

A Visual Guide to Plants of High Fire Risk in Alpine County

A quick Visual Guide for the Alpine County Forest Health Community
Working Group

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Introduction

This guide was developed to assist in the identification of plants that are of high fire risk and may need to be managed to reduce fire hazards on public and private lands. Each species has its own account, listing the common names, synonyms, subordinate taxa a description and photos. For species that are of primary concern excerpts from the Fire Effects Information sheets have been included.

Shrubs

Bitterbrush–*Purshia*

Antelope Bitterbrush–*Purshia tridentata* (PUTR2)

common names: antelope bitterbrush; bitterbrush; antelope bush; buckbrush; deerbrush; quininebrush; antelope-bitterbrush, quinine brush; deer-brush; black sage

Synonyms: The subordinate Taxa *Purshia tridentata* var. *tridentata* is listed as a synonym in the USDA Plants database but is recognized in the Jepson manual and CalFlora.

Subordinate Taxa *Purshia. tridentata. var. tridentata*

Description: Antelope bitterbrush is a tall (2-6', up to 12-14') variable shrub with gray to brown bark and young twigs that are somewhat glandular and tomentose. The leaves are wedge shaped with 3 deep clefts at the tip. Leaves vary from gray green to dark green but in general are darker than sagebrush. Flowers are fragrant, yellow and prolific on most individuals. Fruit are large achenes containing a large black seed.



Image 1–general form of antelope bitterbrush © 2015 Barry Rice (CC BY-NC-SA 3.0). Image 2–The white tomentose underside of an antelope bitterbrush leaf by Larry Blakely (Public Domain). Image 3–Antelope bitterbrush leaves showing upper side. Leafing pattern and young tomentose twigs © 2018 John Doyen (CC BY-NC 3.0). Image 4–The yellow flower of antelope bitterbrush showing the typical rose family flower.(c) 2018 John Doyen (CC BY-NC 3.0). Image 4–The achene of antelope bitterbrush © 2010 Keir Morse (CC BY-NC-SA 3.0).

Fire ecology or adaptations: Antelope bitterbrush is highly susceptible to fire kill [187]. Some ecotypes sprout following fire, either from dormant buds encircling an aboveground root crown, from calluses of meristematic tissue beneath the bark, or from dormant buds on a belowground lignotuber [75,78]. Very young and very old plants (younger than 5 or older than 40-60 years) do not sprout well [29,154].

Antelope bitterbrush occurs in plant communities with a variety of fire regimes. Pre-settlement fires in the ponderosa pine/antelope bitterbrush habitat type were probably less frequent than in other ponderosa pine types due to lower fuel loading [35,60,68]. Driver and Winston [78] estimate a mean fire interval of 7 to 10 years in a ponderosa pine/bitterbrush/pinegrass habitat in north-central Washington. In a pinyon woodland in the San Bernardino Mountains of California, antelope bitterbrush sprouted and became an early dominant following several wildfires. According to the authors, the fire regime in this pinyon-juniper woodland is predominantly long-interval canopy fires, and vegetation recovers slowly after fire [233]. Fuel loading in sagebrush-bitterbrush and juniper/bitterbrush communities tends to be light except in decadent stands, where extremely dry and windy conditions may result in severe fire [191]. Of four shrub communities east of the Cascade Range in Oregon and California-antelope bitterbrush, big sagebrush, snowbrush ceanothus, and greenleaf manzanita-fuel load was lowest in antelope bitterbrush [155].

Immediate fire effect on plant: Antelope bitterbrush is very susceptible to fire kill. It is considered a weak sprouter and is often killed by summer or fall fire [27,35,51,52,173,176]. Antelope bitterbrush in some areas may sprout after light-severity spring fire [1,29,35,44,20]. Scholten [201] reports 70 and 91% of plants killed, respectively, in two separate Idaho wildfires, with 26% sprouting after the first fire and only 2% after the second fire.

Fire management considerations: In ponderosa pine/antelope bitterbrush communities, antelope bitterbrush is more prevalent in communities where fire has been suppressed for decades than in communities that have occasionally burned [191]. However, when fire is completely excluded from ponderosa pine for a long time, antelope bitterbrush becomes decadent [10,144]. Its density declines because dying plants are not replaced [43,44,200]. Frequent Indian-set fires probably favored grasses over antelope bitterbrush on most sites. On dry or stony sites, however, fires would not have carried as well, and antelope bitterbrush probably dominated such sites [8]. According to Driver and Winston [78], frequent, low-intensity wildfire in ponderosa pine communities of north-central Washington encouraged sprouting and maintained antelope bitterbrush as a community dominant.

California Lilacs–Ceanothus

Whitethorn Ceanothus–*Ceanothus cordulatus* (CECO)

Common names: whitethorn ceanothus; snow bush; mountain white-thorn; mountain white thorn; mountain whitethorn; mountain white-thorn ceanothus; mountain white thorn ceanothus; mountain whitethorn ceanothus; mountain snowbush

Synonyms: None

Description: A 2-5'-tall sprawling shrub that can spread to over 12 feet wide. The abundant silvery white stems end in hard sharp thorns. The elliptical to egg shaped leaves are alternate with 3 prominent ribs from the base of each leaf. The plant flowers May to July with small white flowers form dense panicle-like clusters typical of Ceanothus (California Lilac).



Images:1. Whitethorn ceanothus shrub showing whole shrub in bloom with the characteristic flat top and spreading form. © 2012 Jean Pawek (CC BY 3.0). 2. Whitethorn ceanothus flower © 2013 John Doyen (CC BY_NC 3.0) 3. Close up of whitethorn leaf showing characteristic three primary veins. © 2008 Steve Matson (CC BY 3.0). 4. Whitethorn ceanothus close-up showing typical thorns, branching and leaf patterns © Wynn Anderson (CC BY-NC-SA 3.0)

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Fire adaptations: Whitethorn ceanothus is highly dependent on fire [11,14]. After fire it regenerates by stump-sprouting or from seed depending on the severity of the burn. It is characterized specifically as an obligate sprouter in moderate fuel-consumption burns and a facultative seeder following high fuel-consumption fires [25,54]. The seeds of whitethorn ceanothus are refractory: requiring heat alone or in conjunction with other conditions such as cold stratification [55]. Heat from a burn initiates germination by cracking the seed coat to allow for absorption of water [10,17,38,80,82].

Fire management considerations: Prescribed burning of whitethorn ceanothus is used in land management to increase browse [27].

The evolution of whitethorn ceanothus and fire together suggests that the use of prescribed burning is a viable management option in areas to promote whitethorn ceanothus. The use of fire to promote whitethorn ceanothus is suitable because of the fire-stimulated germination of seeds and stump-sprouting in moderate fuel consumption burns. The species adds nitrogen to the soil, possibly enhancing conifer regeneration.

Conversely, overstocked or well-established stands of whitethorn ceanothus add significantly to fuel loading. Extensive stands of whitethorn ceanothus and montane chaparral patches exhibited the greatest mean fire spread/minute and the greatest flame lengths compared to forested types [101]. Snyder [91] notes that during succession, brush cover is still significant even as the basal area of trees doubles. If these populations persist as noted they could act as ladder fuels, increasing the possibility of a stand replacing fire.

Fuel loading becomes an important factor to recognize when using prescribed fire as a land management tool. The changing fire regime in communities where whitethorn ceanothus becomes established, to infrequent, high-severity fires [16], suggests that using fire to manage whitethorn ceanothus should be done with caution.

Snowbrush Ceanothus–*Ceanothus velutinus* (CEVE)

Common names: snowbrush ceanothus; snowbrush; sticky laurel; sticky-laurel; tobacco-brush ceanothus; tobacco brush ceanothus; tobaccobrush ceanothus; tobacco brush; tobacco-brush; tobaccobrush; tobacco-bush ceanothus; tobacco bush ceanothus; tobaccobush ceanothus; varnish-leaved ceanothus; varnish-leaf ceanothus; varnish leaf ceanothus; varnishleaf ceanothus; shiny-leaved ceanothus; shiny-leafed ceanothus; shiny-leaf ceanothus; shiny leaf ceanothus; shinyleaf ceanothus; glossy-leafed snow-bush; glossy-leafed snow bush; glossy-leafed tobacco-brush; glossy-leafed tobacco brush; mountain-balm ceanothus; mountain balm ceanothus; mountain bloom

Synonyms: *Ceanothus velutinus* var. *hookeri*; *Ceanothus velutinus* var. *laevigatus*; *Ceanothus velutinus* var. *velutinus*

A 2-9' shrub (may reach 12-13') forming a dense round topped shrub typically with multiple branches from the base of the shrub. The leaves are 1-3 in long and alternate. The leaves have 3 prominent ribs originating from the base and are finely hairy underneath and highly varnished above. The margins of the leaves are finely toothed or granularly toothed. The leaves are highly fragrant with a cinnamon to balsam-like odor. The flowers grow in a small (3-8 cm) panicle-like inflorescence. The flowers themselves are white and are the typical *Ceanothus* form.



Images: 1- Snowbrush ceanothus shrub showing typical architecture of the shrub. © 2016 Zoya Akulova (CC BYU-NC 3.0) 2- Snowbrush ceanothus showing leaf attachment and general branching pattern. © 2020 Jason Matthias Mills (CC BY_NC_ND 3.0) 3-Snowbrush ceanothus leaves showing dull underside and shiny upper surface. Note the three prominent ribs originating from the base of the leaf. © 2016 Zoya Akulova (CC BY_NC 3.0) 4-Snowbrush ceanothus flowers showing the typical ceanothus flower type. © 2016 John Doyen (CC BY_NC 3.0)

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Fuels Contribution: Snowbrush ceanothus burns "quite hot" [2]. The foliage contains volatile oils that may contribute to fire hazard [284].

Fire Adaptations: Snowbrush ceanothus has dormant, ground-stored seed that requires heat treatment to germinate [109,148,168,236]. Snowbrush ceanothus is promoted by fire, regenerating from seed stimulated by fire [63,143,163,201,228]. Where its seeds are present in the soil, snowbrush ceanothus may dominate early seral growth following a "medium or hot" fire [12]. Snowbrush ceanothus also sprouts vigorously from the root crown after fire [201,228,236]. Resprouting may be an adaptation to recurring fires, allowing for rapid growth and recovery [201]. Fire creates conditions more favorable for snowbrush ceanothus growth by removing the overstory [109]. Snowbrush ceanothus shows a marked increase in burned forest areas due to heat scarification of seed, sprouting, and increased light [109,119]. When conifers overtop the shrubfields, snowbrush ceanothus may die out because of reduced light intensities in the forest understory [119,120].

As a nitrogen fixer, snowbrush ceanothus plays an important role in nitrogen reaccumulation following fire [143].

Control: Moderate to high damage to snowbrush ceanothus may be achieved with applications of triclopyr ester [17,47,55,56,62,120,185,186,187,279], 2,4-D [17,47,56,62,106,107,120,187,204,229], hexazinone, sulfometuron, imazapyr [55], metsulfuron methyl [56], picloram [62,204,279], dichlorprop [106], and glyphosate [47,55]. Effects of herbicide treatments may be temporary, as many applications result in top-kill of snowbrush ceanothus rather than plant death [106]. Spring and summer applications of herbicide may be more effective than fall treatments for controlling snowbrush ceanothus [156]. On sites in California, multiple glyphosate treatments reduced the height and cover of snowbrush ceanothus, but substantially increased the density of seedlings [179]. Miller [184] found that applications of glyphosate failed to control snowbrush ceanothus, with crown cover increasing an average of 41% following treatment.

Hand slashing treatments are not particularly effective for reducing snowbrush ceanothus cover due to its ability to resprout [120]. Unless burned to further stimulate sprouting and seed germination, snowbrush ceanothus responds to mechanical disturbance with a scattered, low percent cover [81]. The root crown of snowbrush ceanothus is resistant to removal by mechanical site preparation [178].

Chinquapin–Chrysolepis

Bush Chinquapin–*Chrysolepis sempervirens* (CHSE11)

Common names: Sierra chinquapin; Sierra chinkapin; Sierra bush chinquapin; Sierran chinquapin; Sierran chinkapin; Sierran bush chinquapin; Dudley Sierra chinquapin; bush Sierra chinquapin; bush golden chinquapin; dwarf golden chinquapin; dwarf golden chinkapin

Synonyms: *Castanopsis sempervirens*

Description: Bush chinquapin is a mid-size spreading shrub typically 1 to 5ft tall but can grow up to 8ft tall. The elliptical leaves are 1-3 inches long with the upper leaf surface a dull green and the lower leaf surface golden to rusty in color. The fruit is a prickly 1 to 2” bur.



Image 1-Bush chinquapin showing its typical sprawling prostrate form. © 2016 John Doyen (CC BY-NC 3.0). Image 2-The underside of bush chinquapin leaves showing the golden yellow scales © 2015 Keir Morse (CC BY-NC-SA). Image 3- Showing the male flowers and female maturing bur of bush chinquapin © 2015 Keir Morse (CC BY-NC-SA 3.0). Image 4- The mature burr of the bush chinquapin © John Doyen (CC BY-NC 3.0)

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Fire ecology or adaptations: Bush chinquapin survives fire by sprouting from the roots, root crown, and stump when aboveground portions of the plant have burned [9,30,32,40]. Because bush chinquapin occurs in many plant communities, natural fire regimes vary. Thickets growing in rock outcrops escape fire for long periods of time [12]. Plants in the understory of coniferous forests historically burned often. Mixed coniferous, sequoia, ponderosa pine (*Pinus ponderosa*), and Jeffrey pine forests burned at 2- to 8-year intervals prior to fire suppression [4]. Frequent fire in these forests favors understories of bush chinquapin over understories of coniferous seedlings [23]. High-elevation thickets of bush chinquapin in the whitebark pine (*Pinus albicaulis*) cover type typically escape burning for 50 to 300 years [1].

