

10780

Colorado Plateau Blackbrush-Mormon-tea Shrubland

BpS Model/Description Version: Aug. 2020

Modelers		Reviewers	
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None	None	None	None
None	None	None	None

Vegetation Type

Shrubland

Map Zone

15

Geographic Range

Southwestern Utah, western Arizona, and southeast Nevada.

Biophysical Site Description

The blackbrush vegetation type is characterized by relatively high cover (50%) of low-statured (50cm tall) evergreen woody shrubs. It occurs at the bioregional transition between the Mojave and Great Basin deserts, from California through Nevada, Arizona, and Utah. Blackbrush is typically found in the elevational zone from 1,220-1,520m, above the creosotebush zone and below the interior chaparral or big sagebrush/pinyon-juniper zones.

Within the Mojave-Colorado plateau ecotone, blackbrush is found on dry slopes and benches above the river canyons of southern Utah and northern Arizona (Turner 1994). It is also found mid-slope on mountain ranges throughout this ecotone.

Vegetation Description

Blackbrush is dominated by the type-species, *Coloeogyne ramosissima* (blackbrush), which can comprise 90-95% of the total plant cover (Shreve 1942). Cover of *Coloeogyne ramosissima* is highest on shallow, sandy soils with strong pretrocalcic (caliche) horizons, where it is the primary dominant plant species. Cover of *Coleogyne ramosissima* is lowest in deeper, silty soils or at its upper or lower ecotones, where it is co-dominant with other native species such as *Larrea tridentata*, *Juniperus* spp. (juniper), *Prunus fasciculata* (desert almond), *Lycium andersonii* (Anderson wolfberry), *Yucca brevifolia*, *Salazaria mexicana* (bladder sage), *Achnatherum* spp., and *Pleuraphis* spp. Dominant alien species include the annuals *Bromus rubens*, *Bromus tectorum* (cheatgrass), and *Erodium cicutarium*.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
CORA	<i>Coleogyne ramosissima</i>	Blackbrush
YUBR	<i>Yucca brevifolia</i>	Yucca brevifolia
GUSA2	<i>Gutierrezia sarothrae</i>	Broom snakeweed
THMO	<i>Thamnosma montana</i>	Turpentinebroom
LYAN	<i>Lycium andersonii</i>	Water jacket

JUOS	<i>Juniperus osteosperma</i>	Utah juniper
ACHY	<i>Achnatherum hymenoides</i>	Indian ricegrass
EPVI	<i>Ephedra viridis</i>	Mormon tea

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

Disturbance Description

Coleogyne ramosissima is considered a poor livestock forage species. Ranchers noted that during the late 1930s and early 1940s wildfires increased production of livestock forage in blackbrush rangeland of southern Nevada and northwestern Arizona (Anonymous 1945). In an attempt to further increase forage production, ranchers and the Bureau of Land Management (BLM) began a program of prescribed burning in the 1940s, during which time ~20% of the 40,000ac of blackbrush were burned by prescribed fire or wildfire in southern Nevada (BLM, Las Vegas, Nevada, grazing district 5) (Croft 1950). Many blackbrush fires also occurred in northwestern Arizona during this time (BLM, Arizona Strip, Arizona, grazing district 2). Additional blackbrush burning likely occurred at least through the 1960s, because a policy review during that time by the Range and Forestry Officer of the BLM in NV recommended that blackbrush burning be continued for purposes of increasing livestock forage (Dimrock 1960). Before 1940, fires in these regions were relatively uncommon (Croft 1950). The long-term effects of these mid-century range burns are currently being evaluated using repeat photography of historical photos originally taken 5-10yrs post-fire and analyses of field reports, memos, and vegetation plot data collected during the late 1940s through the early 1960s by range conservationists and foresters from the BLM and the United States Forest Service, Intermountain Forest and Range Experiment Station (M. Brooks, unpublished data).

Prior to European contact, late seral blackbrush stands were probably more extensive than they are today. The vast expanses of blackbrush rangeland that were burned to improve livestock production during the mid-1900s are still dominated by early seral species and have been re-colonized only sporadically by *Coloeogyne ramosissima* (M. Brooks, unpublished data). Blackbrush within the Nevada Test Site in southern Nevada that has not been managed for livestock production since 1940, and likely was not burned for rangeland improvement, does not currently contain evidence of widespread historical burning (Beatley 1976). It therefore appears that extensive burning to remove blackbrush must have created many of the vegetation stands where *Coloeogyne ramosissima* is either absent or a sub-dominant species today.

The historical fuel complex in late seral blackbrush stands was probably similar to that observed in relatively undisturbed sites today, except for the current prevalence of *Bromus* spp. and *Erodium cicutarium* in most stands. Vegetation characteristics of these stands were characteristic of blackbrush reference conditions, described here. Shrub cover was likely comprised primarily of *Coloeogyne ramosissima* at 30-50% total cover, and interspaces were probably mostly bare, even during years of high rainfall, due to root competition with *Coloeogyne ramosissima*. Other species such as perennial grasses and early seral shrubs probably occurred sporadically, as they do today, along wash stringers and on steep hillslopes where cover of *Coloeogyne ramosissima* is typically low.

