Sheyenne

National Forests and Grasslands
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	8,400.0	3,243.3	6

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	1
Hickory	0
Maple	1
Oak	1
Pine	0
Other	6
	9

Abundance	
Abundant	0
Common	0
Rare	9
Absent	15
	24

	Model Reliability	Adaptability
High	4	9
Medium	9	13
Low	10	2
FIA	2	
	25	**24**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	1	1
No Change	4	4
Decrease	2	2
New	13	13
Unknown	5	5
	25	**25**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	0	0
Good	1	0
Fair	1	3
Poor	3	2
Very Poor	2	2
FIA Only	1	1
Unknown	3	3
	11	**11**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	0	0
Infill	4	5
Migrate	5	4
	9	**9**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	42.6	44.3	47.1	47.7
	CCSM85	42.6	45.1	48.5	52.0
	GFDL45	42.6	48.9	47.3	48.9
	GFDL85	42.6	45.4	48.7	53.6
	HAD45	42.6	45.8	49.8	51.5
	HAD85	42.6	46.3	51.3	56.6
Growing Season May—Sep	CCSM45	64.6	66.6	69.0	69.7
	CCSM85	64.6	67.4	70.5	74.7
	GFDL45	64.6	72.4	70.4	72.4
	GFDL85	64.6	67.9	71.5	77.2
	HAD45	64.6	67.6	70.5	72.6
	HAD85	64.6	67.5	71.7	77.0
Coldest Month Average	CCSM45	7.4	9.0	11.5	11.7
	CCSM85	7.4	8.7	11.1	13.6
	GFDL45	7.4	11.2	12.3	12.9
	GFDL85	7.4	11.4	13.0	15.9
	HAD45	7.4	10.4	14.2	13.9
	HAD85	7.4	13.3	17.8	20.9
Warmest Month Average	CCSM45	71.4	74.1	75.6	76.3
	CCSM85	71.4	75.3	77.4	80.0
	GFDL45	71.4	74.9	76.4	77.8
	GFDL85	71.4	75.3	77.2	80.7
	HAD45	71.4	74.8	76.3	78.0
	HAD85	71.4	75.0	77.4	80.9

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	22.3	23.0	23.1	22.3
	CCSM85	22.3	22.5	21.9	22.4
	GFDL45	22.3	25.4	27.7	25.4
	GFDL85	22.3	25.9	28.1	27.4
	HAD45	22.3	23.7	22.7	23.7
	HAD85	22.3	24.0	23.2	25.3
Growing Season May—Sep	CCSM45	14.8	14.6	14.5	14.2
	CCSM85	14.8	14.1	13.6	13.0
	GFDL45	14.8	17.2	18.6	16.5
	GFDL85	14.8	17.0	18.2	17.1
	HAD45	14.8	14.8	14.1	13.7
	HAD85	14.8	14.9	13.2	12.8

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
green ash	Fraxinus pennsylvanica	WSH	Low	19	45.2	38.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	1
boxelder	Acer negundo	WSH	Low	14.3	21.8	24.5	Sm. inc.	No change	High	Rare	Good	Fair		Infill +	2	2
bur oak	Quercus macrocarpa	NDH	Medium	9.5	15.9	26.7	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	3
eastern cottonwood	Populus deltoides	NSH	Low	4.8	9.5	31.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	4
Siberian elm	Ulmus pumila	NDH	FIA	4.8	9.1	30.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	5
American elm	Ulmus americana	WDH	Medium	9.5	6.2	10.4	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	6
American basswood	Tilia americana	WSL	Medium	4.8	5.5	18.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	7
slippery elm	Ulmus rubra	WSL	Low	4.8	2.9	9.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	8
chokecherry	Prunus virginiana	NSLX	FIA	4.8	0.8	2.8	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	9
eastern redcedar	Juniperus virginiana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	10
red pine	Pinus resinosa	NSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +		3	11
silver maple	Acer saccharinum	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	12
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	13
hackberry	Celtis occidentalis	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	14
flowering dogwood	Cornus florida	WDL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	15
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	16
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	17
quaking aspen	Populus tremuloides	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	18
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	19
northern pin oak	Quercus ellipsoidalis	NSH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +		3	20
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	21
black oak	Quercus velutina	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	22
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	23
black locust	Robinia pseudoacacia	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	24
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	25