HUC 031800 Pearl

USDA Forest Service
Northern Research Station
Landscape Change Research Group
Iverson, Peters, Prasad, Matthews

	sq. km	sq. mi	FIA Plots
Area of Region	22,503	8,688.6	757

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	2
Hickory	8
Maple	4
Oak	20
Pine	5
Other	45
	84

Abundance	
Abundant	3
Common	29
Rare	52
Absent	10
	94

Model	Reliability	Adaptability
High	15	27
Medium	37	57
Low	39	10
FIA	4	
	95	**94**

Potential Change in Habitat Suitability

	Scenario RCP45	Scenario RCP85
Increase	38	41
No Change	18	18
Decrease	24	21
New	3	4
Unknown	12	11
	95	**95**

Capability to Cope or Persist

	Scenario RCP45	Scenario RCP85
Very Good	19	21
Good	15	16
Fair	13	12
Poor	18	19
Very Poor	15	12
FIA Only	3	3
Unknown	8	7
	91	**90**

Migration Potential

	SHIFT RCP45	SHIFT RCP85
Likely	0	0
Infill	14	16
Migrate	1	1
	15	**17**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual	CCSM45	57.7	58.9	60.4	60.5	
Average	CCSM85	57.7	59.2	61.1	63.0	
	GFDL45	57.7	59.8	61.0	61.7	
	GFDL85	57.7	59.6	62.0	64.6	
	HAD45	57.7	59.5	61.7	62.6	
	HAD85	57.7	59.7	62.8	65.7	
Growing	CCSM45	67.7	68.8	70.0	70.3	
Season	CCSM85	67.7	69.0	70.9	73.2	
May—Sep	GFDL45	67.7	70.0	71.2	72.5	
	GFDL85	67.7	69.8	72.4	75.5	
	HAD45	67.7	70.2	72.2	73.0	
	HAD85	67.7	70.3	74.6	77.1	
Coldest	CCSM45	42.5	44.3	45.0	44.9	
Month	CCSM85	42.5	44.6	45.6	46.4	
Average	GFDL45	42.5	45.3	45.4	45.4	
	GFDL85	42.5	43.7	44.5	44.9	
	HAD45	42.5	42.7	44.1	44.8	
	HAD85	42.5	43.8	44.9	46.2	
Warmest	CCSM45	70.6	71.7	72.1	72.2	
Month	CCSM85	70.6	71.8	72.6	73.9	
Average	GFDL45	70.6	73.4	73.5	74.4	
	GFDL85	70.6	72.8	74.0	75.7	
	HAD45	70.6	73.8	75.2	75.4	
	HAD85	70.6	74.2	76.8	77.7	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual	CCSM45	45.5	48.0	52.0	50.1	
Total	CCSM85	45.5	48.4	48.8	52.8	
	GFDL45	45.5	50.7	54.9	53.6	
	GFDL85	45.5	50.0	51.7	53.1	
	HAD45	45.5	44.2	47.2	49.0	
	HAD85	45.5	47.7	42.7	45.8	
Growing	CCSM45	17.7	18.2	19.1	18.7	
Season	CCSM85	17.7	17.1	17.6	18.1	
May—Sep	GFDL45	17.7	20.7	23.4	21.5	
	GFDL85	17.7	21.3	22.7	23.8	
	HAD45	17.7	16.7	17.9	17.6	
	HAD85	17.7	17.9	14.4	14.7	

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.

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.

