

10540

Southern Rocky Mountain Ponderosa Pine Woodland

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Forest and Woodland

Map Zone

26

Geographic Range

Trans-Pecos region (Guadalupe, Chisos, and Davis Mountains), the highest elevation system. Also in the Sacramento Mountains of New Mexico.

Biophysical Site Description

These woodlands occur at the upper elevation range of 6,500-8,000ft and are more mesic coniferous forests. In the Trans-Pecos mountains, occurrences are found on all slopes and aspects. This ecological system generally occurs on igneous, metamorphic, and sedimentary material derived soils, with characteristic features of good aeration and drainage, medium-to-fine texture, neutral to slightly acid pH, an abundance of mineral material, rockiness, and periods of drought during the growing season. Sky Islands in this biophysical setting can be more diverse and difficult to characterize due to diversity of topography and vegetation, as well as Chihuahuan, Southern Rocky Mountains, and Madrean influences.

Vegetation Description

Ponderosa pine (*Pinus ponderosa*) and southwestern white pine (*Pinus strobiformis*) are not known in the Chisos Mountains. Arizona pine (*P. arizonica*) only occurs in the Chisos Mountains and is the dominant conifer, depending on locality and on Southern Rocky Mountains, Madrean or Apacherian transitional influences. Douglas-fir (*Pseudotsuga menziesii*) does not occur in the Davis Mountains; Arizona cypress (*Cupressus arizonica*) only occurs in the Chisos Mountains. Two-needle pinyon (*Pinus edulis*), Mexican pinyon (*Pinus cembroides*), silverleaf oak (*Quercus hypoleucoides*), Gambel oak (*Quercus gambelii*), and juniper (*Juniperus* spp) may be present in the tree canopy. The understory is usually grassy with common species, including New Mexico locust (*Robinia neomexicana*), Gambel oak (*Quercus gambelii*), mountain mahogany (*Cercocarpus montana*), fescue (*Festuca* spp), muhly grass (*Muhlenbergia* spp), and grama grass (*Bouteloua* spp).

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
PIPOS	<i>Pinus ponderosa</i> var. <i>scopulorum</i>	Ponderosa pine

QUGA	<i>Quercus gambelii</i>	Gambel oak
PIAR	<i>Pinus aristata</i>	Bristlecone pine
PIST	<i>Pinus strobus</i>	Eastern white pine
PICE	<i>Pinus cembroides</i>	Mexican pinyon
CUAR	<i>Cupressus arizonica</i>	Arizona cypress

Species names are from the NRCS PLANTS database. Check species codes at <http://plants.usda.gov>.

Disturbance Description

These sites are in a Fire Regime Group I or III. Some portions of these sites are transition zones to Fire Regime Groups II and III. Frequent surface fires were the common fire regime characteristics. Fire intervals ranged from 7-22yrs, and replacement severity occurred at intervals of 150-400yrs+ (Touchan et al. 1996, Brown 2000, Crane 1986, Bradley 1992a, 1992b, Barrett 1988, Morgan et al. 1996, Brown 1994, Poulos et al. 2009). Stand-replacement fires were generally restricted to the closed canopy forest. Topography (aspect, substrate depth, slope, position, etc.) exerted strong control over fire behavior, producing spatially and temporally mixed severity regimes (personal communication, Stanley Kitchen, USDA Forest Service). Bark beetle outbreaks are highly related to stand density and drought. Denser stands in relation to site capacity will favor outbreaks that decrease as trees are thinned. Non-native herbaceous species may move in following severe intensity fire. Review also suggests adding ice and wind storms as other major disturbances. Drought can also cause tree mortality and open the canopy.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	76	12	150	500
Moderate (Mixed)	106	9	10	150
Low (Surface)	11	79	5	50
All Fires	9	100		

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

Scale Description

In the Trans-Pecos this is a large patch community (100s-1000s of acres).

Adjacency or Identification Concerns

In the Trans-Pecos, this system intergrades with Madrean-oak at lower elevations, and it is the community with the highest elevation.

