

11190

Southern Rocky Mountain Juniper Woodland and Savanna

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Steppe/Savanna

Map Zone

26

Model Splits or Lumps

This Biophysical Setting (BpS) is lumped with 10590.

Geographic Range

This southern Rocky Mountain ecological system occurs on semi-arid mountains and foothills in southern Colorado east of the Continental Divide, in foothills, mountains, and plateaus of New Mexico, and extends out to limestone breaks in the southeastern Great Plains. Foothills of Sacramento, Oscura, from the San Andres south to the Organ and Franklin Mountains, Sierra Ladrone, Manzano, Sandia Mountains (steep slopes of Chupadera Mesa) and south to the Guadalupe Mountains.

Biophysical Site Description

This BpS typically is found at elevations between 5,000-7,000ft. Severe climatic events such as frost, drought, and aspect are thought to determine the distribution of pinyon-juniper woodlands to relatively narrow altitudinal belts on mountainsides. Soils supporting this system vary in texture from stony, cobbly, gravelly sandy loams to clay loam or clay. Limestone substrate increases as you move south and is important in the Sacramento, Guadalupe, and Franklin Mountains.

Vegetation Description

Two-needle pinyon (*Pinus edulis*) and/or oneseed juniper (*Juniperus monosperma*) dominate the tree canopy. Mexican pinyon (*Pinus cembroides*) begins to dominate as you move further south. Rocky Mountain juniper (*J. scopulorum*) may co-dominate or replace *J. monosperma* at higher elevations. In southern transitional areas between Madrean Pinyon-juniper Woodland (CES305.797) and southern Rocky Mountain Pinyon-Juniper Woodland (CES306.835) in southern New Mexico, alligator juniper (*J. deppeana*) becomes common. Understory layers are variable and may be dominated by shrubs or graminoids or be absent. Associated species are more typical of southern Rocky Mountains than the Colorado Plateau and include mountain-mahogany (*Cercocarpus montanus*), hairy mountain-mahogany (*C. breviflorus*), red barberry (*Mahonia haematocarpa*), Gambel oak (*Quercus gambelii*), gray oak (*Q. grisea*), pungent oak (*Q. pungens*), shrub live oak (*Q. turbinella*; this species doesn't occur in the Guadalupe), blue

grama (*Bouteloua gracilis*), James' galleta (*Pleuraphis jamesii*), and pinyon ricegrass (*Piptochaetium fimbriatum*).

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
JUDE	<i>Juncus debilis</i>	Weak rush
JUMO	<i>Juniperus monosperma</i>	Oneseed juniper
JUSC	<i>Juncus scirpoides</i>	Needlepod rush
PIED	<i>Pinus edulis</i>	Twoneedle pinyon
PICE	<i>Pinus cembroides</i>	Mexican pinyon
QUGA	<i>Quercus gambelii</i>	Gambel oak
PIFI	<i>Piptochaetium fimbriatum</i>	Pinyon ricegrass
BOGR2	<i>Bouteloua gracilis</i>	Blue grama

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

Disturbance Description

Fires were ignited by lightning during summer monsoon season. Fire regime as described here is based on expert estimate of historical range of variation (Schussman and Smith 2006). Fire is fairly frequent in May and June, mostly mixed-severity. Fire in map zone (MZ) 26 is probably more frequent than modelers in MZ25 described it. Significant drought occurs about every 60yrs and, in combination with the resultant herbivory impacts from pine beetle infestations, causes disproportional mortality of large, old trees.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	29	36	20	1000
Moderate (Mixed)	32	33	20	1000
Low (Surface)	34	31	10	100
All Fires	10	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 Franklin Mountains, patch size is smaller due to drier site conditions. In the Organ Mountains, patch size can be large. Pinyon-juniper woodland usually was distributed across the landscape in large patches between 100s and 1,000s of acres in size. Matrix formations occur at higher elevations. In particularly dissected topography, this type may have occurred in smaller patches.

Adjacency or Identification Concerns

This system is generally found at higher elevations and more mesic sites than semi-desert grassland and desert scrub. Typically, it is bordered at higher elevations by *Madrean encinal* or ponderosa pine-gambel oak woodland. The primary difference between this type and the Madrean pinyon-juniper is that in this type *J. deppeana* and *P. edulis* are more dominant. The fire return interval is also slightly longer for the southern Rocky Mountain type. Cover and density of juniper and pinyon trees at lower elevations in this type doubtless have increased as a result of fire suppression (possibly as mitigated by livestock grazing).