Fire management considerations: Countryman [11] supplies data regarding characteristics of bush chinquapin fuel, including ash content, density, surface-to-volume ratio, heating value (Btu/lb), and weight of solvent extractives present in leaves. He also details fuelbed characteristics of bush chinquapin and mixed bush chinquapin-mountain whitethorn-snowbush ceanothus stands, including standing fuel loading and standing fuel vertical distribution, dead fuel loading, and litter loading. Carpenter [6] provides data regarding seasonal moisture content of bush chinquapin leaves, twigs, and stems.

Frequent fires in ponderosa or Jeffrey pine forests following logging operations may convert these communities to montane chaparral [23].

Goldenbush–Ericameria

Rubber Rabbitbrush–*Ericameria nauseosa* (ERNA10)

Common names: rubber rabbit brush; gray rabbitbrush; grey rabbit brush

Synonyms: *Chrysothamnus nauseosus*; *Chrysothamnus nauseosus* var. *gnaphalodes*; *Chrysothamnus nauseosus* subsp. *gnaphalodes*; *Chrysothamnus nauseosus* subsp. *nauseosa* var. *holeuaca*; *Chrysothamnus nauseosus* subsp. *albicaulis*

Subordinate Taxa: *Ericameria nauseosa* var. *holoeuca*; *Ericameria nauseosa* var. *speciosa*

Description: Rubber rabbit brush is a rounded erect shrub about 1-8' tall with the stems originating from the base. The stem and leaves are densely white hairy giving an overall gray appearance. The leaves of rubber rabbit brush are linear, less than 1/16" wide. The yellow flower heads are 10-31 flowered that form a panicle like cluster that can persist throughout the winter. The fruit are small windblown achenes.



Image 1–Typical form of rubber rabbit brush © 2000 Gary A. Monroe (CC BY-NC 3.0). Image 2–Leafing pattern along the stem of rubber rabbit brush © 2015 Keir Morse (CC BY-NC-SA 3.0). Image 3–Flowers of rubber rabbit brush showing the compound flowers held in a panicle like cluster. Image 4–Achenes of rubber rabbit brush © 2012 Steve Matson (CC BY-NC 3.0).

Fire ecology or adaptations: Rubber rabbitbrush is a fire-adapted species that is typically unharmed or enhanced by fire [99,148]. Recovery time is often rapid to very rapid. Rubber rabbitbrush is often one of the first species to colonize burned areas by sprouting or from off-site seed [107,148]. Sprouts originate from adventitious buds located on the stem and root crown [24]. This species reproduces abundantly from heavily seed crops [148]. Seeds are easily dispersed to burned sites over long distances by wind.

Fire intervals in sagebrush-grass communities have been estimated at 7 to 70 years [148]. The range of fire intervals reported for some species that dominate communities where rubber rabbitbrush occurs are listed below. To learn more about the fire regimes in those communities refer to the Fire Effects Information System summary for that species, under "Fire Ecology or Adaptations."

ponderosa pine: 2-42 years, Mexican pinyon (*Pinus cembroides*): 20-70 years

Fire management considerations: Control of rubber rabbitbrush with fire is described as "erratic" [17]. Results may differ even on the same site and date if burned in different years. The outcome depends largely on whether the fire is hot enough to kill the crowns [17]. In general, fire must be at least "moderately hot" for effective control [74]. Rubber rabbitbrush may be more susceptible if burned after heavy grazing or during the early summer [148]

On many greasewood-rabbitbrush sites, vegetation is typically very sparse and burns can take place only under very hazardous fire conditions [17]. Many degraded sagebrush sites are also difficult to burn. A rest from grazing in summer can increase fuel continuity for better spread if burned in spring, summer, or fall [74].

Juniper–Juniperus

Common juniper–*Juniperus communis* (JUCO6)

Common Names: common juniper; dwarf juniper; prostrate juniper; mountain common uniper; old field juniper; ground juniper

Synonyms: *Juniperus communis* subsp. *alpina*; *Juniperus canadensis*; *Juniperus communis* ssp. *depressa*; *Juniperus depressa*;

Subordinate Taxa *Juniperus communis*. var. *depressa*; *Juniperus communis*. var. *jackii*; *Juniperus communis*. var. *saxatilis*

Description: Common Juniper is a conifer that often grows as a low mat-forming shrub. It typically grows to about 5' and is often wider (7-13') than tall. It can grow to be a much larger tree reaching 25' but this is uncommon in California. The bark is thin and shredding into strips. Leaves are simple stiff needles. The leaves never form the scale like needles that form in mature individuals of other juniper species. Male cones are sessile while the female cone is berry like and ripens to a glaucous blueish black.



Image 1–low sprawling form typical of common juniper © 2012 Gary A. Monroe (CC BY-NC). Image 2–Leaves and berry like female cones of common Juniper © 2012 Dr. Amadej Trnkozy (CC BY-NC-SA 3.0)

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Fire ecology or adaptations: Common juniper is generally described as "susceptible" to fire [25,59]. It is described as being "not equipped with fire-surviving regeneration properties" [81]. Foliage is resinous and very flammable [31]. The degree of damage received increases with progressively greater fire severity. In eastern Canada, older common juniper often survive fires of low severity. Some fire regimes allow common juniper to survive several fires [31].

Fire management considerations: In a north-central Colorado study of fire behavior in quaking aspen stands, common juniper patches burned more intensely and released more heat than adjacent herbaceous areas. A caloric analysis of 5 foliage samples yielded an average low heat content of 5064 kcal/kg. Common juniper fuels tended to be deeper and heavier than herbaceous fuels and flames were longer and deeper in common juniper patches. Fire removed almost all litter, standing herbs, and common juniper foliage, leaving only bare branches. The moisture of green common juniper foliage averaged 112% of oven dry weight on 2 burns [[117](#)].

Manzanita–Arctostaphylos

Greenleaf Manzanita–*Arcotostaphylos patula* (ARPA6)

Common names: green-leaf manzanita; green leaf manzanita; greenleaf manzanita; snowbush manzanita; snowbrush manzanita; green-leaved manzanita; green leaved manzanita; green manzanita; Californian Sierra Nevada manzanita; Greene's manzanita; pine manzanita

Synonyms: *Arctostaphylos parryana*; *Arctostaphylos acutifolia*; *Arctostaphylos parryana* var. *pinetorum*; *Arctostaphylos patula* ssp. *platyphylla*; *Arctostaphylos patula* var. *coalscens*; *Arctostaphylos pungens* var. *platyphylla*

Description: Greenleaf manzanita is a stout much branched shrub 3 to 7' tall. Young branches are resinous glandular while mature branches are dark brown to red. Leaves are broadly ovate to almost round and ½ to 2" long. The flowers are the typical manzanita white to pink urn shaped flower. The fruit is a round green to red drupe ¼ to ⅓" in diameter.



Image 1–General shape of Greenleaf manzanita © 2009 Keir Morse (CC BY-NC-SA 3.0). Image 2–Greenleaf manzanita leaf © 2003 Steve Matson (CC BY-NC 3.0). Image 3–Greenleaf manzanita urn shaped flower © 2009 Barry Breckling (CC BY-NC-SA 3.0). Image 4–Greenleaf manzanita red drupe. © 2009 Keir Morse (CC BY-NC-SA 3.0)

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Fire adaptations: Greenleaf manzanita establishes after fire by seed [11,31,84,112,135,137,161,179,198,199] and sprouting from the lignotuber [15,24,31,89,97,137,157,198]. The dormancy of greenleaf manzanita seeds stored in soil and duff is broken by fire scarification [11,31,84,135,137,161,179,198,199]. Greenleaf manzanita seeds have a hard seed coat that requires fire (or other) scarification. Postfire lignotuber sprouting only occurs in some populations in California and southern Oregon, especially from parts of the Sierra Nevada, southernmost Cascade Range, and North Coast Ranges [94,99]. James [99] notes that greenleaf manzanita lignotubers may increase in size following fire in chaparral ecosystems. The physical and chemical characteristics of greenleaf manzanita produce a highly flammable shrub [30,49,114]. Kauffman [112] postulates that since greenleaf manzanita reproduction is partially dependent upon fire, heightened shrub flammability may be a fire adaptation.

Fire behavior: The fire behavior of 16 prescribed burned plots in montane chaparral communities co-dominated by greenleaf manzanita, huckleberry oak, and whitethorn ceanothus was measured in Yosemite National Park. These fires were separated in space and time. At the time of burning few shrubs exceeded 6 feet (2 m) in height [210].

Fire behavior in a montane chaparral site in Yosemite National Park			
Spread/minute (feet)		Flame length (feet)	
Mean	Range	Mean	Range
11.7	0.0-35.3	12.5	1.0-25.0

Mountain Mahogany–*Cercocarpus*

Desert Mountain Mahogany–*Cercocarpus ledifolius* (CELE3)

Common names: desert mountain mahogany; curlleaf mountain-mahogany; curlleaf mountainmahogany; curlleaf mahogany

Synonyms: None found

Subordinate Taxa: *Cercocarpus ledif. var. intermontanus* *Cercocarpus ledif. var ledifolius*

Description: Desert mountain mahogany is a shrub or small tree typically reaching 3-9' but can reach 35 It can have one to many trunks up to 3' in diameter. Bark on mountain mahogany can be up to an 1" or more thick and furrowed. The leathery leaves are linear to oblong with curled edges. The upper surface of the leaf is light green above and yellow green below. The leaves often grow in tight clusters at the branch tips. The flowers are inconspicuous lack petals but have green to red sepals that form a tube in the leaf axils. As the fruit develops the style elongates to form a plumose tail. The fruit is an achene with a coiled tail.



Image 1–General form of desert mountain mahogany when it takes on a shrub form © 2020 Jean Pawek (CC BY 3.0). Image 2–Desert mountain mahogany leaves showing the glossy front than hairy back. Note these individual have not developed the golden cast on the underside ©2016 Zoya Akulova (CC BY-NC 3.0). Image 3–The small inconspicuous petal less flowers of desert mountain mahogonay © 2012 Steve Matson (CC BY-NC 3.0). Image 4–Maturing achenes of desert mountain

mahogany © 2016 Zoya Akulova (CC BY-NC 3.0). Image 5–Mature tail of the achene of desert mountain mahogany © 2021 David Board (CC BY-NC 3.0).

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FIRE ECOLOGY OR ADAPTATIONS:

Fire adaptations: Curlleaf mountain-mahogany has thick bark and may survive "light" fires [71,127]. Sprouts following fire are rare and short lived [11,145]. Most often curlleaf mountain-mahogany is killed by fire, and regeneration is by seedling establishment [71]. Seed may come from curlleaf mountain-mahogany trees avoiding fire in low fuel areas [45] or by seed surviving in soil [98].

Fire regimes: Some curlleaf mountain-mahogany stands occupy sites with very low fuel levels that rarely burn. However, many researchers indicate that curlleaf mountain-mahogany abundance has increased in the absence of fire since the early 1900s.

Fuels: Fuel characteristics can vary considerably in curlleaf mountain-mahogany communities. In the Lamoille Canyon of the Ruby-East Humboldt Mountains, curlleaf mountain-mahogany communities on north-facing slopes supported an understory of shrubs, forbs, and grasses that produced 1,000 pounds of vegetation/acre. On south-facing slopes soils were shallow, conditions were drier, and understory production was 100 pounds/acre [119]. In curlleaf mountain-mahogany stands in southwestern Montana, bare ground and rock averaged 50% cover, and summer grass coverage was 7% [53]. In limber pine-Douglas-fir forest types in central Idaho, the fire interval is "relatively long." A lack of continuous fuels, sparse undergrowth, open stand structure, and low downed wood accumulations do not support frequent fire [39]. On the Wallowa-Whitman National Forest, curlleaf mountain-mahogany communities also occupy sites that do not carry fire well [97]. Very large trees in the western juniper/curlleaf mountain-mahogany habitat type in Lava Beds National Monument of California had fire scars, suggesting that stand-replacing fires were rare. Erhard [57] indicated that bare pumice and cinder soils may have restricted fire spread. In these habitats, rock coverage was 44%, and litter coverage was 36% [57].

Several studies report that the oldest curlleaf mountain-mahogany trees occupy harsh sites with very low fuel levels. Researchers observed the oldest trees in curlleaf mountain-mahogany-dominated communities throughout Utah in rocky areas that were likely protected from fire [166]. Studies of curlleaf mountain-mahogany stands in Oregon and adjacent areas revealed that old trees (>300 years) occupied rocky sites while younger trees were found on less harsh sites with deeper soils. The researcher suggested that 400- to 600-year old relict curlleaf mountain-mahogany sites were missed by past fires because the rocky sites did not burn [45].

Fire exclusion and curlleaf mountain-mahogany range expansion: Fire exclusion in curlleaf mountain-mahogany habitats has facilitated increased curlleaf mountain-mahogany abundance and successful regeneration in some areas. Repeat photography revealed that curlleaf mountain-mahogany increased in the absence of fire in warm, dry sites in southwestern, central, and southeastern Montana [72] and in parts of Utah's Fishlake National Forest. Early photographs from Utah showing low curlleaf mountain-mahogany coverage date from 1905 to 1938, and recent photographs with increased coverage date from 1996 to 2001 [104].

