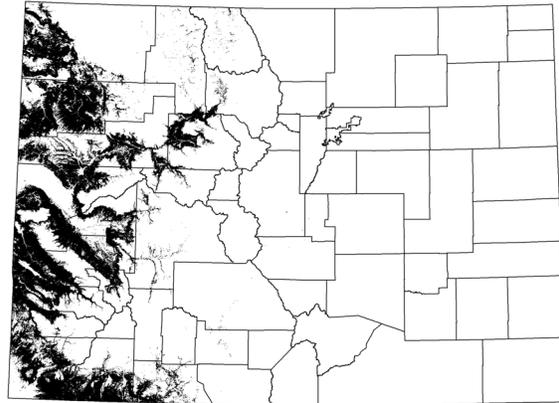


COLORADO PLATEAU PINYON-JUNIPER WOODLAND



S. Kettler



extent exaggerated for display

- JUNIPERUS OSTEOSPERMA WOODED HERBACEOUS ALLIANCE
 - Juniperus osteosperma* / *Hesperostipa comata* Wooded Herbaceous Vegetation
 - Juniperus osteosperma* / *Leymus salinus* Wooded Herbaceous Vegetation
- JUNIPERUS OSTEOSPERMA WOODED SHRUBLAND ALLIANCE
 - Juniperus osteosperma* Wooded Shrubland [Placeholder]
- JUNIPERUS OSTEOSPERMA WOODLAND ALLIANCE
 - Juniperus osteosperma* / *Artemisia nova* / Rock Woodland
 - Juniperus osteosperma* / *Artemisia nova* Woodland
 - Juniperus osteosperma* / *Artemisia tridentata* ssp. *wyomingensis* Woodland
 - Juniperus osteosperma* / *Cercocarpus intricatus* Woodland
 - Juniperus osteosperma* / *Cercocarpus montanus* Woodland
 - Juniperus osteosperma* / *Pseudoroegneria spicata* Woodland
 - Juniperus osteosperma* / *Symphoricarpos oreophilus* Woodland
 - Juniperus osteosperma* Woodland
- PINUS EDULIS - (JUNIPERUS SPP.) WOODLAND ALLIANCE
 - Pinus edulis* - (*Juniperus monosperma*, *Juniperus osteosperma*) / *Hesperostipa comata* Woodland
 - Pinus edulis* - (*Juniperus osteosperma*) / *Bouteloua gracilis* Woodland
 - Pinus edulis* - *Juniperus osteosperma* / *Cercocarpus intricatus* Woodland
 - Pinus edulis* - *Juniperus osteosperma* / *Coleogyne ramosissima* Woodland
 - Pinus edulis* - *Juniperus osteosperma* / *Purshia stansburiana* Woodland
 - Pinus edulis* - *Juniperus* spp. / *Artemisia tridentata* (ssp. *wyomingensis*, ssp. *vaseyana*) Woodland
 - Pinus edulis* - *Juniperus* spp. / *Cercocarpus montanus* Woodland
 - Pinus edulis* - *Juniperus* spp. / *Quercus gambelii* Woodland
 - Pinus edulis* / *Achnatherum scribneri* Woodland
 - Pinus edulis* / *Poa fendleriana* Woodland
 - Pinus edulis* / *Pseudoroegneria spicata* Woodland
 - Pinus edulis* / *Purshia tridentata* Woodland
 - Pinus edulis* / *Quercus X pauciloba* Woodland

Overview: This matrix-forming ecological system occurs on dry mountains and foothills of the Colorado Plateau region from the Western Slope of Colorado to the Wasatch Range, and south to the Mogollon Rim. It is typically found at lower elevations ranging from 4,900-8,000 ft (1,500-2,440 m). These woodlands occur on warm, dry sites on mountain slopes, mesas, plateaus, and ridges. *Pinus edulis* and/or *Juniperus osteosperma* dominate the tree canopy. *Juniperus scopulorum* may codominate or replace *Juniperus monosperma* at higher elevations. These woodlands often occur in a mosaic with other systems, including pinyon-juniper shrublands, sagebrush shrublands, Gambel oak shrublands and semi-desert shrublands.