Issues or Problems

Virtually no components of the fire regimes are known with any certainty. Fire scars are rare, and trees in this system cannot be aged with conventional dendrochronological techniques. Information about fire regimes is extrapolated from adjacent systems, and extreme caution is warranted when interpreting these models. Fire season can be inferred more reliably than fire frequency; the former likely is equally or more important than the latter. This system also includes pinyon-juniper woodlands and savannas with understories dominated by other shrubs or a grass layer and lacks evergreen oaks, which may have a different fire behavior.

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	B	B	B	B	B	B	B	B	UN	UN
Tree	5-10	D	D	D	D	D	C	C	C	UN	UN
Tree	10-25	D	D	D	D	D	C	C	C	UN	UN
Tree	25-50	D	D	D	D	D	C	C	C	UN	UN
Tree	>50	D	D	D	D	D	C	C	C	UN	UN

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	22	Early Development 1 - All Structures
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIFI	Piptochaetium fimbriatum	Pinyon ricegrass	Upper
BOGR2	Bouteloua gracilis	Blue grama	Upper
QUGA	Quercus gambelii	Gambel oak	Upper

QUTU2	Quercus turbinella	Sonoran scrub oak	Upper
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Description

Initial post-fire community dominated by perennial *caespitose* grasses. Blue grama (*Bouteloua gracilis*) dominates among other grama grasses. Evidence of past fires may be observed, including charcoal and resprouting woody plants.

Maximum Tree Size Class

None

Class B	34	Mid Development 1 - Closed
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
JUDE	<i>Juncus debilis</i>	Weak rush	Upper
PIED	<i>Pinus edulis</i>	Twoneedle pinyon	Upper
QUGA	<i>Quercus gambelii</i>	Gambel oak	Upper
QUTU2	<i>Quercus turbinella</i>	Sonoran scrub oak	Upper

Description

Community dominated by young to mature alligator juniper (*J. deppeana*) and evergreen oak trees of various ages.

Maximum Tree Size Class

Pole 5-9" DBH

Class C	1	Late Development 1 - Closed
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
JUDE	<i>Juncus debilis</i>	Weak rush	Upper
PIED	<i>Pinus edulis</i>	Twoneedle pinyon	Upper
QUGA	<i>Quercus gambelii</i>	Gambel oak	Middle
OUTU2	<i>Quercus turbinella</i>	Sonoran scrub oak	Middle

Description

Woodland phase: site dominated by relatively dense old alligator juniper (*J. deppeana*), redberry juniper (*J. coahuilensis*), and evergreen oak trees. The tallest trees would be ~35-40ft tall.

Maximum Tree Size Class

Medium 9-21" DBH

Class D	43	Late Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
JUDE	<i>Juncus debilis</i>	Weak rush	Upper
PIED	<i>Pinus edulis</i>	Twoneedle pinyon	Upper
PIFI	<i>Piptochaetium fimbriatum</i>	Pinyon ricegrass	Lower
BOGR2	<i>Bouteloua gracilis</i>	Blue grama	Lower

Description

Savanna phase with more frequent fire. *J. coahuilensis* is dominant, and Pinchot's juniper (*J. pinchotii*) is present. The tallest trees would be ~35-40ft tall.

Maximum Tree Size Class

None

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:CLS	9
Mid1:CLS	10	Late1:CLS	84
Late1:CLS	85	Late1:CLS	999
Late1:OPN	85	Late1:OPN	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
Replacement Fire	Early1:ALL	Early1:ALL	0.0833	12	Yes	0
Alternative Succession	Mid1:CLS	Late1:OPN	0.02	50	Yes	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.025	40	Yes	0
Mixed Fire	Mid1:CLS	Mid1:CLS	0.04	25	No	0
Wind or Weather or Stress	Late1:OPN	Late1:OPN	0.015	67	No	0
Replacement Fire	Late1:OPN	Early1:ALL	0.0167	60	Yes	0
Mixed Fire	Late1:OPN	Late1:OPN	0.04	25	No	0
Surface Fire	Late1:OPN	Late1:OPN	0.0667	15	No	0
Wind or Weather or Stress	Late1:CLS	Late1:OPN	0.015	67	Yes	0
Replacement Fire	Late1:CLS	Early1:ALL	0.0167	60	Yes	0
Mixed Fire	Late1:CLS	Late1:OPN	0.04	25	Yes	0
Surface Fire	Late1:CLS	Late1:CLS	0.0667	15	No	0

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