A thick understory of curlleaf mountain-mahogany and antelope bitterbrush (*Purshia tridentata*) developed in ponderosa pine woodlands of Lava Beds National Monument after fire was excluded [94]. In presettlement times, fires were probably very common in wooded areas of Lava Beds National Monument. Modoc and Shasta natives utilized fires for hunting, and lightning is common from late spring through summer [127]. Frequent fires likely restricted curlleaf mountain-mahogany to the "roughest and most barren" areas. Ponderosa pine reproduction has suffered in the thick understory, and increased fuel loads have likely altered fire behavior from presettlement time [94].

From fire scars, fire history, historical literature, and past photos, researchers suggest that fire "restricted curlleaf mountain-mahogany development" in curlleaf mountain-mahogany stands in Montana, Idaho, Wyoming, Utah, and Nevada. Since European settlement fire size and frequency have decreased, and curlleaf mountain-mahogany regeneration has "far exceeded former levels." In the earliest photos of the study areas, curlleaf mountain-mahogany was confined to rocky sites or thin soil sites where fires were likely infrequent. Stand age analysis indicates that curlleaf mountain-mahogany abundance has increased in the past 170 years. Curlleaf mountain-mahogany stands on deep soils in central and southeastern Idaho and southwestern Montana were historically grasslands, and all curlleaf mountain-mahogany plants established after 1900. Researchers speculate that prior to 1900, a high fire frequency prevented curlleaf mountain-mahogany establishment [71].

Fire management considerations: Many researchers suggest that fire in decadent or seral stands may increase curlleaf mountain-mahogany regeneration. Gruell and others [71] suggest that continual protection of curlleaf mountain-mahogany from disturbances will decrease productivity. Fire is recommended for old-aged stands. Stands with low fuel levels and some curlleaf mountain-mahogany trees confined to rocky sites would likely retain a seed source and are the best candidates for prescribed fire. Fire may also be useful in increasing curlleaf mountain-mahogany productivity in seral stands where conifers are "competitive" and curlleaf mountain-mahogany is not reproducing. Fires in the fall will likely leave some curlleaf mountain-mahogany survivors in areas where woody fuels are sparse [71].

In areas where Douglas-fir saplings and pole-sized trees are successional replacing curlleaf mountain-mahogany plants in west-central and southwestern Montana, prescription fires may encourage curlleaf mountain-mahogany regeneration and increase herbaceous vegetation production. Prescribed fire in these stands would also decrease fuel loads and reduce the chance of severe fire [73].

Fire should be discouraged in big sagebrush-antelope bitterbrush mule deer winter range on the east side of the Sierra Nevada range. Fire incidence has increased in recent time. From 1957 to 1982, 49,000 acres (20,000 ha) of winter range burned, but from 1983 to 1988, 159,000 acres (64,300 ha) burned. On burned sites, cheatgrass is typically the most abundant species. The stomach contents of mule deer taken in December of 1951 and 1952 revealed diets of mostly browse: big sagebrush, antelope bitterbrush, and curlleaf mountain-mahogany. Dry cheatgrass was 6% of mule deer diets at that time. Mule deer analyzed in 1987 had diets composed primarily of dry cheatgrass (79%) [217].

Oak–Quercus

Huckleberry Oak–*Quercus vacciniifolia* (QUVA)

Common Names: huckleberry oak; huckle-berry oak; huckleberry-leaved oak; huckleberry-leaved oak; huckleberry-leaf oak; huckleberry leaf oak

Synonyms: *Quercus chrysolepis* var *vacciniifolia*, *Quercus chrysolepis* subsp. *Vacciniifolia*; *Quercus palmeri* var. *vaccinifolia*

This shrub is a low (2-5 feet tall) to prostrate evergreen. Its leaves are ½ to 1 ¼ inches long with entire to micro-toothed margins. The leaves should appear similar to huckleberry leaves but more robust. Acorns of huckleberry oak are ½ inch long with a shallow white hairy cup.



Image 1-shows the general shape and stature of huckleberry oak © 2011 Wynn Anderson (CC BY-NC-SA 3.0). Image 2 shows the leaf and acorns of huckleberry oak © 2011 Wynn Anderson (CC BY-NC-SA 3.0)

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FIRE ECOLOGY OR ADAPTATIONS :

Huckleberry oak has adapted to fire by sprouting from the root crown [3,24].

This shrub has resinous, flammable leaves [5,24]. Its low, spreading growth form encourages surface fire, especially in dense, even-aged stands with considerable horizontal continuity [16,24]. Huckleberry oak in the subcanopy layer of coniferous forests often acts as a ladder fuel, resulting in crown fire [24].

FIRE MANAGEMENT CONSIDERATIONS :

Huckleberry oak aids in the spread of surface and crown fires. Reducing the density of shrub fields is recommended, especially in inhabited areas or locations nearby. This can be accomplished by removing every other oak in a field, or by creating islands of shrubs with cleared areas between them. Stumps require herbicide treatment or grubbing out to prevent sprouting. Thinning

huckleberry oak in the subcanopy layer, and pruning "leave" shrubs to less than 18 inches (46 cm) in height reduces fire hazard in forested areas [\[24\]](#).

Rabbitbrush–*Chrysothamnus*

Green rabbitbrush–*Chrysothamnus viscidiflorus* (CHVI8)

Common Names: yellow rabbitbrush; green rabbitbrush; low rabbitbrush; Douglas rabbitbrush; lanceleaf rabbitbrush; hairy low rabbitbrush; varied-leaf yellow rabbitbrush; low narrowleaf rabbitbrush; mountain low rabbitbrush; stickyleaf low rabbitbrush

Synonyms:

Subordinate Taxa: *Chrysothamnus viscidiflorus* subsp. *lanceolatus*; *Chrysothamnus viscidiflorus* subsp. *viscidiflorus*

Description: Green rabbitbrush is erect shrub 1-4' tall. It has many brittle yellow stems. The leaves are bright green and often exhibit a twist. The flower heads are yellow and grow in a flat head bunch. Fruit is an achene that is wind dispersed.



Image 1–Green rabbitbrush has a round form due to the branches typically growing from a central point. © 2013 Jean Pawek (CC BY 3.0). Image 2–Green rabbitbrush leaves often twist © 2015 Zoya Akulova (CC BY-NC 3.0). Image 3–The yellow flower heads of green rabbitbrush © 2019 John Doyen (CC BY-NC 3.0). Image 4–Seeds of green rabbitbrush are wind dispersed © Jean Pawek (CC BY 3.0)

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Fire management considerations: Yellow rabbitbrush produces small stems and seed stalks annually which die but remain on the plant for a year or more. During drought periods, this dry, dead material may increase fuel accumulation and contribute to the spread of fire [64].

Sagebrush–Artemisia

Black sagebrush–*Artemisia arbuscula* (ARAR8)

Common Names: little sagebrush; low sagebrush; black sagebrush

Subordinate Taxa: *Artemisia. arbuscula* ssp. *arbuscula*; *Artemisia. arbuscula* ssp. *thermopola*

Description: Black sagebrush is a low sagebrush growing only 4-16” tall. The leaves are light grayish green and three cleft. The inflorescence is a spike of small hairy yellow flowers. The fruit is a tiny achene.



Image 1–Black sagebrush forms small mounds © 2013 Jean Pawek (CC BY 3.0). Image 2–Typical landscape where black sagebrush grows © 2015 Zoya Akulova (CC BY-NC 3.0). Image 3–The leaves of black sagebrush are trilobed and small © 2017 Steve Matson (CC BY-NC 3.0). Image 4–Black sagebrush has small yellow flowers. © 2017 Steve Matson (CC BY-NC 3.0).

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[Information available at Forest Service Fire Effects Information System.](#)

Common Sagebrush–*Artemisia tridentata* ([ARTR2](#))

Common sagebrush has three subspecies found in Alpine County. The three subspecies have such distinct habitat preferences that they are often treated as if they were distinct species. *Artemisia tridentata* subsp. *vaseyana* is the most common species in Alpine County based on Calflora observations and typically occurs at higher elevations on mountain slopes. *Artemisia tridentata* subsp. *tridentata* is the second most observed subspecies in Alpine County with only 5 observations in the CalFlora database. It typically is found in dryer valley bottoms. *Artemisia tridentata* subsp. *wyomingensis* has only one observation in Alpine County. It typically occurs in the driest harshest locations in the valley bottom and is unlikely in Alpine County but not impossible.

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Big Sagebrush–Artemisia tridentata ssp. tridentata ([ARTRT1](#))

Common names: big sagebrush; big sage-brush; big sage brush; big sagebush; big western sagebrush; big western sage; big-leaf sagebrush; bigleaf sagebrush; tall western sagebrush; tall western sage; big mountain sagebrush; common sagebrush; common sage-brush; common sage bush; three-toothed sagebrush; three-toothed sage-brush; three-tooth sagebrush; three-toothed sage; three-tooth sage; three tooth sage; blue/black sagebrush; basin big sagebrush

Synonyms: *Artemisia angusta*; *Artemisia tridentata* var. *angustifolia*; *Seriphidium tridentatum*

Description: Big sagebrush is an upright shrub typically 3-10' tall but can range from a dwarf shrub to almost tree like and reach 16' tall. The leaves are narrow wedge-shaped typically 3 times longer than wide. Inflorescences erect. This species typically occurs in the valley bottoms. Only 6 records in Calflora database (5 herbarium records)





Image 1–General upright appearance of big sagebrush © 2000 Gary A. Monroe (CC BY-NC 3.0). Image 2–Typical leafing pattern of big sagebrush © 2001 Charles E. Jones (CC BY 3.0). Image 3–The erect inflorescence of big sagebrush © 2002 Charles E. Jones (CC BY 3.0). Image 4–Small yellow flower of big sagebrush © 2014 Richard Spellenberg (CC BY-NC-SA 3.0).

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FIRE MANAGEMENT CONSIDERATIONS:

Sapsis [90] reports "investigations of prescribed burning as an ecological agent in basin big sagebrush dominated systems are lacking." However, a number of studies have focused on big sagebrush in general. Fire as a management tool has primarily been used to reduce big sagebrush. Where sagebrush reduction is a desired goal, prescribed burns in basin big sagebrush communities tend to be more successful than those in Wyoming big sagebrush, but less successful than those in mountain big sagebrush [19]. In Nevada where "range improvements" were desired, best results have been obtained after spring or late fall burns [5]. Summer burns in big sagebrush communities can leave the soil bare and subject to erosion. Favorable results are often obtained after fire in basin big sagebrush if an adequate understory is present prior to the burn [21].

Britton and others [19] report that as a general rule for a successful prescribed burn in big sagebrush at least 20% canopy cover of big sagebrush should be present, with at least 200 to 300 lb. per acre of herbaceous fuel. Beardall and Sylvester [5] suggest that for prescribed burns to succeed in big sagebrush communities in Nevada, the following conditions should be met: 600 to 700 lb./acre fine fuels; ignition should occur when relative humidity is 60% or less; soil must be wet, winds must be 8 miles per hour or greater; and burning should stop when spring growth of grasses reaches 2 inches. Big sagebrush should be at least 1/3rd of total plant cover [84]. The presence of weedy annuals may prevent establishment of desirable perennial grasses and can increase future fire hazards [20].

Removing sagebrush by fire or chemical treatment may release desirable undergrowth if the site is in good condition. However, many basin big sagebrush sites today are limited in extent and do not have a high density of undergrowth to respond if the overstory is reduced. Animals are attracted to

burned areas and may damage low-vigor plants if the animals concentrate in a small area. In some cases, prescribed fire in big sagebrush communities can create mosaics that are beneficial to wildlife [21].

In general, burning in cheatgrass-infested big sagebrush types is not recommended if cheatgrass cover exceeds 50% or if cover of fire-resistant native grasses is less than 20%. Cheatgrass is more likely to invade after fire if the dominant native grass is not a fire-resistant species (for example, Thurber needlegrass or Idaho fescue) or if native grasses were in poor condition prior to fire [84,115]. Artificial seeding with native grasses is recommended after fire if cheatgrass was a major component of the prefire community or if it was a minor component and native grasses were in poor condition [115,121]. Communities in good condition may at least partially recover from temporary postfire increases in cheatgrass, especially when fire is followed by favorable precipitation.

Mountain Sagebrush–Artemisia tridentata ssp. vaseyana (ARTRV)

Common names: big sagebrush; big sage-brush; big sage brush; big sagebush; big western sagebrush; big western sage; big-leaf sagebrush; bigleaf sagebrush; tall western sagebrush; tall western sage; big mountain sagebrush; common sagebrush; common sage-brush; common sage bush; three-toothed sagebrush; three-toothed sage-brush; three-tooth sagebrush; three-toothed sage; three-tooth sage; three tooth sage; blue/black sagebrush

Synonyms: *Artemisia tridentata* var. *vaseyana*; *Seriphidium vaseyanaum*

Description: Mountain sagebrush is a medium to tall shrub typically 2-4' tall but sometimes reaching 8' tall. Mountain sagebrush often appears flat topped because of the flower heads are typically at a uniform height. Mountain sagebrush leaves are broadly wedge shaped and three lobed, less than 4 times longer than wide. The fragrance is typically "sweeter" than the other subspecies.

data from spring and fall prescribed fires in mountain big sagebrush, Wyoming big sagebrush, and basin big sagebrush communities in California, Nevada, Oregon, and Montana.

