

# HUC 010900 Massachusetts-Rhode Island Coastal 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    19,180    7,405.3    298

### Species Information

The columns below provide brief 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	Abundance		Model		Potential Change in Habitat Suitability		Capability to Cope or Persist		Migration Potential		
				Reliability	Adaptability	Scenario RCP45	Scenario RCP85	Scenario RCP45	Scenario RCP85	SHIFT RCP45	SHIFT RCP85	
Ash	2			High	23	22	Increase	16	21	Very Good	2	2
Hickory	3			Medium	28	47	No Change	14	10	Good	12	15
Maple	5	Abundant	2	Low	28	15	Decrease	20	19	Fair	10	9
Oak	9	Common	13	FIA	8		New	21	23	Poor	12	11
Pine	4	Rare	43				Unknown	16	14	Very Poor	13	13
Other	35	Absent	26							FIA Only	5	5
	<b>58</b>		<b>84</b>		<b>87</b>	<b>84</b>		<b>87</b>	<b>87</b>	Unknown	8	6
											<b>62</b>	<b>61</b>

### Potential Changes in Climate Variables

#### Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	43.8	44.9	46.2	46.3	
Average	CCSM85	43.8	45.2	46.7	48.5	
	GFDL45	43.8	45.6	47.2	48.0	
	GFDL85	43.8	45.6	48.0	50.7	
	HAD45	43.8	45.3	47.5	48.6	
	HAD85	43.8	45.3	48.1	51.2	
Growing Season	CCSM45	54.1	55.4	56.4	56.6	
	CCSM85	54.1	55.4	56.9	59.0	
May—Sep	GFDL45	54.1	56.0	57.9	58.6	
	GFDL85	54.1	56.1	58.7	61.4	
	HAD45	54.1	55.6	57.7	59.1	
	HAD85	54.1	55.1	58.5	61.5	
Coldest Month	CCSM45	28.1	29.0	29.9	30.4	
	CCSM85	28.1	29.6	30.3	31.6	
Average	GFDL45	28.1	30.3	31.2	31.9	
	GFDL85	28.1	30.4	31.5	32.9	
	HAD45	28.1	29.2	30.7	31.0	
	HAD85	28.1	29.8	31.1	33.0	
Warmest Month	CCSM45	58.4	59.7	60.2	60.2	
	CCSM85	58.4	59.8	60.7	61.6	
Average	GFDL45	58.4	60.1	61.0	61.7	
	GFDL85	58.4	60.4	61.9	63.5	
	HAD45	58.4	59.9	61.0	61.7	
	HAD85	58.4	59.3	61.0	63.0	

#### Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	32.5	32.0	31.5	35.3	
Total	CCSM85	32.5	32.7	33.7	36.4	
	GFDL45	32.5	34.6	36.3	35.3	
	GFDL85	32.5	33.8	35.7	36.9	
	HAD45	32.5	33.0	36.1	35.5	
	HAD85	32.5	35.1	35.6	36.4	
Growing Season	CCSM45	12.6	13.5	12.4	13.5	
	CCSM85	12.6	12.9	13.3	13.5	
May—Sep	GFDL45	12.6	12.1	11.8	12.0	
	GFDL85	12.6	12.5	11.6	11.7	
	HAD45	12.6	12.9	13.5	12.9	
	HAD85	12.6	12.8	12.8	13.2	

