

# Great Smoky Mountains

## National Park

### Climate Change Atlas Tree Species

#### Current and Potential Future Habitat, Capability, and Migration

Landscape Change Research Group  
Iverson, Peters, Prasad, Matthews  
USFS Northern Research Station  
Delaware, OH

Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIaiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
chestnut oak	Quercus prinus	NDH	High	70.9	859.5	12.12	No change	No change	High	Abundant	Very Good	Very Good			1	1
yellow-poplar	Liriodendron tulipifera	WDH	High	80.2	857.1	10.68	No change	Sm. dec.	High	Abundant	Very Good	Good			1	2
red maple	Acer rubrum	WDH	High	81.4	818.92	10.06	No change	No change	High	Abundant	Very Good	Very Good			1	3
Virginia pine	Pinus virginiana	NDH	High	50	537.41	10.75	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	4
eastern hemlock	Tsuga canadensis	NSH	High	66.3	503.13	7.59	No change	No change	Low	Abundant	Fair	Fair			0	5
northern red oak	Quercus rubra	WDH	Medium	68.6	406.52	5.93	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	6
scarlet oak	Quercus coccinea	WDL	Medium	62.8	402.07	6.4	No change	No change	Medium	Common	Fair	Fair			1	7
sweet birch	Betula lenta	NDH	High	58.1	376.27	6.47	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	8
sourwood	Oxydendrum arboreum	NDL	High	80.2	325.57	4.06	No change	No change	High	Common	Good	Good			1	9
pignut hickory	Carya glabra	WDL	Medium	65.1	274.8	4.22	No change	No change	Medium	Common	Fair	Fair			1	10
eastern white pine	Pinus strobus	WDH	High	39.5	270.66	6.85	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	11
white oak	Quercus alba	WDH	Medium	65.1	263.01	4.04	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	12
black locust	Robinia pseudoacacia	NDH	Low	64	260.69	4.08	No change	No change	Medium	Common	Fair	Fair			1	13
red spruce	Picea rubens	NDH	High	9.3	211.47	22.73	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	14
eastern redcedar	Juniperus virginiana	WDH	Medium	19.8	199.47	10.09	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	15
mockernut hickory	Carya alba	WDL	Medium	45.3	186.73	4.12	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	16
blackgum	Nyssa sylvatica	WDL	Medium	69.8	167.21	2.4	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	17
white ash	Fraxinus americana	WDL	Medium	36	155.63	4.32	No change	Sm. inc.	Low	Common	Poor	Fair			1	18
shortleaf pine	Pinus echinata	WDH	High	39.5	155.34	3.93	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	19
pitch pine	Pinus rigida	NSH	High	39.5	152.17	3.85	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	20
yellow birch	Betula alleghaniensis	NDL	High	25.6	151.58	5.92	No change	No change	Medium	Common	Fair	Fair			1	21
American beech	Fagus grandifolia	WDH	High	38.4	147.26	3.84	No change	Sm. inc.	Medium	Common	Fair	Good			1	22
sugar maple	Acer saccharum	WDH	High	43	144.23	3.35	No change	Sm. dec.	High	Common	Good	Fair			1	23
flowering dogwood	Cornus florida	WDL	Medium	55.8	142.95	2.56	No change	No change	Medium	Common	Fair	Fair			1	24
black oak	Quercus velutina	WDH	High	50	139.42	2.79	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	25
southern red oak	Quercus falcata	WDL	Medium	20.9	121.03	5.78	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	26
black cherry	Prunus serotina	WDL	Medium	29.1	90.1	3.1	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	27
shagbark hickory	Carya ovata	WSL	Medium	22.1	77.71	3.52	Sm. dec.	No change	Medium	Common	Poor	Fair			1	28
yellow buckeye	Aesculus flava	NSL	Low	19.8	77.63	3.93	No change	No change	Low	Common	Poor	Poor			0	29
American basswood	Tilia americana	WSL	Medium	20.9	75.58	3.61	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	30
post oak	Quercus stellata	WDH	High	11.6	74.27	6.39	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	31
silverbell	Halesia spp.	NSL	Low	25.6	70.42	2.75	No change	No change	Medium	Common	Fair	Fair			1	32
black walnut	Juglans nigra	WDH	Low	19.8	64.03	3.24	No change	Sm. inc.	Medium	Common	Fair	Good			1	33
sassafras	Sassafras albidum	WSL	Low	37.2	61.79	1.66	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	34
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	23.3	61.21	2.63	No change	Sm. inc.	NA	Common	Unknown	Unknown			0	35
hackberry	Celtis occidentalis	WDH	Medium	9.3	59.78	6.43	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	36
American elm	Ulmus americana	WDH	Medium	10.5	58.97	5.63	No change	Lg. inc.	Medium	Common	Fair	Very Good	Infill +	Infill ++	1	37
winged elm	Ulmus alata	WDL	Medium	11.6	49.16	4.23	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	38
serviceberry	Amelanchier spp.	NSL	Low	29.1	44.83	1.54	No change	No change	Medium	Rare	Poor	Poor			1	39
loblolly pine	Pinus taeda	WDH	High	7	42.21	6.05	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	40
American holly	Ilex opaca	NSL	Medium	7	37.45	5.37	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	41
green ash	Fraxinus pennsylvanica	WSH	Low	12.8	35.42	2.77	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	42
striped maple	Acer pensylvanicum	NSL	Medium	26.7	35.09	1.31	No change	No change	Medium	Rare	Poor	Poor			1	43
Table Mountain pine	Pinus pungens	NSL	Low	10.5	34.99	3.34	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			1	44
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	10.5	33.5	3.2	Sm. inc.	Lg. inc.	High	Rare	Good	Good			1	45
bitternut hickory	Carya cordiformis	WSL	Low	10.5	29.71	2.84	No change	Sm. inc.	High	Rare	Fair	Good			1	46
sweetgum	Liquidambar styraciflua	WDH	High	15.1	26.64	1.76	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	47
eastern redbud	Cercis canadensis	NSL	Low	18.6	25.84	1.39	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	48
cucumber tree	Magnolia acuminata	NSL	Low	14	24.07	1.73	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	49
pin cherry	Prunus pensylvanica	NSL	Low	7	21.72	3.11	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	50
boxelder	Acer negundo	WSH	Low	5.8	19.8	3.41	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	51
chinkapin oak	Quercus muehlenbergii	NSL	Medium	3.5	15.15	4.34	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	52
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	10.5	14.36	1.37	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	53