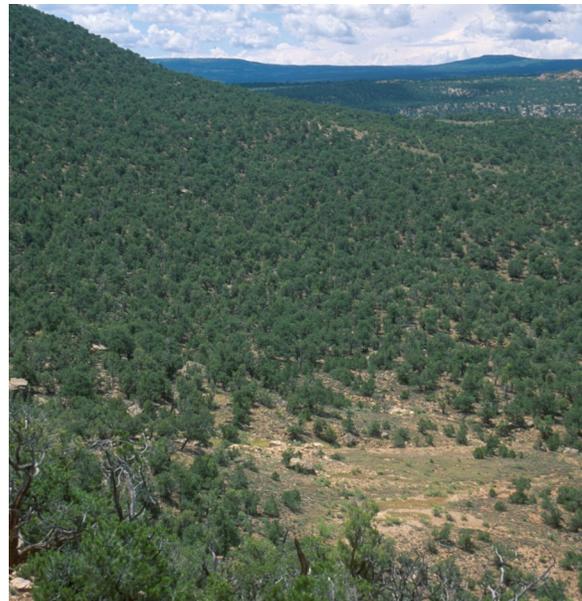
Characteristic species: These woodland associations are characterized by stands with 25-60% canopy cover of trees typically 10-30 ft (3-10 m) in height. These stands may be solely dominated by the evergreen needle-leaved tree *Pinus edulis*, or may be co-dominated by the scale-leaf evergreen tree *Juniperus osteosperma* or other *Juniperus* species. The understory ranges from a relatively rich mixture of evergreen and/or deciduous shrubs, to a sparse to moderately dense herbaceous layer dominated by perennial grasses (with or without shrubs), to no vegetation at all (Reid et al. 1999).

A sparse to moderately dense shrub layer (0-30%) may be present with little to high species diversity. Characteristic shrubs and dwarf-shrubs include *Artemisia tridentata*, *Arctostaphylos pungens*, *Amelanchier utahensis*, *Cercocarpus montanus*, *Cercocarpus ledifolius*, *Coleogyne ramosissima*, *Ephedra viridis*, *Gutierrezia sarothrae*, *Purshia mexicana*, *Purshia tridentata*, *Quercus gambelii*, *Quercus turbinella*, *Symphoricarpos oreophilus* and *Shepherdia rotundifolia*. Scattered cacti are often present, including *Opuntia* spp., *Echinocereus* spp., and *Yucca* spp.

Perennial graminoids are the most abundant species in the sparse to moderately dense (1-30% cover) herbaceous layer. Characteristic graminoid species include *Bouteloua curtipendula*, *Bouteloua gracilis*, *Aristida* spp., *Festuca arizonica*, *Koeleria macrantha*, *Hesperostipa comata*, *Achnatherum hymenoides*, *Pseudoroegneria spicata*, *Poa fendleriana*, *Pleuraphis jamesii*, and *Pascopyrum smithii*. *Carex* spp. may be found in more mesic sites with *Quercus gambelii*. Annual grasses may be seasonally present. The forb layer may be diverse, but has little cover. Commonly present forbs include *Artemisia*, *Eriogonum*, *Cryptantha*, *Aster*, *Solidago*, *Heterotheca*, *Mirabilis*, *Penstemon*, *Phlox*, *Senecio*, and *Zinnia* species. Annual forbs may be seasonally present.

Environment: Severe climatic events occurring during the growing season, such as frosts and drought, are thought to limit the distribution of pinyon-juniper woodlands to relatively narrow altitudinal belts on mountainsides. Annual precipitation is usually from 12-22 in (30-55 cm) in the form of rain and snow.

Stands occur on a variety of aspects and slopes. Slope may range from nearly level to steep (up to 80%). Soils supporting this system vary in texture ranging from stony, cobbly, gravelly sandy loams to clay loam or clay. Parent materials likewise vary widely from granite, basalt, limestone, and sandstone to mixed alluvium (Springfield 1976). Soil depths may range from shallow to deep.



G. Doyle

Dynamics: The effect of a fire on a stand is largely dependent on the tree height and density, fine fuel load on the ground, weather conditions, and season (Wright et al. 1979, Dwyer and Pieper 1967). Large trees generally survive unless the fire gets into the crown due to heavy fuel loads in the understory. In this system fire acts to open stands, increase diversity and productivity in understory species, and create a mosaic of stands of different sizes and ages across the landscape while maintaining the boundary between woodlands and adjacent shrubs or grasslands (Bradley et al. 1992). Altered fire regimes, overgrazing, and tree cutting can all affect stand quality and fire behavior. These factors can also disturb cryptogamic soils and lead to increased soil erosion and habitat/species loss.

Variation: Stands vary considerably in appearance and composition, both altitudinally and geographically. Juniper tends to be more abundant at the lower elevations, pinyon tends to be more abundant at the higher elevations, and the two species share dominance within a broad middle-elevation zone (Woodin and Lindsey 1954, Heil et al. 1993). Site conditions influence the stand density. Sites with fewer trees typically have relatively deep soils and support a dense herbaceous level; those with more trees have shallow, rocky soils and often occur on steeper slopes. Stands may range from even aged to un-even aged stands. Some stands may have closed canopies with little or no understory, but many stands are open with widely scattered trees with a wide variety of understory vegetation (Rondeau 2001).

