor Very Poor Sweetgum Liquidambar styraciflua WDH High 8.5 37.9 3.9 Lg. inc. Lg. inc. Medium Rare Good Good Infill ++ Infill ++ 2 syellow buckeye Carpinus caroliniana WSL Low 13.5 37.7 1.7 No change Lg. inc. Medium Rare Poor Good 14.4 Medium Rare Po	shellbark hickory	Carya laciniosa	NSL	Low	22.6	83.9	3.2 Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0 34
post oak Quercus stellata WDH High 7.6 64.1 6.2 Lg. inc. Lg. inc. High Common Very Good Very Good Infill ++ Infill ++ 1 sycamore Platanus occidentalis NSL Low 15.7 62.2 3.1 Lg. inc. Lg. inc. Medium Common Very Good Infill ++ Infill ++ 1 sycamore Pinus echinata WDH High 10.6 53.6 3.1 Lg. inc. Lg. inc. Medium Common Very Good Very Good Infill ++ Infill ++ 1 sycamore Very Good Very Good	Ohio buckeye	Aesculus glabra	NSL	Low	19.9	81.5	2.6 Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0 35
sycamore Platanus occidentalis NSL Low 15.7 62.2 3.1 Lg. inc. Lg. inc. Medium Common Very Good Very Good Very Good Infill ++ Infill ++ 1 shortleaf pine Pinus echinata WDH High 10.6 53.6 3.1 Lg. inc. Lg. inc. Medium Common Very Good Very Good Very Good Infill ++ Infill ++ 1 shortleaf pine Pinus echinata WDH High 10.6 53.6 Sm. inc. Lg. inc. High Rare Good Good Infill ++ Infill ++ 1 shortleaf pine Pinus echinata WDH Low 10.9 49.0 3.6 Sm. inc. Lg. inc. High Rare Good Good Infill ++ Infill ++ 1 shortleaf pine Pinus echinata WDH High 8.5 37.9 3.9 Lg. inc. Lg. inc. Lg. inc. Medium Rare Good Good Infill ++ Infill ++ 2 shortleaf pine Pinus echinata WDH High 8.5 37.9 3.9 Lg. inc. Lg. inc. Medium Rare Poor Good Infill ++ Infill ++ 2 shortleaf pine Pinus echinata WDH High 8.5 37.9 3.9 Lg. inc. Medium Rare Poor Good Infill ++ Infill ++ 2 shortleaf pine Pinus echinata WDH Pinus echinata W	honeylocust	Gleditsia triacanthos	NSH	Low	21.8	81.5	2.8 Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1 36
shortleaf pine Pinus echinata WDH High 10.6 53.6 3.1 Lg. inc. Lg. inc. Medium Common Very Good Very Good Infill ++ Infill ++ 1 3 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	post oak	Quercus stellata	WDH	High	7.6	64.1	6.2 Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1 37
Shumard oak Quercus shumardii NSL Low 10.9 49.0 3.6 Sm. inc. Lg. inc. High Rare Good Good Infill ++ Infill ++ 1 4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	sycamore	Platanus occidentalis	NSL	Low	15.7	62.2	3.1 Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1 38
yellow buckeye Aesculus flava NSL Low 3.6 44.6 3.1 Lg. dec. Lg. dec. Low Rare Very Poor Very Poor 0 4 4 5 4 6 5 4 7 6 7 6 7 6 7 7 7 8 7 8 7 8 7 8 7 8 7 8	shortleaf pine	Pinus echinata	WDH	High	10.6	53.6	3.1 Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1 39
sweetgum Liquidambar styraciflua WDH High 8.5 37.9 3.9 Lg. inc. Lg. inc. Medium Rare Good Good Infill ++ Infill ++ 2 4 American hornbeam; muscle\ Carpinus caroliniana WSL Low 13.5 37.7 1.7 No change Lg. inc. Medium Rare Poor Good 14	Shumard oak	Quercus shumardii	NSL	Low	10.9	49.0	3.6 Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1 40
American hornbeam; musclev Carpinus caroliniana WSL Low 13.5 37.7 1.7 No change Lg. inc. Medium Rare Poor Good 1	yellow buckeye	Aesculus flava	NSL	Low	3.6	44.6	3.1 Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0 41
	sweetgum	Liquidambar styraciflua	WDH	High	8.5	37.9		Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2 42
	American hornbeam; muscle	ex Carpinus caroliniana	WSL	Low	13.5	37.7	1.7 No change	Lg. inc.	Medium	Rare	Poor	Good			1 43
	sweet birch	Betula lenta	NDH	High	9.5	36.8	2.5 Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0 44
American basswood Tilia americana WSL Medium 10.8 33.4 1.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0	American basswood	Tilia americana	WSL	Medium	10.8	33.4	1.3 Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0 45
	flowering dogwood	Cornus florida	WDL	Medium	21.2	32.7		Lg. inc.	Medium	Rare	Good	Good			1 46
river birch Betula nigra NSL Low 3.4 27.5 5.6 Sm. dec. Sm. dec. Medium Rare Very Poor Very Poor 0	river birch	Betula nigra	NSL	Low	3.4	27.5	5.6 Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 47