HUC 031800 Pearl

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

Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
loblolly pine	Pinus taeda	WDH	High	94.8	4742.2	34.4	No change	No change	Medium	Abundant	Good	Good			1	1
sweetgum	Liquidambar styraciflua	WDH	High	93.6	1272.0	9.5	No change	No change	Medium	Abundant	Good	Good			1	2
water oak	Quercus nigra	WDH	High	92.7	912.6	7.0	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	3
blackgum	Nyssa sylvatica	WDL	Medium	78.5	340.4	2.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	4
shortleaf pine	Pinus echinata	WDH	High	53.3	326.5	4.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	5
red maple	Acer rubrum	WDH	High	76.7	307.0	2.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	6
slash pine	Pinus elliottii	NDH	High	13.4	297.2	11.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	7
white oak	Quercus alba	WDH	Medium	62	293.1	3.4	No change	Sm. inc.	High	Common	Good	Very Good			1	8
southern red oak	Quercus falcata	WDL	Medium	63.6	279.6	2.9	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	9
yellow-poplar	Liriodendron tulipifera	WDH	High	49.8	270.6	3.9	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	10
post oak	Quercus stellata	WDH	High	46.9	202.5	2.8	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	11
black cherry	Prunus serotina	WDL	Medium	70.2	183.6	1.7	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	12
winged elm	Ulmus alata	WDL	Medium	48.1	132.1	1.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	13
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	32.9	131.4	3.1	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	14
mockernut hickory	Carya alba	WDL	Medium	46.6	131.2	1.9	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	15
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	44.8	120.7	2.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	16
sweetbay	Magnolia virginiana	NSL	Medium	24.7	119.1	3.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	17
willow oak	Quercus phellos	NSL	Low	25.8	111.8	3.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	18
longleaf pine	Pinus palustris	NSH	Medium	12.8	105.5	4.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	19
laurel oak	Quercus laurifolia	NDH	Medium	24.2	86.9	2.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	20
swamp tupelo	Nyssa biflora	NDH	Medium	13	81.5	5.2	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	21
American beech	Fagus grandifolia	WDH	High	24.5	79.8	2.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	22
flowering dogwood	Cornus florida	WDL	Medium	53.1	79.5	1.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	23
pignut hickory	Carya glabra	WDL	Medium	34.5	72.4	1.5	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	24
spruce pine	Pinus glabra	NSL	Low	19.2	67.8	3.1	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	25
American elm	Ulmus americana	WDH	Medium	31.8	65.6	1.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	26
sugarberry	Celtis laevigata	NDH	Medium	12.8	65.5	2.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	27
bald cypress	Taxodium distichum	NSH	Medium	6.4	59.4	5.8	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	2	28
common persimmon	Diospyros virginiana	NSL	Low	40	57.4	1.1	No change	No change	High	Common	Good	Good			1	29
green ash	Fraxinus pennsylvanica	WSH	Low	24.8	56.0	2.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	30
eastern redcedar	Juniperus virginiana	WDH	Medium	20.2	55.3	1.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	31
water tupelo	Nyssa aquatica	NSH	Medium	6.5	52.3	6.3	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	2	32
slippery elm	Ulmus rubra	WSL	Low	11.3	45.1	3.4	Lg. dec.	No change	Medium	Rare	Very Poor	Poor			1	33
southern magnolia	Magnolia grandiflora	NSL	Low	12.3	43.8	2.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	34
sassafras	Sassafras albidum	WSL	Low	29	41.1	0.9	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	35
overcup oak	Quercus lyrata	NSL	Medium	10.3	40.0	3.7	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair	Infill +	Infill +	1	36
swamp chestnut oak	Quercus michauxii	NSL	Low	13.2	37.6	2.6	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	37
black willow	Salix nigra	NSH	Low	13.7	37.5	1.9	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair			1	38
sourwood	Oxydendrum arboreum	NDL	High	22.4	34.8	1.0	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			1	39
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	17.8	34.3	1.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	40
blackjack oak	Quercus marilandica	NSL	Medium	12.7	33.9	1.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	41
American holly	Ilex opaca	NSL	Medium	18.7	32.4	1.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	42
water hickory	Carya aquatica	NSL	Medium	7.6	28.0	3.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	43
sycamore	Platanus occidentalis	NSL	Low	6.7	25.2	1.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	44
Shumard oak	Quercus shumardii	NSL	Low	14.3	24.9	1.4	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +	Infill +	1	45
black oak	Quercus velutina	WDH	High	17.8	24.6	0.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	46
pecan	Carya illinoinensis	NSH	Low	1.9	14.6	2.8	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	2	47