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American chestnut	Castanea dentata	NSLX	FIA	14	9.12	0.65	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	54
common persimmon	Diospyros virginiana	NSL	Low	8.1	8.79	1.08	No change	No change	High	Rare	Fair	Fair			1	55
slippery elm	Ulmus rubra	WSL	Low	3.5	6.86	1.97	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	56
white mulberry	Morus alba	NSL	FIA	3.5	5.66	1.62	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	57
river birch	Betula nigra	NSL	Low	1.2	5.15	4.43	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	58
chokecherry	Prunus virginiana	NSLX	FIA	1.2	3.72	3.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	59
red mulberry	Morus rubra	NSL	Low	5.8	3.63	0.62	No change	No change	Medium	Rare	Poor	Poor		Infill +	1	60
shingle oak	Quercus imbricaria	NDH	Medium	1.2	3.51	3.02	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	61
ailanthus	Ailanthus altissima	NSL	FIA	3.5	3.2	0.92	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	62
bigleaf magnolia	Magnolia macrophylla	NSL	Low	1.2	2.71	2.33	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	63
bigtooth aspen	Populus grandidentata	NSL	Medium	1.2	2.21	1.9	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	64
mountain maple	Acer spicatum	NSL	Low	1.2	1.43	1.23	No change	No change	High	Rare	Fair	Fair			1	65
sugarberry	Celtis laevigata	NDH	Medium	1.2	1.13	0.97	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	66
honeylocust	Gleditsia triacanthos	NSH	Low	1.2	0.91	0.78	Sm. inc.	Lg. inc.	High	Rare	Good	Good			2	67
silver maple	Acer saccharinum	NSH	Low	1.2	0.62	0.53	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	68
Shumard oak	Quercus shumardii	NSL	Low	1.2	0.56	0.48	No change	Lg. inc.	High	Rare	Fair	Good			2	69
butternut	Juglans cinerea	NSLX	FIA	1.2	0.55	0.47	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	70
black maple	Acer nigrum	NSH	Low	1.2	0.44	0.38	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	71
pawpaw	Asimina triloba	NSL	Low	1.2	0.43	0.37	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	72
paulownia	Paulownia tomentosa	NSL	FIA	1.2	0.33	0.28	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	73
American mountain-ash	Sorbus americana	NSL	Low	1.2	0.29	0.25	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	74
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	NA	Absent	New Habitat	New Habitat			0	75
slash pine	Pinus elliotii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	76
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	77
pond cypress	Taxodium ascendens	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	78
northern white-cedar	Thuja occidentalis	WSH	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	79
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	80
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	81
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	82
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	83
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	84
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			3	85
blue ash	Fraxinus quadrangulata	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	86
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	87
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	88
swamp tupelo	Nyssa biflora	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	89
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	90
swamp white oak	Quercus bicolor	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	91
cherrybark oak; swamp red oak	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	92
laurel oak	Quercus laurifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	93
overcup oak	Quercus lyrata	NSL	Medium	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat		Migrate +	3	94
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	95
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	96
willow oak	Quercus phellos	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	97
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	98
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	99
black willow	Salix nigra	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	100
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	101