- Bradley, A. F., N. V. Noste and W. C. Fischer. 1992. Fire ecology of forests and woodlands in Utah. USDA Forest Service General Technical Report INT-287. Intermountain Research Station. Ogden, UT. 128 pp.
- Dwyer, D. D., and R. D. Pieper. 1967. Fire effects on blue gramma-pinyon-juniper rangeland in New Mexico. *Journal of Range Management* 20:359-362.
- Heil, K.D., Porter, J.M., Fleming, R. and Romme, W.H. 1993. Vascular flora and vegetation of Capitol Reef National Park, Utah. National Park Service Technical Report NPS/NAUCARE/NRTR-93/01.
- Reid, M.S., K.A. Schulz, P.J. Comer, M.H. Schindel, D.R. Culver, D.A. Sarr, and M.C. Damm. 1999. An alliance level classification of vegetation of the coterminous western United States. A report to the University of Idaho Cooperative Fish and Wildlife Research Unit and National Gap Analysis Program in fulfillment of cooperative agreement 1434-HQ-97-AG-01779. The Nature Conservancy, Western Conservation Science Department, Boulder CO. Compact disk.
- Rondeau, R. 2001. Ecological system viability specifications for Southern Rocky Mountain ecoregion. First Edition. Colorado Natural Heritage Program, Colorado State University, Fort Collins, CO. 181 pp.
- Springfield, H.W. 1976. Characteristics and management of southwestern pinyon-juniper Colorado State University, Fort Collins, CO. 181 pp.
- Wright, H. A., L. F. Neuenschwander, and C. M. Britton. 1979. The role and use of fire in sagebrush-grass and pinyon-juniper plant communities: A state-of-the-art review. Gen. Tech. Rep. INT-58, USDA, Forest Serv., Ogden, Utah. 49 pp.
- Woodin, H. E., and A. A. Lindsey. 1954. Juniper-pinyon east of the Continental Divide, as analyzed by the pine-strip method. *Ecology* 35:473-489.

Rank:	A	B	C	D
① SIZE				
Acres	>30,000	10,000-30,000	5,000-10,000	< 5,000
② CONDITION				
<p>Non-native spp. (annual grasses, e.g. <i>Bromus tectorum</i>)</p> <p>Native increaser spp.</p> <p>Disturbance (e.g. ranch activities and buildings; energy development; off-road vehicle use)</p> <p>Ground cover</p>	<p>Absent or incidental.</p> <p>< 5% cover.</p> <p>No surficial disturbance is evident, the stand has never been "chained" and re-seeded. Some disturbance may be evident in small, isolated areas (e.g. mines or ranch activities and buildings; minor off-road vehicle use--<1%). Few to no roads.</p> <p>Microbiotic crusts are intact. Natural microrelief is undisturbed. Soil erosion is not accelerated by anthropogenic activities. Accelerated soil erosion had not occurred, or if in the past, the herbaceous cover has increased sufficiently to check this problem.</p>	<p>May be present in disturbed areas only.</p> <p>May be present and even dominant in spots, but not throughout the occurrence.</p> <p>No surficial disturbance is evident, the stand has never been "chained" and re-seeded. If some disturbance is evident it is limited to less than 20% of the occurrence area (<5%). There are no to only a few roads found within the occurrence.</p> <p>Microbiotic crusts intact in at least 80% of the occurrence. Soil erosion may be accelerated in small patches, or lightly so throughout the occurrence. Soil erosion can be easily reversed by relatively simple, straightforward, and inexpensive changes in management.</p>	<p>Can be abundant in both small and large patches.</p> <p>Surficial disturbances occur on more than 20% of the area. Up to 50% of the stand may have been "chained" and re-seeded. There are more than a few roads found within the occurrence.</p> <p>Microbiotic crusts are removed from more than 25% of the area, or are in various stages of degradation throughout the occurrence. Soil erosion and gullyng may be observed in patches (up to 30%) within the stand.</p>	<p>Present and abundant.</p> <p>Surficial disturbances occur on more than 50% of the area (e.g. mines or ranch activities and buildings; off-road vehicle use). Up to 50% of the stand may have been "chained" and re-seeded.</p> <p>Microbiotic crusts are >75% removed, occurring only in small pockets naturally protected from livestock and off-road vehicle use. Soil erosion may be severe in places.</p>
③ LANDSCAPE CONTEXT				
<p>Connectivity</p> <p>Surrounding land</p>	<p>Highly connected.</p> <p>Occurrence is surrounded by a large area (>2000 ac/800 ha) of natural vegetation, that captures the characteristic ecological gradients (including adjacent large patch and surrounding matrix communities and geomorphic processes.</p>	<p>Moderately connected.</p> <p>Landscape is composed of at least 80% natural or semi-natural vegetation, with species interactions and natural processes occurring across communities. The stand may be surrounded by an expansive semi-natural landscape that has been used extensively for grazing.</p>	<p>Moderately fragmented.</p> <p>Landscape is a mosaic of agricultural or semi-developed areas and natural or semi-natural vegetation, the latter composing 25-80% of the landscape.</p>	<p>Highly fragmented.</p> <p>Occurrence is surrounded primarily by urban or agricultural landscape, with <25% landscape cover of natural or semi-natural vegetation.</p>