Low amounts of fine fuels in interspaces probably limited fire spread to only extreme fire conditions, during which high winds, low relative humidity, and low fuel moisture led to high-

intensity stand-replacing crown fires. Historical fire return intervals (FRIs) appear have been on the order of centuries (Webb et al. 1987), allowing late seral blackbrush stands to reestablish.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	282	100	100	1000
Moderate (Mixed)				
Low (Surface)				
All Fires	282	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

Although the Biophysical Setting (BpS) can be extensive (>100,000ac) in the Mojave Desert, the typical scale of common disturbance extent ranges from 100-1000ac. Exceptions do occur in excess of 1,000s of acres.

Adjacency or Identification Concerns

Blackbrush is considered to be one of the most flammable native plant assemblages in the Mojave Desert. Many large fires have occurred in this vegetation type since the 1980s in the Spring Mountains and Mormon Mountains in Nevada, the Beaver Dam Mountains in Utah, the Black Mountains and Virgin Mountains in Arizona, and at Joshua Tree National Park in California (Brooks and Esque 2002). Although fire is generally no longer advocated as a tool for range improvement, ignitions from lightning and accidental ignitions along roads have been sufficient to burn significant acreage of blackbrush during the past few decades.

The fuel complex in blackbrush appears to be more conducive to burning now than in the past. Alien annual grasses currently occur in most blackbrush stands, facilitating the spread of fire after years of high rainfall. Post-fire landscapes are even more dominated by these alien grasses, raising concerns that they will promote recurrent fire and prevent the reestablishment of *Coloeogyne ramosissima*. Interestingly, reports from the early 1950s also acknowledge the role that alien annual grasses, especially *Bromus rubens*, plays in facilitating the spread of fire in blackbrush (Dimrock 1960; Holmgren 1960; Jensen et al. 1960), although there was disagreement as to whether the burned landscapes were more or less susceptible than unburned landscapes to reburning. Jensen et al. (1960) thought the chances of reburning were low because they observed low fine-fuel levels in post-fire landscapes, but their observations were made during the mid-century drought when fine-fuel loads were on the low end of their possible range. In contrast, Holmgren (1960), who accompanied Jensen et al. on the same field visits, thought that the danger of accidental fire in blackbrush would be higher in areas that previously burned than in unburned areas, if high winter rainfall had produced more *Bromus rubens* biomass and other fine fuels. Prior to the invasion of *Bromus rubens* and *Bromus tectorum* during the late 1800s to early 1900s (Brooks 2000; Young 2000), fine-fuel loads were likely not as great in either blackbrush stands, resulting in fewer fires and fewer reburns.

Issues or Problems

Native Uncharacteristic Conditions

Shrub cover >50% can be considered uncharacteristic.

Comments

151078 is identical to 131078.

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	B	B	UN	UN	UN	UN	UN
Shrub	0.5-1.0	A	A	A	B	B	UN	UN	UN	UN	UN
Shrub	1.0-3.0	A	A	A	B	B	UN	UN	UN	UN	UN
Shrub	>3.0	A	A	A	B	B	UN	UN	UN	UN	UN
Tree	0-5	B	B	B	B	B	UN	UN	UN	UN	UN
Tree	5-10	B	B	B	B	B	UN	UN	UN	UN	UN
Tree	10-25	B	B	B	B	B	UN	UN	UN	UN	UN
Tree	25-50	B	B	B	B	B	UN	UN	UN	UN	UN
Tree	>50	B	B	B	B	B	UN	UN	UN	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	24	Early Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
GUSA2	Gutierrezia sarothrae	Broom snakeweed	Upper
MESP2	Menodora spinescens	Spiny menodora	Upper
EPNE	Ephedra nevadensis	Nevada jointfir	Upper
ACHY	Achnatherum hymenoides	Indian ricegrass	Upper

Description

Historically, fire was relatively uncommon in this vegetation. The average FRI for replacement fire was 400yrs. When burned, the fire-tolerant/crown-sprouting shrubs such as spiny menodora, horsebrush, and snakeweed will dominate the site. At higher elevations of mesic blackbrush, a big sagebrush-desert bitterbrush community typically replaces blackbrush for a protracted period. This class can express itself for >100yrs, with varying amounts of blackbrush gradually establishing after decades and eventually succeeding. A few examples of this that have been observed in the field are believed to be >60yrs+. The ground cover varies by elevation and

moisture regime, with mesic sites being generally 10-35% with some sites only capable of 10% cover. The thermic sites are generally 10-15% ground cover with exception going as high as 35%.

Maximum Tree Size Class

No Data

Class B 76 Late Development 1 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
CORA	Coleogyne ramosissima	Blackbrush	Upper
EPNE	Ephedra nevadensis	Nevada jointfir	Upper
YUSC2	Yucca schidigera	Mojave yucca	Upper
JUOS	Juniperus osteosperma	Utah juniper	Upper

Description

This community class seems to be stable and occurs after a threshold is crossed. Composition is 50-70% blackbrush dominated. Other species are perennial grasses of desert needlegrass, Indian ricegrass, galleta grass, fluff grass, and threeawn. Lesser shrub composition includes: Nevada ephedra, turbinella oak, desert bitterbrush, fourwing saltbush, and Anderson's wolfberry in mesic sites and Nevada ephedra, creosotebush, Mojave buckwheat, snakeweed, prickly pear, white bursage, and spiny menodora in thermic sites. There are other shrubs also.

Maximum Tree Size Class

Sapling >4.5ft; <5" DBH

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:OPN	0	Late1:CLS	74
Late1:CLS	75	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
Replacement Fire	Early1:OPN	Early1:OPN	0.002	500	Yes	0
Replacement Fire	Late1:CLS	Early1:OPN	0.004	250	Yes	0

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