Mountain big sagebrush sites are among the most productive sagebrush sites [227,417,553], and mountain big sagebrush stands often have enough fuels to carry fire [66] (see Fire management considerations for fuels). Biomass, and thus fuel loading and often fuel continuity, generally increase along an environmental gradient from warm, dry Wyoming big sagebrush sites to cool, moist mountain big sagebrush sites and cold, moist mountain shrub sites (figure 10) [416]. Surface fuels in mountain big sagebrush shrublands were historically characterized by a relatively dense herbaceous layer. The predominance of Mollisols in mountain big sagebrush communities shows long-term (hundreds to thousands of years) dominance of grasses on those sites [227] (see Soils).

Late-successional communities produce the most vegetative biomass [398]. In a review, Miller and Eddleman [417] reported total annual herbaceous production in mountain big sagebrush stands ranging from 625 to 2,454 pounds/acre (700 to 2,750 kg/ha), while basin big sagebrush ranged from 774 to 2,098 pounds/acre (868 to 2,352 kg/ha) and Wyoming big sagebrush ranged from 393 to 691 pounds/acre (440 to 775 kg/ha). Goodrich et al. [227,228,230,232] reported total annual herbaceous production in mountain big sagebrush communities ranging from 373 to 2,100 pounds/acre (418 to 2,354 kg/ha). The low end of the range (373 pounds/acre) was from near Dubois, Idaho, where sites were likely near the ecotone with Wyoming big sagebrush [227].

Mountain big sagebrush sites have mostly small-diameter fuels. In the Bighole Valley, Montana, shrubs, herbs, litter and duff accounted for 96% of the total surface fuel loadings in mountain big sagebrush/bluebunch wheatgrass stands. Surface fuels were typically <1 inch (2.5 cm) in diameter. Surface fuel loading averaged 0.005 kg/m² for 1-hour fuels, 0.009 kg/m² for 10-hour fuels, 0.004 kg/m² for 100-hour fuels, and 0 kg/m² for 1,000-hour fuels [314]. These correspond to diameter size classes of <0.25 inch (0.62 cm), 0.25 to 1 inch (0.62–2.54 cm), 1 to 3 inches (2.54–7.62 cm), and >3 inches (7.62 cm), respectively [524]. Dead stemwood is common in old mountain big sagebrush plants [90,673,741] (see Botanical description).

When trees establish and spread in mountain big sagebrush communities (see Shrubland succession and Woodland expansion), fuel characteristics change because cover of live mountain big sagebrush and herbaceous plants decreases as tree cover increases, and communities succeed from sagebrush steppe to late-successional conifer woodland (e.g., [35,329,413,426,523,617,688,745,750,751,765]). Fuel loads increase and peak as trees establish in early woodland succession, then decline from early to midsuccession. In late woodland succession, 10-hour fuel loads decrease, and 100-hour fuel loads increase (figure 12). In mountain big sagebrush steppe and during the initial stage of conifer establishment (Phase I), fuel loads are dominated by herbaceous plants and shrubs, the midsuccessional stage (Phase II) by shrubs and litter, and late-successional stage (Phase III) by living trees and downed dead trees and branches [688,717,751]. Dead sagebrush becomes increasingly common throughout succession. In the Sheep Rock Mountains, Utah, the percent of dead mountain big sagebrush plants in western juniper-singleleaf pinyon woodlands increased from none in <10-year-old stands to 16.2% in a 46-year-old stand, and 66.6% in stands >100 years old [35].

As mountain big sagebrush steppe succeeds to woodland, tree crowns increase in size, continuity of crown fuels increases, and surface fuel abundance, continuity, and packing ratios decrease.

These changes in fuel structure reduce the potential for surface fires burning under moderate weather conditions and increase the potential for crown fires burning under extreme conditions (i.e., high wind, high atmospheric instability, low humidity, and high temperatures) [416,425,601]. On sites where big sagebrush or similar large shrubs dominate, shrubs are more likely than trees to carry fire, especially if trees are widely spaced. As big sagebrush and herbaceous species decline during succession, trees become more important in carrying fire [539]. Simulations suggest that high winds (>15 miles/hour (25 km/hour)) are needed to carry fire through a singleleaf pinyon-California juniper woodland canopy that contains 2.2 tons/acre (5.4 tons/ha) of available canopy fuels, and flame lengths in the woodlands exceed those in big sagebrush-rubber rabbitbrush shrublands [178]. A landscape modeling study suggests that fire size increases as the area of mid-successional woodland increases on the landscape ($r^2 = 0.785$) and decreases as the area of late-successional woodland increases on the landscape ($r^2 = 0.758$) [750]

The presence of woodland vegetation can increase fire severity in mountain big sagebrush communities. An analysis of a 46,680-acre (18,890 ha) July wildfire in southwestern Idaho showed that remotely-sensed burn severity in sagebrush steppe measured 1 and 2 years after fire was negatively correlated with the amount of mountain big sagebrush and low sagebrush steppe and early-successional woodlands nearby (approximate range of r -values = -0.5 to -0.7) and positively correlated with the amount of late-successional woodlands nearby (approximate range of r -values = 0.5-0.7, $P \leq 0.05$ for all comparisons) (figure 13) [601].

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Wyoming Sagebrush– Artemisia tridentata ssp. wyomingensis (ARTRW8)

Common names: Wyoming big sagebrush; big sagebrush; big sage-brush; big sage brush; big sagebush; big western sagebrush; big western sage; big-leaf sagebrush; bigleaf sagebrush; tall western sagebrush; tall western sage; big mountain sagebrush; common sagebrush; common sage-brush; common sage bush; three-toothed sagebrush; three-toothed sage-brush; three-tooth sagebrush; three-toothed sage; three-tooth sage; three tooth sage; blue/black sagebrush

Synonyms: *Seriphidium tridentatum* ssp. *wyomingense*, *Artemisia tridentata* var. *wyomingensis*

Description: Perennial shrub < 40” tall but can be up to 80” tall. Leaf: generally, $\frac{1}{2}$’ long wedged shaped 3-lobed leaf with middle lobe slightly longer than lateral lobes. Less than 3 times longer than wide. Leaf approximately grey green. Flower (Jun-Sep): Small yellow green flowers in a short narrow panicle (1-5” long) with side branches often surrounded by vegetative branches (often described as giving the plant a twiggy appearance. This subspecies often occurs in the harsher dryer sagebrush sites. NOTE: only one record in Calflora observations (UNR herbarium).



Image 1–General form of Wyoming big sagebrush © 2000 Gary A. Monroe (CC BY-NC 3.0). Image 2– Inflorescence, twigs and leaves of Wyoming big Sagebrush.

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Fuels: Big sagebrush foliage is highly flammable [110,539]. During the growing season, foliar heat content (maximum amount of energy generated by burning leaves) increases while live fuel moisture content decreases [593]. Wright and Prichard [837,841] provide models for predicting shrub, nonshrub, and total aboveground biomass consumption based on data from spring and fall prescribed fires in Wyoming big sagebrush, basin big sagebrush, and mountain big sagebrush communities in California, Nevada, Oregon, and Montana.

Biomass, and thus fuel loading and often fuel continuity, generally increase along an environmental gradient from warm and dry to cold and moist sagebrush sites. While Wyoming big sagebrush sites occur along the drier end of the gradient, soil temperature and moisture regimes vary and include soils that are warm and dry, cool and dry, and warm and moist [142] (table 6, fig. 8). Thus,

productivity "varies rather widely" among Wyoming big sagebrush sites [640]. A review by Miller and Eddleman [495] reported that total annual herbaceous production in Wyoming big sagebrush stands across the West ranged from 390 to 690 pounds/acre (440-770 kg/ha), while that in basin big sagebrush stands ranged from 770 to 2,100 pounds/acre (87-2,350 kg/ha) and that in mountain big sagebrush stands ranged from 630 to 2,450 pounds/acre (700-2,750 kg/ha). Schlatterer [639] approximated that the least productive Wyoming big sagebrush sites in the Great Basin and surrounding areas produce <400 pounds/acre (450 kg/ha) of herbs annually, while the most productive sites produce up to 900 pounds/acre (1,000 kg/ha). In northern Utah, southern Idaho, northeastern Nevada, and west-central Wyoming, total annual production in Wyoming big sagebrush communities ranged from 460 to 990 pounds/acre (520-880 kg/ha) [558]. Average annual production of graminoids, forbs, and shrubs in the least productive Wyoming big sagebrush stand on the Shoshone National Forest, Wyoming, was 278, 133, and 328 pounds/acre, respectively (312, 149, and 368 kg/ha), and in the most productive stand was 427, 231, and 206 pounds/acre, respectively (479, 259, and 231 kg/ha) [732].

Precipitation is highly variable year to year in many Wyoming big sagebrush sites (e.g., [777]) (see Climate), and it affects the amount of fuels (biomass and plant cover) on these sites [493,504]. Fuels can be sparse in Wyoming big sagebrush communities [118,830], especially in dry years. This can make prescribed burning difficult [127] (see Fire Management Considerations: Considerations for Fuels). In southeastern Oregon, total herbaceous biomass in 3 Wyoming big sagebrush/Thurber needlegrass communities ranged from 100 pounds/acre (110 kg/ha) during a dry year (50% of average annual precipitation) to 520 pounds/acre (580 kg/ha) during a wet year (185% of average annual precipitation). Forb biomass changed up to 4-fold between dry (17 pounds/acre (19 kg/ha)) and wet (67 pounds/acre (75 kg/ha)) years [495]. In central Utah, mean total plant cover in Wyoming big sagebrush stands ranged from 37% to 79% during 20 years. The correlation of total live plant cover to total precipitation the preceding year was not significant, although nearly so ($R^2 = 0.42$; $P = 0.07$), and total live plant cover appeared to increase during wet periods and decline during droughts [811]. In central Nevada, comparisons of peaks in charcoal abundance with climate records suggest a positive correlation between fire occurrence and relatively wet periods in landscapes now dominated by Wyoming big sagebrush and basin big sagebrush, implying that these big sagebrush communities are fuel-limited, where fine-fuel biomass increases during relatively wet periods and is then ignited during relatively dry years [476].

Considerations for Fuels: Overview: Warm, dry Wyoming big sagebrush communities often have sparse fuels [118,830] that make prescribed burning difficult [127,149,404,770], while moister Wyoming big sagebrush stands may have enough fuels to carry fire [67,127]. Because cover of Wyoming big sagebrush and herbaceous fuels is variable and often patchy [149,325], burns often form a patchy mosaic of burned and unburned areas [149,856]. Britton and Clark [104] considered Wyoming big sagebrush sites the most difficult to burn under prescription, basin big sagebrush intermediate, and mountain big sagebrush sites the easiest based on the amount of herbaceous fuels (see Fuels).

Prescribed fire may be used to create fire breaks and potentially reduce spread rate, flame lengths, and intensity of future wildfires in midsuccessional Wyoming big sagebrush communities where postfire cheatgrass invasion is unlikely [604]. Seventeen years after prescribed fire in a Wyoming big sagebrush site with low pre- and postfire cover of cheatgrass (<8.4%) at Hart Mountain National

Antelope Refuge, total fuel loads were 7 times greater in unburned plots (5,366 pounds/acre (6,015 kg/ha)) than burned plots (741 pounds/acre (831 kg/ha)). Shrub fuel was nearly 10 times greater in unburned than burned plots, and litter under shrubs was nearly 4 times greater in unburned than burned plots. Herbaceous fuels were 5 times lower in unburned than burned plots ($P < 0.01$ for all comparisons). These fuels data were used to model fire behavior in unburned and burned plots under four scenarios of fuels drying. The model estimated that rate of spread, flame lengths, and fireline intensity were lower in burned than unburned plots across all scenarios [604]. Historically, sparse fuels on burned sagebrush areas may have acted as fire breaks [578].

Field sampling methods to estimate fuel characteristics of Wyoming big sagebrush were developed in the 1980s [110,211], and more recently, photo series guides were developed to estimate fuels in Wyoming big sagebrush communities (e.g., [86,553,634,684,737,838]). Wyoming big sagebrush fine fuel (twig) and foliage biomass can be estimated using crown area and height [211]. The strong correlation between these variables ($R^2 = 0.71$) makes crown area and height suitable for modeling fuel characteristics of Wyoming big sagebrush and mountain big sagebrush [110]. Reiner et al. [602] developed regression equations to predict foliage biomass, live biomass, and total biomass for Wyoming big sagebrush and mountain big sagebrush in central Nevada. Photo guides that quantify fuels in all strata (e.g., [86,684]) can be used to predict vegetation and fuel response to various treatments, assess target conditions, set management objectives, help choose management activities to meet objectives, and determine treatment effectiveness [86].

Several models describe fuel and weather conditions necessary to enable fire spread in big sagebrush ecosystems (e.g., [45,67,105,110,264,563,740,836,840]). For example, Brown [110] developed a fire behavior model in Wyoming big sagebrush and mountain big sagebrush ecosystems based on fuels sampled in Montana and Idaho and estimated how rate of spread and fireline intensity vary with big sagebrush height, percent cover, foliage moisture, and fraction of dead stemwood. Wright [836] developed models for predicting fuel consumption and proportion of area burned during spring and fall prescribed fires in big sagebrush communities, which included Wyoming big sagebrush, basin big sagebrush, and mountain big sagebrush communities. Frandsen [264] developed a model estimating fuel load of Wyoming big sagebrush and basin big sagebrush for fire behavior predictions. Britton et al. [105] provide a big sagebrush cover-herbaceous fuel load curve representing proportions of big sagebrush cover and herbaceous fuels needed to produce a successful burn. They conclude that at least 20% big sagebrush cover and 200 to 300 pounds/acre (224-336 kg/ha) of herbaceous fuel are needed to ensure a prescribed burn that reduces big sagebrush density. Wyoming big sagebrush cover is typically <25% [285,495] (see Stand structure), and this may contribute to the difficulty in getting a fire to carry through many Wyoming big sagebrush communities [118]. Fuel characteristics and subsequent fire behavior change when Wyoming big sagebrush and other warm to cool and moist sagebrush communities succeed to woodlands [846] (see Fuels) and when these communities are invaded by nonnative annual grasses [813] (see Considerations for Nonnative Invasive Plants).