**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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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
red maple	Acer rubrum	WDH	High	86.5	1522.8	25.9	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
eastern white pine	Pinus strobus	WDH	High	70.3	880.4	18.1	Lg. dec.	Lg. dec.	Low	Abundant	Poor	Poor			0	2
black oak	Quercus velutina	WDH	High	68.3	349.5	7.0	No change	No change	Medium	Common	Fair	Fair			1	3
scarlet oak	Quercus coccinea	WDL	Medium	62.2	330.1	8.5	No change	Sm. dec.	Medium	Common	Fair	Poor			1	4
northern red oak	Quercus rubra	WDH	Medium	54	316.4	8.8	No change	Sm. dec.	High	Common	Good	Fair			1	5
white oak	Quercus alba	WDH	Medium	70.1	281.3	6.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	6
pitch pine	Pinus rigida	NSH	High	32.2	259.1	13.0	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	7
black cherry	Prunus serotina	WDL	Medium	37.6	115.9	5.5	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	8
white ash	Fraxinus americana	WDL	Medium	35.4	90.9	3.7	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	9
sweet birch	Betula lenta	NDH	High	31.5	86.7	3.9	Sm. inc.	No change	Low	Common	Fair	Poor			1	10
blackgum	Nyssa sylvatica	WDL	Medium	36.6	83.6	3.3	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	11
yellow birch	Betula alleghaniensis	NDL	High	27.4	67.9	3.2	No change	Sm. inc.	Medium	Common	Fair	Good			1	12
eastern hemlock	Tsuga canadensis	NSH	High	21.7	66.7	6.0	No change	Sm. dec.	Low	Common	Poor	Poor			0	13
pignut hickory	Carya glabra	WDL	Medium	17.4	65.1	3.9	No change	Sm. inc.	Medium	Common	Fair	Good			1	14
American elm	Ulmus americana	WDH	Medium	18.1	57.5	3.6	Sm. dec.	No change	Medium	Common	Poor	Fair	Infill +	Infill +	1	15
gray birch	Betula populifolia	NSL	Low	18.9	36.4	2.7	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	16
American beech	Fagus grandifolia	WDH	High	20.8	28.9	2.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	17
eastern redcedar	Juniperus virginiana	WDH	Medium	19.4	28.9	1.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	18
sugar maple	Acer saccharum	WDH	High	18.9	28.2	2.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	19
mockernut hickory	Carya alba	WDL	Medium	9.1	21.7	1.8	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	20
bigtooth aspen	Populus grandidentata	NSL	Medium	14.7	21.4	2.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	21
Norway maple	Acer platanoides	NSL	FIA	6.7	20.1	8.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	22
quaking aspen	Populus tremuloides	WDH	High	7.3	19.2	3.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	23
green ash	Fraxinus pennsylvanica	WSH	Low	10.4	19.0	4.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	24
sassafras	Sassafras albidum	WSL	Low	21.1	18.1	1.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	25
shagbark hickory	Carya ovata	WSL	Medium	16.2	16.6	1.7	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	26
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	6.8	14.1	3.2	No change	No change	Low	Rare	Very Poor	Very Poor			0	27
paper birch	Betula papyrifera	WDH	High	8.5	14.1	2.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	28
chestnut oak	Quercus prinus	NDH	High	4	13.5	4.7	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	29
pin cherry	Prunus pennsylvanica	NSL	Low	4.1	11.2	4.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	30
black willow	Salix nigra	NSH	Low	4	10.3	8.2	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	31
bear oak; scrub oak	Quercus ilicifolia	NSLX	FIA	4.9	8.4	2.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	32
silver maple	Acer saccharinum	NSH	Low	1.4	8.0	6.1	Sm. dec.	Sm. inc.	High	Rare	Poor	Good			2	33
black locust	Robinia pseudoacacia	NDH	Low	5.8	5.8	2.0	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	34
hackberry	Celtis occidentalis	WDL	Medium	0.4	5.1	4.4	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	35
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	7.5	4.8	0.8	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	36
honeylocust	Gleditsia triacanthos	NSH	Low	0.4	4.6	3.5	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	37
swamp white oak	Quercus bicolor	NSL	Low	7.2	4.5	1.7	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	38
post oak	Quercus stellata	WDH	High	2.2	4.2	4.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	39
balsam poplar	Populus balsamifera	NSH	Medium	0.9	4.0	7.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	40
balsam fir	Abies balsamea	NDH	High	0.9	3.8	7.4	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	41
black walnut	Juglans nigra	WDH	Low	0.9	3.6	6.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	42
red pine	Pinus resinosa	NSH	Medium	2.1	2.9	2.9	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	43
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	2.3	2.4	1.1	No change	Lg. inc.	High	Rare	Fair	Good	Infill +	Infill ++	2	44
American chestnut	Castanea dentata	NSLX	FIA	4.4	2.3	0.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	45
American holly	Ilex opaca	NSL	Medium	3.6	2.3	1.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	46
tamarack (native)	Larix laricina	NSH	High	1.3	2.0	1.3	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	47



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yellow-poplar	Liriodendron tulipifera	WDH	High	1.8	1.5	1.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	48
Norway spruce	Picea abies	NSH	FIA	1.3	1.2	0.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	49
American basswood	Tilia americana	WSL	Medium	4.3	1.1	0.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	50
boxelder	Acer negundo	WSH	Low	0.9	1.1	2.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	51
pin oak	Quercus palustris	NSH	Low	0.9	0.8	1.4	Very Lg. dec.	No change	Low	Rare	Lost	Very Poor			0	52
chokecherry	Prunus virginiana	NSLX	FIA	0.4	0.7	0.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	53
northern catalpa	Catalpa speciosa	NSHX	FIA	0.9	0.3	0.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	54
butternut	Juglans cinerea	NSLX	FIA	3.1	0.3	2.0	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	55
American mountain-ash	Sorbus americana	NSL	Low	0.9	0.2	0.5	No change	No change	Low	Rare	Very Poor	Very Poor			0	56
Scots pine	Pinus sylvestris	NSH	FIA	0.8	0.2	0.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	57
serviceberry	Amelanchier spp.	NSL	Low	1.9	0.1	0.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	58
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	59
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	60
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	61
Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	62
bald cypress	Taxodium distichum	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	63
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	64
river birch	Betula nigra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	65
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	66
water hickory	Carya aquatica	NSL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	67
bitternut hickory	Carya cordiformis	WSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	68
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	69
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	70
flowering dogwood	Cornus florida	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	71
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	72
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	Unknown	Low	Modeled	Unknown	Unknown			0	73
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	74
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	75
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	76
red mulberry	Morus rubra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	77
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	78
redbay	Persea borbonia	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	79
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	80
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	81
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	82
swamp chestnut oak	Quercus michauxii	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	83
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	84
willow oak	Quercus phellos	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	85
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	86
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	87