HUC 051001 Licking

HUC 6 Watershed

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

Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv Chn	gCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO N
pin oak	Quercus palustris	NSH	Low	2.1	27.2	13.1 Sm.	dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2 48
shingle oak	Quercus imbricaria	NDH	Medium	8.8	21.7	1.8 Sm.	dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2 49
pawpaw	Asimina triloba	NSL	Low	10.7	17.9	1.3 Lg. c	dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0 50
silver maple	Acer saccharinum	NSH	Low	3.1	15.3	4.9 Sm.	dec.	No change	High	Rare	Poor	Fair	Infill +	Infill +	2 51
serviceberry	Amelanchier spp.	NSL	Low	11.1	15.3	0.9 Lg. c	dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0 52
cucumbertree	Magnolia acuminata	NSL	Low	5.1	13.0	0.9 Sm.	dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 53
butternut	Juglans cinerea	NSLX	FIA	3.1	12.0	1.6 Unk	known	Unknown	Low	Rare	FIA Only	FIA Only			0 54
eastern hophornbeam; ironv	v Ostrya virginiana	WSL	Low	3.2	6.4	0.6 Lg. i	inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2 55
black maple	Acer nigrum	NSH	Low	1	6.3	6.0 Lg. c	dec.	Lg. dec.	High	Rare	Poor	Poor			0 56
eastern cottonwood	Populus deltoides	NSH	Low	2	6.1	2.8 Sm.	dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2 57
blue ash	Fraxinus quadrangulata	NSL	Low	3.8	5.8	1.3 No c	change	No change	Low	Rare	Very Poor	Very Poor			2 58
red mulberry	Morus rubra	NSL	Low	3	5.1	0.9 No c	change :	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2 59
common persimmon	Diospyros virginiana	NSL	Low	2.3	5.0	1.1 Lg. i	inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1 60
southern red oak	Quercus falcata	WDL	Medium	2.3	4.2	1.1 Lg. i	inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2 61
paulownia	Paulownia tomentosa	NSL	FIA	2.1	3.1	1.5 Unk	nown	Unknown	NA	Rare	NNIS	NNIS			0 62
ailanthus	Ailanthus altissima	NSL	FIA	1.4	1.7	0.3 Unk	known	Unknown	NA	Rare	NNIS	NNIS			0 63
American chestnut	Castanea dentata	NSLX	FIA	2.2	1.4	0.4 Unk	known	Unknown	Medium	Rare	FIA Only	FIA Only			0 64
bigtooth aspen	Populus grandidentata	NSL	Medium	1	1.0	0.9 Very	y Lg. dec. '	Very Lg. dec.	Medium	Rare	Lost	Lost			0 65
yellow birch	Betula alleghaniensis	NDL	High	0.2	0.8	0.1 Sm.	dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 66
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	0.8	0.8	0.1 Unk	known	Unknown	Medium	Rare	FIA Only	FIA Only			0 67
blackjack oak	Quercus marilandica	NSL	Medium	0.3	0.8	0.2 Lg. i	inc.	Lg. inc.	High	Rare	Good	Good			2 68
black willow	Salix nigra	NSH	Low	1	0.8	0.8 No c	change	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2 69
white mulberry	Morus alba	NSL	FIA	0.5	0.7	0.3 Unk	known	Unknown	NA	Rare	NNIS	NNIS			0 70
winged elm	Ulmus alata	WDL	Medium	0.9	0.4	0.3 Lg. ii	inc.	Lg. inc.	Medium	Rare	Good	Good			2 71
American holly	llex opaca	NSL	Medium	1	0.2	0.2 Lg. c	dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0 72
ashe juniper	Juniperus ashei	NDH	High	0	0	0 New	v Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0 73
loblolly pine	Pinus taeda	WDH	High	0	0	0 New	v Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3 74
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0 Unk	known	Unknown	Medium	Absent	Unknown	Unknown			0 75
mountain maple	Acer spicatum	NSL	Low	0	0	0 Unk	known	Unknown	High	Absent	Unknown	Unknown			0 76
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0 New	v Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3 77
pecan	Carya illinoinensis	NSH	Low	0	0	0 New	v Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3 78
black hickory	Carya texana	NDL	High	0	0	0 New	v Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3 79
sugarberry	Celtis laevigata	NDH	Medium	0	0	0 New	v Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3 80
black ash	Fraxinus nigra	WSH	Medium	0	0	0 Unk	known	New Habitat	Low	Absent	Unknown	New Habitat			3 81
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0 Unk	known	Unknown	Medium	Absent	Unknown	Unknown			0 82
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	0	0	0 Unk	known	Unknown	Low	Absent	Unknown	Unknown			0 83
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0 Unk	nown	Unknown	Medium	Absent	Unknown	Unknown			0 84
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	0	0	0 New	v Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3 85
swamp chestnut oak	Quercus michauxii	NSL	Low	0	0	0 New	v Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3 86
water oak	Quercus nigra	WDH	High	0	0	0 New	v Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3 87
live oak	Quercus virginiana	NDH	High	0	0	0 New	v Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3 88
bluejack oak		NSL	Low	0	0	0 Unk	cnown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3 89
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0 New	v Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0 90