Grazing management to reduce fuel loads: While impacts of livestock grazing on big sagebrush communities vary (see Livestock grazing), strategic livestock grazing can be used under some conditions to reduce fine fuel biomass and continuity and thereby decrease the risk, size, and severity of wildfires and possibly increase effectiveness of fire suppression [189,197,198,199,200,201,203,526,634]. This is particularly important in areas with cheatgrass-

dominated understories [215,235,526,569], where seasonally targeted grazing may help break the grass/fire cycle [201]. Ungrazed Wyoming big sagebrush, mountain big sagebrush, and low sagebrush plots in southeastern Oregon had ~2 times more perennial bunchgrass cover, 1.5 times more total herbaceous cover, ~3 times more standing fine fuel biomass, ~2 times more total fine fuel biomass (standing biomass plus litter), more perennial grass cover without fuel gaps, and smaller fuel gaps than grazed plots ($P \leq 0.03$ for all comparisons) [197]. Fall and spring grazing in Wyoming big sagebrush steppe in east-central Oregon reduced fine fuel biomass, cover, and height, and increased fuel moisture, thereby decreasing ignition and initial spread potential compared with the ungrazed treatment. Grazing effects on predicted fire behavior differed between fall and spring grazing. In the August that followed grazing treatments, the probability of initial fire spread was 6-fold greater in the fall-grazed compared with the spring-grazed treatment. This suggests that spring grazing may reduce fuels more than fall grazing [203]. In Wyoming big sagebrush and mountain big sagebrush communities in Owyhee County, Idaho, cattle grazing was an effective tool for reducing flame height and rate of fire spread during a late September prescribed fire. Shrub cover was low (<25%-30%); at higher shrub cover (31%-78%), fire may have carried through the shrub canopy. The authors concluded that for cattle grazing to reduce fuels, and thus create or maintain fire breaks, shrub cover must be maintained at low levels [634]. Diamond et al. [215] suggest that strategic grazing in nonnative annual grasslands could reduce fuel loads and continuity enough to prevent a flame front from carrying across treated areas even under "peak fire conditions" (i.e., July-August). Davison [209] provides detailed information on using livestock grazing to reduce fuel loads in cheatgrass-dominated rangelands.

Grasses

Bromes–Bromus

Japanese Brome–*Bromus japonicus* (BRAR5(formerly BRJA))

Common names: Japanese cheat; Japanese cheat-grass; Japanese cheat- grass; Japanese cheatgrass; Japanese chess; Japanese brome; Japanese brome-grass; Japanese brome grass; Japanese bromegrass; Japan brome-grass; Japan brome grass; Japan bromegrass; Thunberg's brome; spreading brome; spreading brome-grass; spreading brome grass; meadow chess

Synonyms: *Bromus japonicus* subsp. *japonicus*. However, currently the USDA plants database views *Bromus japonicus* as a synonym for *Bromus arvensis*, field brome. Both Jepson and CalFlora recognize *Bromus japonicus*.

Description: Japanese brome is a non-native introduced winter annual grass. It typically reaches 8-48" tall. The sheaths of this grass are hairy while the blades are glabrous to hairy. The inflorescence is an open panicle. The spikelets are not strongly flattened.



Image 1–General appearance of Japanese brome © 2021 Martin a. Prinz (CC BY-NC 3.0). Image 2–A closeup view of the sheath, ligule and blade of Japanese brome © 2023 Linda Jo Conn (CC BY-NC 3.0). Image 3–The panicle and florets of Japanese brome © 2020 Bill Crins (CC BY-NC). Image 4–Mature/dry florets of Japanese Brome © 2013 Cathy Bell (CC BY-NC-ND 3.0)

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Other management considerations: Japanese brome is usually regarded as a noxious weed on rangelands and prairies because it competes with native perennials for water and nutrients [4,29,61,66]. It is reported in general literature as increasing with moderate to heavy grazing [56,61,66]. It may decrease under such grazing regimes, however. Whisenant and Uresk [74] observed that Japanese brome density in Badlands National Park, South Dakota, which is only lightly grazed, appeared much greater than in more heavily utilized adjacent rangeland. They hypothesized that litter accumulation with little or no grazing created a favorably mesic environment for Japanese brome germination and establishment. Mechanical treatments may increase, sometimes greatly, Japanese brome populations. With favorable soil moisture Japanese brome establishes wherever native vegetation is disturbed and soil nitrogen levels are temporarily increased [30]. Mowing a Kansas tallgrass prairie in August resulted in one such Japanese brome population increase [32].

Control: The best way to prevent or minimize Japanese brome invasion is to minimize soil disturbance. Where Japanese brome has already established, it can be reduced with herbicides. Atrazine is most commonly used [13,40]. A list of other pre- and postemergent herbicides effective against Japanese brome is available [79].

Fire ecology or adaptations: Except in wet years, fire tends to reduce Japanese brome populations [31]. The reduction usually lasts for only 1 or 2 years, however [31,65]. Some seed is killed by fire, but seedbank reserves, reproductive capacity, and competitive ability of Japanese brome are usually sufficient to allow for repopulation of an area within 2 years unless the site is reburned [69,72,78].

Cheatgrass–*Bromus tectorum* (BRTE)

Common names: common cheat; common cheat-grass; common cheat grass; common cheatgrass; cheat-grass brome; cheat grass brome; cheatgrass brome; downy cheat; downy cheat-grass; downy cheat grass; downy cheatgrass; downy brome-grass; downy brome grass; downy brome-grass; downy chess; downy chess-grass; downy chess grass; downy chessgrass; downy chess brome; downy chess brome-grass; downy chess brome grass; downy chess brome-grass; invasive cheat-grass; invasive cheat grass; invasive cheatgrass; weedy cheat-grass; weedy cheat grass; weedy cheatgrass; introduced cheat; introduced cheat grass; introduced cheatgrass; nonnative cheatgrass; European cheat-grass; European cheat grass; European cheatgrass; fire-prone cheat-grass; fire-prone cheat grass; fire prone cheat grass; fire-prone cheatgrass; fire prone cheatgrass; bronco cheat; bronco cheatgrass; feary chess; drooping brome; drooping brome-grass; drooping brome-grass; thatch brome-grass; thatch brome grass; thatch brome-grass; slender chess; awned brome grass; bur-brome; clinging brome; 100-days grass; prickly brome; military grass; Mormon oats; brome tec; brom tec; brom tect

Synonyms: *Anisantha tectorum*; *Bromus tectorum* var. *glabratus*

Subordinate taxa: None

Description: Cheatgrass is a non-native introduced winter annual grass. It typically reaches 6-24" tall but may be as small as 1" or as tall as 48". Cheatgrass is bright green maturing to red as it cures to a light straw brown. The leaves are often densely hairy with a short membranous ligule and no auricles. The inflorescence is a drooping panicle of 13 to 8(10) florets.





Image 1–A cheatgrass thicket © 2016 Jean Pawek (CC BY 3.0). Image 2–A closeup of the leaf sheath and stem of cheatgrass © 20019 Janet Wright (CC BY-NC). Image 3–Maturing seed head of cheatgrass © 2019 Соколков Юрий Павлович (CC BY-NC 3.0). Image 3–Seed head of cheatgrass as it begins to disperse © Алина Ключева (CC BY-NC 3.0).

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Fire regimes: Cheatgrass expansion has dramatically changed fire regimes and plant communities over vast areas of western rangelands by creating an environment where fires are easily ignited, spread rapidly, cover large areas, and occur frequently [484]. An estimated 80,000 km² of primarily shrubland and grassland communities in the Great Basin have fire regimes that have been seriously altered because of the presence of cheatgrass. Approximately 67% of this area is in ecosystems that historically experienced mixed-severity fires at intervals of 35 to 100+ years; and about 25% is in areas that historically experienced low-severity fires at intervals of 0 to 35 years [282]. Cheatgrass promotes more frequent fires by increasing the biomass and horizontal continuity of fine fuels that persist during the summer lightning season and by allowing fire to spread across landscapes where fire was previously restricted to isolated patches [37,46,48,71,78,107,240,406,461,475,484]. Fire in these habitats can have severe effects on native species of plants and animals, although the impact of fire regime changes may differ by region and ecosystem type due to differences in the composition and structure of the invaded plant communities [111,329,461,469] and to climatic differences such as occurrence of summer thunderstorms [48,238].

Cheatgrass fuels: In the absence of grazing, grass biomass during the fire season may represent 2 years of fuel accumulation, which appears to be optimal for grassland fires [238]. Abundant, continuous cover of cheatgrass can lead to rapid spread of wildfires so that under conditions of high temperatures, low humidity, and wind, the fires are very difficult to suppress [476].

Brooks [69] compared the roles of nonnative annual grasses and other annual plants in facilitating the spread of fires in the Mojave Desert. Landscapes dominated by nonnative annual grasses, especially annual bromes (*Bromus* spp.), are more flammable than those dominated by native forbs. Possible explanations for this include higher surface-to-volume ratio of grasses compared to

forbs; more continuous vegetative cover; and the ability of alien annual grasses to remain rooted and upright longer than native forbs, allowing them to persist as flammable fuels into the summer when the threat of fire is highest [69]. Thick layers of annual plant litter accumulate, and litter decomposes especially slowly in desert regions [69,487]. Accumulations of litter led to particularly hot temperatures, long flame residence times, and continuous burn patterns in experimental fires in the Mojave Desert [69].

Cheatgrass provides a flammable link between open grasslands and forests. It cures early in the fire season and ignites readily during dry periods because of its finely divided stems and pedicels, and it responds readily to changes in atmospheric moisture because of its fine structure. Moisture content is the single most important factor influencing cheatgrass flammability, and varies with plant phenology and color change as follows [314]

Fuel management/fire prevention: On areas where cheatgrass is abundant, special measures may be necessary to prevent recurrent fires, and thus prevent the elimination of fire-sensitive perennial grasses and forbs [60] and other potential adverse impacts (see [Fire Ecology](#) and [Impacts and Control](#) for more information). Fire suppression can discourage invasion and spread of cheatgrass [365]. Grazing management to reduce fuel loads and greenstripping are 2 methods employed to prevent large recurrent fires in areas dominated by cheatgrass. Additionally, herbicides are being tested for effectiveness in creating fuelbreaks in cheatgrass-dominated range [412].

Red Brome–*Bromus rubens* (BRRU2)

Common Names: red brome; compact brome; foxtail chess; Spanish brome

Synonyms: *Anisantha madritensis*; *Bromus madritensis* subsp. *rubens*

Description: Red brome is a non-native introduced winter annual grass. It typically grows to 8-28" tall. The leaf sheaths are downy to slightly hairy. It lacks auricles and has glabrous ligules. The leaf blades are not typically hairy. The inflorescence is a compact panicle.



Image 1–A thicket of red brome (the redish grass) by Stanley Spencer (Public Domain). Image 2–The sheath, ligule and blade of red brome © 2008 Zoya Akulova (CC BY-NC 3.0). Image 3–Inflorescence of red brome © 2008 Luigi Rignanese (CC BY-NC 3.0). Image 4–Maturing seed head of red brome © 2023 Zoya Akulova (CC BY-NC 3.0).

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Fire ecology or adaptations: Red brome generally shortens fire return intervals [59,60,87]. The increased presence of red brome has promoted fires in areas where fire was previously infrequent due to insufficient fuels [68]. Once established red brome may increase fire frequency by enhancing potential for start and spread [10]. In general, red brome produces an abundant and continuous cover of persistent fine fuels, promoting fast, "hot" fires [21].

Desert: Areas of the Mojave Desert dominated by red brome are more susceptible to fire than areas dominated by native forbs. Dead red brome culms and blades are persistent (commonly 2 years); herbage of most Mojave Desert annual species usually lasts 1 year or less. Red brome produces high amounts of persistent flammable fuels in perennial plant interspaces, promoting ignition and spread [22].

California chaparral: The invasion of red brome has contributed to short fire return intervals and the subsequent degradation of chaparral [87]. Keeley [50] has observed shorter fire intervals (< 10 years) resulting from the increased presence of red brome and other exotic annuals. Greater fire frequency has promoted the degradation of native herb communities and promoted communities of chaparral shrubs with an exotic, annual understory [87]. Dead stems and litter are persistent, promoting spread of fire in shrub communities, especially across areas between shrubs and trees [44,87].