HUC 031800 Pearl

Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
shagbark hickory	Carya ovata	WSL	Medium	6.5	14.2	1.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	48
live oak	Quercus virginiana	NDH	High	2.1	11.5	1.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	49
redbay	Persea borbonia	NSL	Low	7	11.3	0.9	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	50
river birch	Betula nigra	NSL	Low	2.2	11.1	4.7	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	51
red mulberry	Morus rubra	NSL	Low	9.3	11.0	0.9	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	52
honeylocust	Gleditsia triacanthos	NSH	Low	0.9	9.9	11.0	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	53
white ash	Fraxinus americana	WDL	Medium	7.5	9.4	0.7	Sm. inc.	Sm. inc.	Low	Rare	Poor	Poor	Infill +	Infill +	1	54
water elm	Planera aquatica	NSL	Low	2.7	7.8	2.9	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	55
bitternut hickory	Carya cordiformis	WSL	Low	4.8	7.5	0.8	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	56
scarlet oak	Quercus coccinea	WDL	Medium	5.5	6.4	0.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	57
eastern redbud	Cercis canadensis	NSL	Low	5.8	6.1	0.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	58
boxelder	Acer negundo	WSH	Low	5.2	6.0	1.1	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	59
Nuttall oak	Quercus texana	NSH	Medium	3.9	5.0	0.7	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	60
northern red oak	Quercus rubra	WDH	Medium	2.6	4.4	1.6	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	61
eastern cottonwood	Populus deltoides	NSH	Low	0.4	4.2	9.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	62
silver maple	Acer saccharinum	NSH	Low	1.3	3.9	2.9	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	63
Osage-orange	Maclura pomifera	NDH	Medium	1.1	3.8	2.2	No change	Sm. inc.	High	Rare	Fair	Good			2	64
pawpaw	Asimina triloba	NSL	Low	1.3	3.3	2.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	65
shellbark hickory	Carya laciniosa	NSL	Low	2.4	3.0	1.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	66
black walnut	Juglans nigra	WDH	Low	1.1	2.3	1.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	67
bigleaf magnolia	Magnolia macrophylla	NSL	Low	1.4	2.1	1.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	68
pond cypress	Taxodium ascendens	NSH	Medium	0.3	1.4	0.6	No change	No change	Medium	Rare	Poor	Poor	Infill +		2	69
florida maple	Acer barbatum	NSL	Low	1	1.3	0.8	No change	No change	High	Rare	Fair	Fair		Infill +	2	70
durand oak	Quercus sinuata var. sinuata	NSL	FIA	0.9	1.3	1.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	71
cedar elm	Ulmus crassifolia	NDH	Medium	1.3	1.2	0.8	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	72
serviceberry	Amelanchier spp.	NSL	Low	1.8	1.2	0.7	No change	No change	Medium	Rare	Poor	Poor			0	73
turkey oak	Quercus laevis	NSH	Medium	0.4	0.8	1.8	Lg. dec.	Sm. dec.	High	Rare	Poor	Poor			0	74
pin cherry	Prunus pensylvanica	NSL	Low	0.9	0.6	0.7	No change	No change	Medium	Rare	Poor	Poor			0	75
cucumbertree	Magnolia acuminata	NSL	Low	0.9	0.5	0.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	76
chinkapin oak	Quercus muehlenbergii	NSL	Medium	1	0.5	0.3	No change	Sm. dec.	Medium	Rare	Poor	Very Poor			0	77
waterlocust	Gleditsia aquatica	NSLX	FIA	0.4	0.4	0.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	78
bluejack oak	Quercus incana	NSL	Low	0.1	0.2	0.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	79
silverbell	Halesia spp.	NSL	Low	0.4	0.2	0.5	No change	No change	Medium	Rare	Poor	Poor			0	80
ailanthus	Ailanthus altissima	NSL	FIA	0.4	0.2	0.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	81
black hickory	Carya texana	NDL	High	0.1	0.2	0.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	82
chokecherry	Prunus virginiana	NSLX	FIA	0.4	0.2	0.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	83
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0.4	0.1	0.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	84
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +		3	85
Table Mountain pine	Pinus pungens	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	86
Virginia pine	Pinus virginiana	NDH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	87
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	88
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	89
hackberry	Celtis occidentalis	WDH	Medium	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat		Migrate +	3	90
black ash	Fraxinus nigra	WSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	91
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	92
chestnut oak	Quercus prinus	NDH	High	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	93
black locust	Robinia pseudoacacia	NDH	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	94

HUC 6 Watershed
Climate Change Atlas Tree Species
Current and Potential Future Habitat, Capability, and Migration

Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
American basswood	Tilia americana	WSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	95

Sep 2022