Issues or Problems

Native Uncharacteristic Conditions

Comments

Succession Classes

Mapping Rules

Upper Layer Lifeform	Height (m)	Canopy Cover (%)									
		0-10	11-20	21-30	31-40	41 - 50	51-60	61-70	71-80	81-90	91-100
Herb	0-0.5	A	A	A	A	A	A	A	A	A	A
Herb	0.5-1.0	A	A	A	A	A	A	A	A	A	A
Herb	>1.0	A	A	A	A	A	A	A	A	A	A
Shrub	0-0.5	A	A	A	A	A	A	A	A	A	A
Shrub	0.5-1.0	A	A	A	A	A	A	A	A	A	A
Shrub	1.0-3.0	A	A	A	A	A	A	A	A	A	A
Shrub	>3.0	A	A	A	A	A	A	A	A	A	A
Tree	0-5	C	C	C	B	B	B	B	B	B	B
Tree	5-10	C	C	C	B	B	B	B	B	B	B
Tree	10-25	D	D	D	E	E	E	E	E	E	E
Tree	25-50	D	D	D	E	E	E	E	E	E	E
Tree	>50	D	D	D	E	E	E	E	E	E	E

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leafform distinction where a qualifier is added to the class letter: Brdl (broadleaf), Con (conifer), or Mix (mixed conifer and broadleaf). UN refers to uncharacteristic native or a combination of height and cover that would not be expected under the reference condition. NP refers to not possible or a combination of height and cover which is not physiologically possible for the species in the BpS.

Description

Class A 10 Early Development 1 - All Structures

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIPOS	<i>Pinus ponderosa</i> var. <i>scopulorum</i>	Ponderosa pine	Upper
QUGA	<i>Quercus gambelii</i>	Gambel oak	Upper
MUMO	<i>Muhlenbergia montana</i>	Mountain muhly	Upper
FEAR2	<i>Festuca arizonica</i>	Arizona fescue	Upper

Description

0-15yrs. Openings with grass, shrub and forbs created after replacement fire. Post-replacement vegetation is patchy and episodic. Ponderosa pine (*P. ponderosa*) seedlings can be limited and variable. Gambel oak (*Q. gambelii*) and Fendler's ceanothus (*Ceanothus fendleri*) are vigorous rapid resprouters.

Maximum Tree Size Class

None

Class B 2 Mid Development 1 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIPOS	<i>Pinus ponderosa</i> var. <i>scopulorum</i>	Ponderosa pine	Upper

QUGA	Quercus gambelii	Gambel oak	Mid-Upper
FEAR2	Festuca arizonica	Arizona fescue	Mid-Upper
MUHLE	Muhlenbergia	Muhly	Mid-Upper

Description

PIPOS	Pinus ponderosa var. scopulorum	Ponderosa pine	Upper
QUGA	Quercus gambelii	Gambel oak	Upper
FEAR2	Festuca arizonica	Arizona fescue	Upper
MUHLE	Muhlenbergia	Muhly	None

Description

41yrs+. Forest canopy closure is 30%+. Closed canopy containing a mixture of large trees, poles, saplings and shrubs.

Maximum Tree Size Class

Large 21-33"DBH

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:OPN	15
Mid1:OPN	16	Late1:OPN	40
Mid1:CLS	16	Late1:CLS	40
Late1:OPN	41	Late1:OPN	999
Late1:CLS	41	Late1:CLS	999

Probabilistic Transitions

Disturbance Type	Disturbance occurs In	Moves vegetation to	Disturbance Probability	Return Interval (yrs)	Reset Age to New Class Start Age After Disturbance?	Years Since Last Disturbance
Alternative Succession	Early1:ALL	Mid1:CLS	1	1	Yes	11
Surface Fire	Early1:ALL	Early1:ALL	0.1	10	No	0
Replacement Fire	Early1:ALL	Early1:ALL	0.11	9	Yes	0
Alternative Succession	Mid1:OPN	Late1:CLS	1	1	Yes	20
Replacement Fire	Mid1:OPN	Early1:ALL	0.005	200	Yes	0
Mixed Fire	Mid1:OPN	Mid1:OPN	0.01	100	No	0
Surface Fire	Mid1:OPN	Mid1:OPN	0.1	10	No	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.0167	60	Yes	0
Mixed Fire	Mid1:CLS	Mid1:OPN	0.04	25	Yes	0
Alternative Succession	Late1:OPN	Late1:CLS	1	1	Yes	40
Replacement Fire	Late1:OPN	Early1:ALL	0.0025	400	Yes	0
Mixed Fire	Late1:OPN	Late1:OPN	0.01	100	No	0
Surface Fire	Late1:OPN	Late1:OPN	0.1	10	No	0
Surface Fire	Late1:CLS	Late1:CLS	0.004	250	No	0
Replacement Fire	Late1:CLS	Early1:ALL	0.005	200	Yes	0
Mixed Fire	Late1:CLS	Late1:OPN	0.008	125	Yes	0
Insects or Disease	Late1:CLS	Late1:OPN	0.02	50	Yes	0

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