Wheatgrass–*Elymus*

Medusahead–*Elymus caput-medusae* (TACA8 (formerly ELCA13))

Common Names: Medusa-head; Medusa head; Medusahead; medusa-head; medusa head; medusahead; Medusa's head; medusa's head; Medusa-head rye; Medusa head rye; Medusahead rye; medusa-head rye; medusa head rye; medusahead rye; Medusa-head wild-rye; Medusa-head wild rye; Medusahead wild-rye; Medusa-head wildrye; Medusa head wildrye; Medusahead wild rye; Medusahead wildrye; medusa-head wild-rye; medusa-head wild rye; medusa-head wildrye; medusa head wildrye; medusahead wild-rye; medusahead wild rye; medusahead wildrye; Medusa-head grass; Medusahead grass; medusa-head grass; medusahead grass; Medusa wildrye; medusa wildrye

Synonyms: *Taeniatherum caput-medusae*, *Taeniatherum asperum*; *Taeniatherum crinitum* var. *caput-medusae*

Subordinate Taxa:

Description: Medusahead is a non-native introduced winter annual grass. It typically grows to 6-20" tall. The sheath is glabrous. The leaf does not have small auricles 0.1-0.5mm. The ligule is membranous. The leaf blade is glabrous to puberulent, with long ciliate hairs near the collar. The inflorescence is spike and dense much like foxtails. One of the most distinctive features is that the seed head does not disarticulate.



Image 1–A thick patch of medusahead by Gabriel Campbell (Public Domain). Image 2–The sheath, collar, ligule and blade of the leaf of medusahead © 2025 Ibrahim Hirory (CC BY-NC). Image 3– A young seed head of medusahead by Gabriel Campbell (Public Domain). Image 4–Typical appearance of the seed head after seed dispersal. Note that the seed head does not disarticulate © 2024 Вадим (CC BY-NC).

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Fire regimes: The expansion of exotic annual grasses such as medusahead has substantially increased frequency of fire in the western United States [69]. Medusahead has a fine structure and its herbage dries completely; therefore, its standing dead biomass is extremely flammable. The hazard of wildfire is further increased by considerable litter [41]. Medusahead litter decomposes more slowly than that of most plants [108], therefore making stands of this annual grass a fire hazard [84]. Slow decomposition is a result of its high silica content [77,104]: total ash content of medusahead contains 72 to 89% silica [104]. The long-lasting litter formed by medusahead is easily ignited and burns readily [79]. Invasion can initiate a cycle where a non-native grass colonizes an area and provides the fine fuel necessary for the initiation and propagation of fire. Fires then increase in frequency, area, and possibly severity. Following these grass-fueled fires, non-native grasses recover more rapidly than native species and cause a further increase in fire [27]. Frequent

fires destroy the shrub component of the plant community, and potentially part of the bunchgrass community, without destroying "significant" amounts of medusahead seed [79].

The non-native grasses cheatgrass and medusahead have invaded the low sagebrush communities on the volcanic tablelands of northeastern California and northwestern Nevada. When precipitation is adequate, the interspaces between sagebrush plants are completely covered by these invasive grasses. The fine fuels of these plants, and the accumulation of litter of highly siliceous medusahead, create conditions in which fire is easily carried. Negative effects of wildfires in this region include erosion of the thin, coarse-textured, eolian veneer soils [11]. For example, the herbaceous vegetation of a ponderosa pine/Sandberg bluegrass in Modoc County, California, included many other native herbaceous species. After a wildfire, medusahead excluded almost all other understory species [22].

Plant response to fire: Medusahead increases under frequent fires at the expense of native species and sometimes, cheatgrass. It promotes further frequent fire by increasing fuel loads [27,76]. Accumulated medusahead litter enables stand-replacement fires to occur in ecosystems such as low sagebrush sites that, under "pristine" conditions, may have been fire-resistant [11,116,119,122]. Wildfires in medusahead-infested areas usually minimally damage soil surfaces and soil erosion is limited, but enough medusahead seed survives to produce thinned, vigorous stand of multiculmed medusahead plants the following year. Within a few years, stand densities approach prefire levels [54].

In cheatgrass and medusahead wildfires, accumulation of litter and the rapidity at which the litter combusts lead to soil heating of such short duration that nitrate levels may increase. Wildfire-induced increases in soil nitrate in cheatgrass and medusahead-dominated areas are undesirable: Medusahead is nitrophilic and readily germinates in seedbeds with high nitrate levels. Near Alturas, California, a wind-driven wildfire rapidly spread across a medusahead-dominated area. The litter did not completely ash and there were still viable medusahead fruits in the lightly charred litter. Bioassays of the burned soil found over 6.2×10^6 germinable seeds of medusahead per acre (unpublished data; R. R. Blank, USDA/ARS, Reno, NV) [10].

Low Fire Risk Shrub Alternatives

Alder Buckthorns–Frangula

Red Buckthorn–Frangula rubra (FRRU)

Common Names: red buckthorn; Sierra coffee berry; Sierra coffeeberry; red alder buckthorn

Synonyms: Rhamnus rubra

Subordinate Taxa: Frangula rubra ssp. rubra; Frangula rubra ssp. obtusissima; Rhamnus californica var. rubra; Rhamnus californica var. obtusissima

Description: Red buckthorn is a deciduous spreading shrub usually 4-6' tall. The bark is red to bright gray with the terminal buds hairy. Leaves are alternate, thin with a finely toothed to entire margin with a variable form from ½ to 3" long that can be narrowly elliptical to obovate. Inflorescence is an umbel of green starlike flowers. The fruit is a drupe that ripens to black.



Image 1–General appearance of red buckthorn © 2009 Keir Morse (CC BY-NC-SA 3.0). Image 2–Showing typical leaf morphology and leafing pattern along with red stems of red buckthorn © 2009 Barry Breckling (CC BY-NC-SA 3.0). Image 3–Typical red buckthorn greenish flowers © 2005 Steve Matson (CC BY-NC 3.0). Image 4–Ripe red buckthorn drupes and underside of leaves © Zoya Akulova (CC BY-NC 3.0)

[A note provided by the Jepson eFlora](#): *Frangula rubra* subsp. *nevadensis* (A. Nelson) Kartesz & Gandhi in Nevada. The *Frangula rubra* complex is a group of closely related plants that needs study. In NV they reach only Douglas and Washoe counties. C.B. Wolf's descriptions (1938) provide only a single distinct character to separate the subspecies, but field and herbarium study argue for the recognition of infraspecific taxa even with the intermediates and variants. The range of *Frangula rubra* subsp. *obtusissima*, in central SN, is central, and Wolf reported "intergradations in various degrees" between it and all the other subspecies. Furthermore, *Frangula rubra* subsp. *yosemitana* and *Frangula californica* subsp. *cuspidata* grow along the east side of SN and can be easily confused. Plants of both taxa can be deciduous, but Wolf noted differences in pubescence and in leaf margin characters to differentiate the 2, although both are variable throughout their ranges.

California Lilacs –Ceanothus

Prostrate Ceanothus–*Ceanothus prostrates* (CEPR)

Common Names: prostrate ceanothus; Mahala mats; Pinemat

Synonyms: *C. divergens*; *C. prostrates* var. *laxus*; *C. prostrates* var. *occidentalis*.

Subordinate Taxa: *C. P. Var. prostratus*

A mat forming shrub typically growing no more than 2-6 inches tall (occasionally 1 ½ ft) that can form an extensive mat. The branches root at the joints. The opposite leaves are small, and holly like with prickles on the tips of each marginal tooth. The flowers are blue to lavender in an umbel-like inflorescence with the typical ceanothus like flower.



Images 1: Prostrate ceanothus showing its typical flat low growing Sierra form. © 2010 Keir Morse (CC BY -NC-SA 3.0) 2: Prostrate ceanothus leaf showing the single mid-rib and holly like dentation (© 2008 Steve Matson (CC BY_NC 3.0) 3: Prostrate ceanothus showing typical branching form and slightly clustered leaf orientation. 4. Prostrate Ceanothus infloerense © 2013 Jason Matthias Mills (CC BY-NC_ND 3.0)

Cherry–Prunus

Desert Peach–*Prunus andersonii* (PRAN2)

Common Names: Anderson's desert peach; Anderson's peach; Anderson's peachbrush; Anderson desert peach; Anderson peach; Anderson peachbrush; beautiful desert peach

Synonyms: None found.

Description: Desert peach is a deciduous open branched upright shrub, 3-7' tall but can reach 10'. It has short lateral branches that form spines. The leaves are simple with pointed tips and minute teeth on the margins. Flowers are typically solitary but can form bunches. The flowers are typical of prunus with 5 pink petals (sometimes white). The fruit are drupes about ½" in size with dry husk like flesh.



Image 1–A desert peach in full bloom © 1982 Gary Monroe (CC BY-NC 3.0). Image 2–Leafing pattern, young twigs and spines of desert peach © 2024 Steve Matson (CC BY 3.0). Image 3–A leaf of desert peach showing the teeth on the margins. © 2022 Michael Stein (CC BY-NC 3.0). Image 4–Flower of desert peach © 2008 Steve Matson (CC BY-NC 3.0). Image 5–Dried fruit of desert peach ready to disperse © 2012 Jean Pawek (CC BY 3.0).

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Bitter Cherry–*Prunus emarginata* (PREM)

Common Names: common bitter cherry; common bitter-cherry; common bittercherry; western bitter cherry; western bitter-cherry; quinine cherry

Synonyms: None Found.

Description: Bitter cherry is a deciduous shrub 4-12' tall although can reach 30'. The bark is smooth dark brown to red with horizontal gray bands and rows of orange lenticels. When scratched there can be a faint almond smell to the bark. The leaves are oblong fine toothed and rounded at the tip. The flowers are very fragrant and the typical form of cherry blossoms and are typically in clusters of 3-12.



Image 1–General shrub form of bitter cherry © 2020 John Doyen (CC BY-NC 3.0). Image 2–A trunk of bitter cherry showing the gray bands and orange lenticels by Gabriel Campbell (Public Domain). Image 3–Flowers of bitter cherry © 2017 John Doyen (CC BY-NC 3.0). Image 4–The leaf of a bitter cherry © 2006 Steve Matson (CC BY-NC 3.0). Image 5–Fruit of bitter cherry © 2009 Barry Breckling (CC BY-NC-SA 3.0)

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Chokecherry–*Prunus virginiana* (PRVI)

Common Names: common choke-cherry; common choke cherry; common chokecherry; common choak-cherry; common choak cherry; red choke-cherry; red choke cherry; red chokecherry; Virginia choke-cherry; Virginia choke cherry; Virginia chokecherry; Virginia bird-cherry; Virginia bird cherry; Virginian bird-cherry; Virginian bird cherry; Virginian bird-cherry-tree; Virginian bird cherry tree

Synonyms: *Prunus demissa*; *Prunus virginiana* subsp. *demissa*

Subordinate Taxa: *Prunus virginiana* var. *demissa*

Descripton: Chokecherry is a deciduous shrub to small tree from 3-20' tall. The bark is a smooth dull red to grey. The leaves are ovate and 1 ½-3" long. The flowers are fragrant white in 2-5" racemes. The fruit is a round dark purple drupe.



Image 1–General form of chokecherry © 2012 Jean Pawek (CC BY 3.0). Image 2–Bark of chokecherry © 2016 Zoya Akulova (CC BY-NC 3.0). Image 3–Leaves of chokecherry © 2021 Zoya Akulova (CC BY-NC 3.0). Image 4–The raceme of chokecherry © 2013 Jason Matthias Mills (CC BY-NC-ND 3.0). Image 5–Fruit of chokecherry © 2018 Zoya Akulova (CC BY-NC 3.0)

[USDA NRCS Plant Guide for chokecherry](#)

[USDA NRCS Plant Guide for western chokecherry](#)

[Information available at Forest Service Fire Effects Information System.](#)

Currants–Ribes

Alpine Gooseberry–*Ribes lasianthum* (RILA2)

Common names: alpine gooseberry, woolly-flowered gooseberry; woolly-flower gooseberry; woolly flower gooseberry

Synonyms: *Grossularia lasiantha*; *Ribes leptanthum*

Description: Alpine gooseberry is a spreading shrub that is 1-3' feet tall. The young branches can be puberulent and have 1-3 spines at the nodes. The hairy glandular leaves are $\frac{1}{3}$ to $\frac{3}{4}$ " long with 3-4 lobes with crenulated margins. Flowers are erect racemes of 2 to 4 lemon-yellow flowers about $\frac{1}{8}$ " long with the typical gooseberry form. The fruit is a smooth red berry.



Image 1–An alpine gooseberry showing the general form of the spreading shrub. © 2012 Barry Breckling (CC BY-NC-SA). Image 2–Typical leafing pattern of alpine gooseberry. Note the spines at the nodes. Image 3–Typical leaf rounded and lobed leaf and bright lemon-yellow flower of alpine gooseberry. © 2016 John Doyen (CC BY-NC 3.0) Image 4–The red berry of alpine gooseberry. Note the lack of prickles more typical of currants and unlike many gooseberries. ©2014 John Doyen (CC BY-NC 3.0)

Wax Currant–*Ribes cereum* (RICE)

Common names: wax currant; whiskey currant

Synonyms: *Ribes reniforme*; *Ribes viscidulum*

Subordinate Taxa: *Ribes cereum*. var. *cereum*

Description: Wax currant is a deciduous shrub, 1-2' tall but under favorable conditions can reach 8' Branches are smooth with grey or brown bark that can be finely hairy on younger branches. The nodes lack spines. Leaves are orbicular with 3 to 5 lobes and $\frac{1}{4}$ to 1" and typically are clustered or on short spurlike branches. The margins of the leaves are crenulate. The upper surface are glandular pubescent giving the leaves a sticky feeling. Leaves have a spicy fragrance. Flowers occur in short drooping clusters of $\frac{1}{2}$ " white to pink tubular flowers. The fruit are $\frac{1}{4}$ to $\frac{1}{2}$ " glandular red berries.



Image 1–Shows the general form of wax currant in dryer conditions © 2021 Jean Pawek (CC BY 3.0)

Image 2–Shows typical shape of wax currant leaves. Note the glandular pubescents and slightly

lobed leaves with crenulated margins. Image 3–Wax currant flower showing the tubular flowers with the typical currant/gooseberry flower form. Note the slightly more lobed leaves illustrated here.

Image 4–Red wax currant berries showing slight glandular pubescent that often lessens later in the season.

[Information available at Forest Service Fire Effects Information System.](#)

Mountain Gooseberry–*Ribes montigenum* (RIMO2)

Common names: mountain gooseberry; alpine prickly currant; gooseberry currant; western prickly gooseberry; mountain prickly gooseberry; alpine prickly gooseberry; alpine prickly current; alpine prickley current; subalpine prickly currant; closed-cap gooseberry; cloud-cap currant; cloudcap currant; cloudcap current; gooseberry-currant; gooseberry currant; gooseberry current; false gooseberry; red-fruit gooseberry

Synonyms: *Limnobototrya montigena*; *Ribes lacustre* var. *molle*; *Ribes lentum*; *Ribes nubigenum*

Description: Mountain gooseberry is a straggling shrub growing 1-5' tall. The branching stems are covered with prickles and hairs and nodes have 1-5 spines. The leaves are 1 ½" long with 3-5 lobes that are cleft almost to the base with bluntly toothed margins. The inflorescence is a few-flowered raceme of yellow and pink saucer like flowers with the typical currant form. The fruit are a red berry lacking prickles unlike many gooseberries.



Image 1–Typical spreading form of mountain gooseberry © 2024 Keir Morse (CC BY-NC-SA 3.0)

Image 2–Typical leaves and flowers of mountain gooseberry © 2024 Keir Morse (CC BY-NC-SA 3.0).

Image 3–Typical young branch of mountain gooseberry showing the prickles and hairs along the stem and the spines at the nodes. Image 4–Typical older branch of mountain gooseberry showing the prominent spines at the nodes and the lose of prickles along the stem. Image 5–The bright red

berries of mountain gooseberry. Note the lack of prickles typical of many gooseberries.

Information available at [Forest Service Fire Effects Information System](#).

Sierra Currant–*Ribes nevadense* (RINE)

Common names: Sierra currant; mountain pink currant; mountain pink current; Sierra pink currant; pink Sierra currant; Sierra Nevada currant; Sierran currant; Nevada currant

Synonyms: *Ribes glaucescens*; *Ribes ascendens*; *Ribes grantii*; *Ribes hittellianum*; *Ribes nevadense* var. *glaucescens*; *Ribes nevadense* var. *jaegeri*

Description: Sierra currant is a slender openly branched shrub 3 ½ to 6 ½” tall. The branches can be puberulent on young growth and lack spines on the nodes. The deciduous leaves are round with the upper surface resin dotted with 3-5 palmate lobes that are bluntly toothed and usually 3 ¼” long. The inflorescence is a spreading or drooping dense raceme of 8-20 flowers. The flowers are bright pink rose color of bell-shaped flowers with the typical currant flower form. Fruit is a blue-black berry.



Image 1–Sierra current’s general form showing arching branching pattern © Jean Pawek (CC BY 3.0). Image 2–Sierra currant’s 3-5 lobed leaf © 2009 Barry Breckling (CC BY-NC-SA 3.0). Image 3–The rose-pink flowers of the Sierra currant © 2024 Kier Morse (CC BY-NC-SA 3.0). Image 4– The blue black glandular haired berry of Sierra currant © 2013 Jean Pawek (CC BY 3.0).

Sierra Gooseberry–*Ribes roezlii* (RIRO)

Common names: sierra gooseberry; sierran gooseberry

Synonyms: *Grossularia roezlii*; *Ribes aridum*

Description: Sierra gooseberry is a stout spreading shrub 1 ½' to 4' tall. Young branches are pubescent but lack prickles with 1-3 nodal spines. The bright green leaves are 3-5 lobed with blunt teeth. The inflorescence raceme of 1-3 The flowers have a wine-purple tubular sepals with white petals with the typical gooseberry form. The fruit are purple to red with numerous stout spines and glandular bristles.



Image 1–The spreading form of Sierra gooseberry © 2016 John Doyen (CC BY-NC). Image 2–Palmately lobed leaf of Sierra gooseberry © 2016 John Doyen (CC BY-NC). Image 3–The red and white flower of Sierra gooseberry © 2008 Keir Morse (CC BY-NC-SA 3.0). Image 4–The a maturing red prickly berry of Sierra gooseberry © 2016 Jason Matthias Mills (CC BY-NC-ND 3.0)

[Information available at Forest Service Fire Effects Information System.](#)

Desert Gooseberry–*Ribes velutinum* (RIVE)

Common names: desert gooseberry; desert goose-berry; plateau gooseberry; Goodding's gooseberry

Synonyms: *Ribes glanduliferum*; *Ribes velutinum* var. *Glanduliferum*; *Ribes velutinum* var. *gooddingii*; *Ribes gooddingii*; *Grossularia velutina*

Description: Desert gooseberry is an upright stout shrub that is usually 2-6' tall. Nodes are armed with 1 to 3 stout spines. Leaves are palmately lobed with rounded teeth. The inflorescence is 1-4 flowered raceme. The white to light yellow, tubular flower is small, ½". The fruit is a yellow ripening to purple, glandularly hairy berry.



Image 1–The general form of desert gooseberry © 2014 Steve Matson (CC BY-NC 3.0). Image 2–The small palmately lobed leaves of desert gooseberry ©2015 Steve Matson (CC BY-NC 3.0). Image 3–The small yellow cuplike flower of desert gooseberry © 2016 John Doyen (CC BY-NC 3.0). Image 4–The green and red spineless fruit of desert gooseberry by Gabriel Campbell (Public Domain). Image 5–The typical leafing pattern of desert gooseberry showing the nodal spines.

[Information available at Forest Service Fire Effects Information System.](#)

Sticky Currant–*Ribes viscosissimum* (RIVI3)

Common names: sticky currant; sticky current; sticky flowering currant; sticky flowering-currant; sticky-flowering currant; sticky wild currant

Synonyms: *Ribes hallii*; *Ribes viscosissimum* var. *hallii*;

Description: Sticky currant is an erect shrub typically 3 to 6' tall. The foliage is fragrant 3 lobed cordate leaves. The inflorescence is a drooping raceme of 4 to 15 white tubular flowers with the typical currant form. The black berries are covered in a bluish wax.



Image 1–The typical upright form of sticky currant. Image 2–The three lobed cordate leaf of sticky currant showing the sticky glandular hairs. Image 3–The inflorescence of sticky currant showing the white to pink flowers. Image 4–The blue black berry of sticky currant. Note the glandular hairs. © 2022 Canbycontributor (CC SA 4.0)

Dogwood–Cornus

American Dogwood–*Cornus sericea* (COSE16)

Common names: American dogwood; redosier dogwood; creek dogwood; red dogwood

Synonyms: *Cornus alba* var. *californica*; *Cornus alba* var. *occidentalis*; *Cornus Xclalifornica*; *Cornus occidentalis*; *Cornus stolonifera* var. *californica*; *Cornus stolonifera* var. *occidentalis*; *Cornus alba*; *Cornus alba* var. *baileyia*; *Cornus alba* var. *interior*; *Cornus alba* var. *sibirica*; *Cornus baileyi*; *Cornus instolnea*; *Cornus interior*; *Cornus sericea* var. *interior*; *Cornus sericea* ssp. *stolonifera*; *Cornus stolonifera* var. *baileyi*; *Cornus stolonifera* var. *coloradensis*; *Cornus stolonifera* var. *interior*; *Cornus stolonifera* var. *stolonifera*; *Swida instolnea*; *Swida sericea*; *Swida stolonifera*

Subordinate Taxa: *Cornus sericea* ssp. *occidentalis*; *Cornus sericea* ssp. *sericea*

Descripton: American dogwood is an tall stoloniferous shrub, 3-20' tall, that can form dense thickets. The branches are thin and often bright red. The 2 to 6" leaves are opposite, simple and entire with the typical dogwood venation. The inflorescence is densely clustered flat-topped cyme of many simple white flowers. The fruit are white drupes.



Image 1–American dogwood along a creek © 2017 Jean Pawek (CC BY 3.0). Image 2–Winter branches of American dogwood © 2015 Jean Pawek (CC BY 3.0). Image 3–American dogwood leaf © 2012 Gary A. Monroe (CC BY-NC 3.0). Image 4–American dogwood inflorescence © 2020 Richard Spellenberg (CC BY-NC-SA 3.0). Image 5–American dogwood fruit © 2023 Zoya Akulova (CC BY-NC 3.0)

[Information available at Forest Service Fire Effects Information System.](#)

Elderberry–Sambucus

Blue Elderberry–*Sambucus mexicana* (SANIC4(formerly (SAME5))

Common Names: blue elderberry; common elderberry; American elder; American black elderberry

Synonyms: *Sambucus caerulea*; *Sambucus cerulea*; *Sambucus nigra* subsp. *caerulea*; *Sambucus nigra* subsp. *canadensis*; USDA Plants database recognizes this species as *Sambucus nigra* subsp. *canadensis*

Description: Blue elderberry is an erect somewhat woody shrub that reaches 2-12' tall. The branches are smooth yellow green with a distinct white pith. The leaves are pinnately compound and opposite with 3-9 leaflets. Leaflets are glabrous with an acute tip. Flowers are numerous small and white in a flat-topped inflorescence and very fragrant. Fruit are berries that are small purple black to blue with a white bloom.

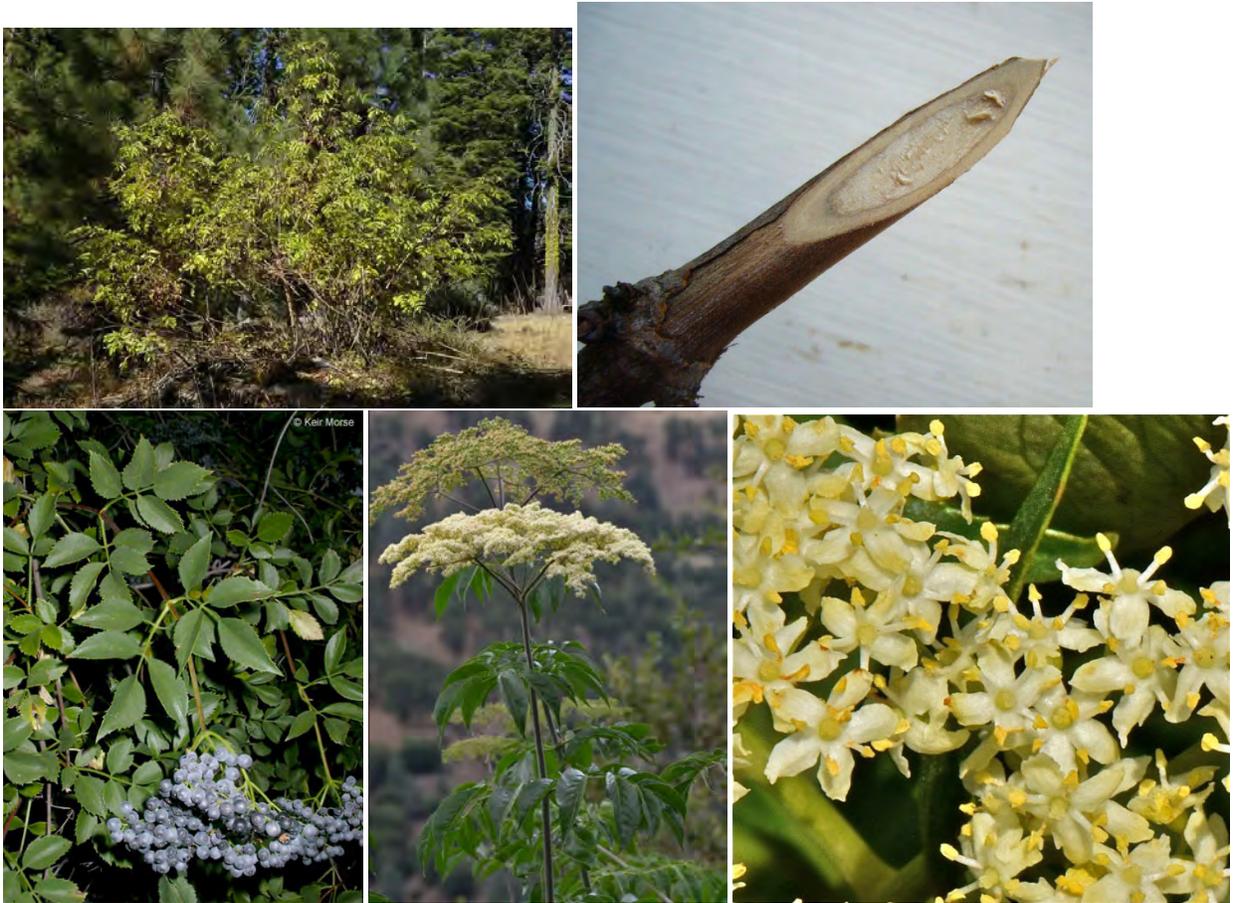


Image 1–General form of blue elderberry © 2013 Jean Pawek (CC BY 3.0). Image 2–A cross section of a branch from a blue elderberry showing the pith © 2011 Zoya Akulova (CC BY-NC 3.0). Image 3–Leaves and fruit of blue elderberry showing the opposite arrangement and general characteristics © 2016 Keir Morse (CC BY-NC-SA 3.0). Image 4–Flat topped inflorescence of blue elderberry © 2015 Barry Breckling (CC BY-NC-SA 3.0). Image 5–Close-up of the flowers of blue elderberry © 2019 John Doyen (CC BY-NC 3.0)

Red Elderberry–*Sambucus racemosa* (SARA2)

Common Names: red elderberry; red elder; stinking elderberry; scarlet elderberry; stinking elder; bunchberry elder

Synonyms: *Sambucus microbotrys*; *Sambucus pubens*

Subordinate Taxa: *Sambucus racemosa* var. *melanocarpa*; *Sambucus* l var. *racemosa*

Description: Red elderberry is an erect somewhat woody shrub that reaches 7-20' tall. The branches are pubescent yellow green with a distinct white pith. The leaves are pinnately compound and opposite with 5-7 leaflets. Leaflets are glabrous with an acute tip. The foliage has a strong distinctive odor. Flowers are numerous small and white in a cyme and very fragrant. The fruit are red berries



Image 1–General form of red elderberry © 2006 Charles E. Jones (CC BY 3.0). Image 2–Pinnately compound leaf of red elderberry © 2022 Zoya Akulova (CC BY-NC 3.0). Image 3–Inflorescence of red elderberry © 2022 Zoya Akulova (CC BY-NC 3.0). Image 4–Red fruit of red elderberry © 2012 Jason Mthias Mills (CC BY=NC-ND 3.0)

[USDA NRCS Plant Guide](#)

[Information available at Forest Service Fire Effects Information System.](#)

Ephedra–Ephedra

Green Ephedra–*Ephedra viridis* (EPVI)

Common names: green ephedra; green Mormon tea; green Mormon-tea; green jointfir; green jointfir; mountain ephedra; mountain joint fir; joint fir

Synonyms: *Ephedra nevadensis* var. *pluribracteata*; *Ephedra nevadensis* subvar. *pluribracteata*; *Ephedra nevadensis* var. *viridis*

Description: Green ephedra is a evergreen erect shrub reaching $\frac{3}{4}$ to 5' tall. It's numerous green branches point upward forming a broom like appearance. The branches have prominent node that resemble joints. The small inconspicuous scale like leaves are associated with the joints. Green ephedra is a gymnosperm and does not have flowers. It does have cones. Green ephedra is dioicous and produces male and female cones on different plants. The pollen cones are spherical to ovoid and $\frac{1}{4}$ " long. The female cones are ovoid and $\frac{1}{3}$ " long.



Image 1–Green ephedra typically has a broom-like appearance © 2013 Jean Pawek (CC by 3.0).

Image 2–A close-up of the general appearance of older and younger branches as well as the small inconspicuous leaves at the joints. © 2015 Steve Matson (CC BY-NC 3.0). Image 3–Green ephedra male cone © 2017 John Doyen (CC BY-NC). Image 4–Green ephedra female cone © Jean Pawek (CC BY-NC 3.0)

[Information available at Forest Service Fire Effects Information System.](#)

Honeysuckle–Lonicera

Purpleflower Honeysuckle–*Lonicera conjugialis* (LOC05)

Common names: purple-flowered honeysuckle; purple flowered honeysuckle; purple-flower honeysuckle; purple flower honeysuckle; purpleflower honeysuckle; double-flowered honeysuckle; double flowered honeysuckle; double honeysuckle; wedded honeysuckle

Synonyms: None found.

Description: Purpleflower honeysuckle is a slender stemmed straggly shrub reaching 5' tall. The leaves are are oblong obovate thin and light green tending toward hairy and 3" long. The flowers are generally paired in leaf axils. The purple flowers are small $\frac{3}{8}$ " lon. The fruit is a bright red berry often the two paired berries fused.

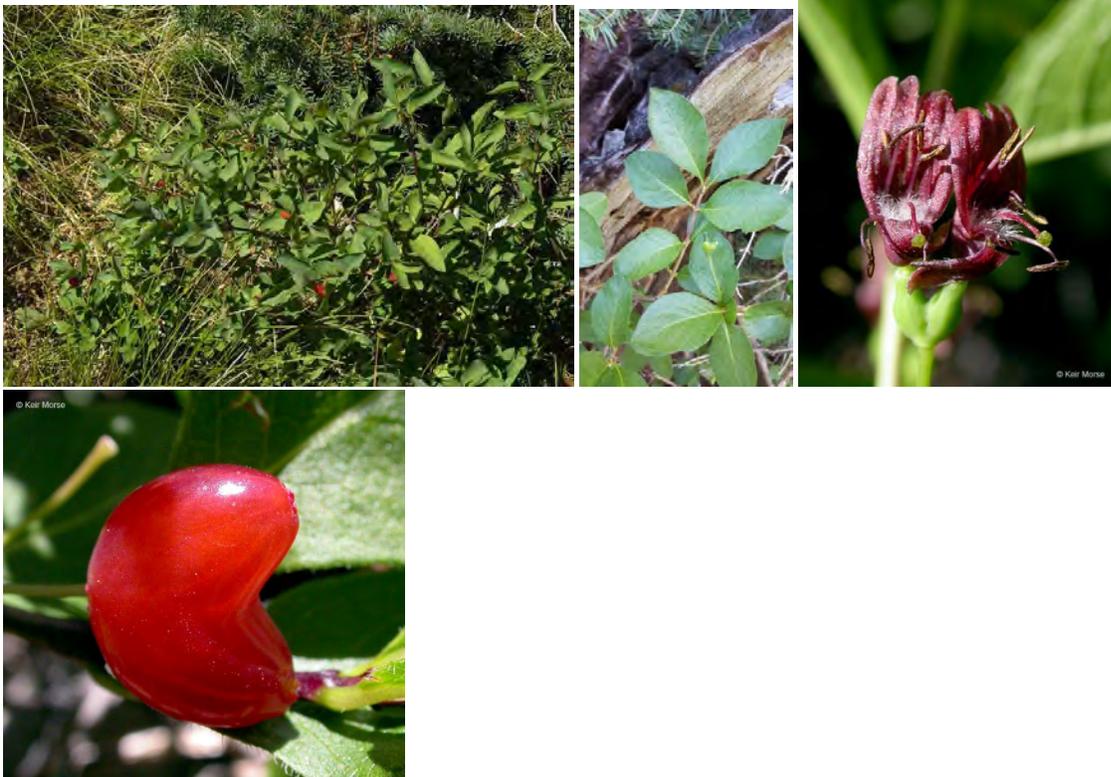


Image 1–Purpleflower honeysuckle is a slender straggly shrub © 2012 Jean Pawek (CC BY 3.0).

Image 2–Purpleflower honeysuckle leaves are oppiste and bright green. © 2017 Julie Kierstead

Nelson (CC BY-NC 3.0). Image 3–The purpleflower honeysuckle’s flower petals are fused typical of

honeysuckles © 2010 Keir Morse (CC BY-NC-SA 3.0). Image 4–The red berries of purpleflower

honeysuckle often fuse together © 2010 Keir Morse (CC BY-NC-SA 3.0)

Huckleberry–*Vaccinium*

Dwarf bilberry–*Vaccinium caespitosum* (VACE)

Common names: dwarf bilberry; dwarf huckleberry; dwarf whortleberry; Sierra bilberry; marsh hummock huckleberry; dwarf blueberry; swamp blueberry; dwarf grouseberry

Synonyms: *Vaccinium caespitosum* var. *angustifolium*; *Vaccinium caespitosum* var. *cunifolium*; *Vaccinium caespitosum* var. *paulidicolum*; *Vaccinium arbusculum*; *Vaccinium caespitosum* var. *arbuscula*; *Vaccinium nivictum*; *Vaccinium paulidicolum*; *Vaccinium caespitosum*; *Vaccinium caespitosum* var. *caespitosum*; *Vacciniumcaespitosum* var. *paludicola*; *Vaccinium caespitosum* var. *arbuscula*; *Vaccinium caespitosum* var. *caespitosum*; *Vaccinium caespitosum* var. *paludicola*;

Description: Dwarf bilberry is a short spreading rhizomatous shrub, 2 to 20” tall. Branches are green when young but age to reddish or brown. The bark has a shredded appearance. The alternate bright green leaves are elliptic ½ to 2” long. Flowers are typical white to pink urn-shaped flowers of blueberries. The berry is spherical and dark blue to black with a glaucous bloom.



Image 1–Dwarf bilberry is a low spreading shrub © 2010 Keir Morse (CC BY-NC-SA 3.0). Image 2–The leaves of dwarf bilberry are bright green often with a glaucous bloom © 2009 Barry Breckling (CC BY-NC-SA 3.0). Image 3–The pink urn shaped flowers of dwarf bilberry © 2015 Barry Breckling (CC BY-NC-SA 3.0). Image 4–The dark blue berry of dwarf bilberry © 2010 Keir Morse (CC BY-NC-SA 3.0)

[From Forest Service Fire Effects Information System.](#)

Manzanita–Arctostaphylos

pinemat manzanita–*Arctostaphylos nevadensis* (ARNE)

Common names: pinemat manzanita; kinnikinnick

Synonyms: *Arctostaphylos pungens*

Subordinate Taxa: *A. nevadensis* ssp. *nevadensis*

Descripton: Pinemat manzanita is a low growing and spreading shrub typically less than 2' tall. Young twigs can be gray puberulent maturing to smooth brownish to deep red. Leaves are small, ½ to 1", ovate to elliptical and shiny green. The flowers are typical of manzanita. They are small, ¼ to ½" white and urn shaped. The fruit is a many seeded, spherical, berry-like drupe.



Image 1–Pinemat manzanita is a prostrate scrambling ground cover like shrub © 2010 Keir Morse (CC BY-NC-SA 3.0). Image 2–A pinemat manzanita leaf and young stem © 2008 Steve Matson (CC BY-NC 3.0). Image 3–Pinemat manzanita flowers ©2005 Steve Matson (CC BY-NC 3.0). Image 4– Ripening fruit of pinemat manzanita © 2010 Barry Breckling (CC BY-NC-SC 3.0).

[From Forest Service Fire Effects Information System.](#)

Rose–Rosa

Wood's rose–*Rosa woodsia*(ROWO)

Common Names: Wood's rose; interior rose; common wild rose; mountain rose; pear-hip rose; prairie rose; Dendler rose; wild rose; Tehachapi rose

Synonyms: *Rosa ultramontana*; *Rosa woodsii* var. *granulifera*; *Rosa woodsii* var. *arizonica*; *Rosa arizonica*;

Subordinate Taxa *Rosa woodsii* subsp. *ultramontana*; *Rosa woodsii* var. *gratissima*

Description: Wood's rose is a deciduous shrub that typically forms dense thickets growing 3-10' tall. The stems of wood rose have thin red to grey bark with numerous prickles. The leaves are alternate pinnately compound with 5-7 leaflets. The leaflets are obovate and finely toothed. The flowers typically pink and occur as clusters although often occur singly. The fruit is a fleshy, red hip filled with hairy nutlets.



Image 1–Wood's Rose thicket under aspen. ©2015 Barry Breckling (CC BY-NC-SA 3.0). Image 2–The stem of Wood's rose with red bark and covered with prickles © 2015 Steve Matson (CC BY-NC 3.0). Image 3–Wood's rose leaves showing the pinnately compound leaves © 2021 Steve Matson (CC BY-NC 3.0). Image 4–Pink 5 petaled flower of Wood's rose © 2020 Jean Pawek (CC BY 3.0). Image 5–A mature rose hip of Wood's rose.

[USDA NRCS Plant Guide](#)

[Information available at Forest Service Fire Effects Information System.](#)

Snowberry–*Symphoricarpos*

Creeping snowberry–*Symphoricarpos mollis* (SYMO)

Common Names: creeping snowberry; trailing snowberry; spreading snowberry; soft-haired snowberry; Nuttall's snowberry; low-growing snowberry; Southern California snowberry; southern California snowberry; California creeping snowberry; California creeping snow-berry; California creeping snow berry; trip-vine snowberry; tripvine snowberry; trip-vine; trip vine; tripvine

Synonyms: *Symphoricarpos albus* var. *mollis*; *Symphoricarpos hesperius*;

Description: Creeping Snowberry is a spreading shrub 1-2' tall. The branches often trail along the ground for 3-6'. Leaves are opposite thin and pale green. The flowers are white to pink blushing red and bell shaped. Fruit are white berries.



Image 1–Creeping snowberry has a sprawling nature © 2014 Jean Pawek (CC BY 3.0). Image 2– Creeping snowberry has thin light green opposite leaves © 2014 Jean Pawek (CC BY 3.0). Image 3– The leaves of can become lobed under certain conditions © 2019 Roberto R. Calderón (CC BY-NC 3.0). Image 4–The pink to red flowers of creeping snowberry ©2018 Jasn Matthias Mills (CC BY-NC-ND 3.0). Image 5– The white fruit of creeping snowberry © 2009 Barry Breckling (CC BY-NC-SA 3.0).

[Information available at Forest Service Fire Effects Information System.](#)

roundleaf snowberry–*Symphoricarpos rotundifolius* (SYRO)

Common Names: roundleaf snowberry; round-leaved snowberry; long flowered snowberry; mountain snowberry

Synonyms: *S. austinae*; *S. glabratus*; *S. glaucus*; *S. montanus*; *S. oreophilus* var. *utahensis*; *S. parvifolius*; *S. rotundifolius* var. *vaccinioides*; *S. tetonesis*; *S. utahensis*; *S. vaccinioides*; *S. oreophilus*

Subordinate Taxa: *S. rotundifolius* var. *rotundifolius*;

Roundleaf snowberry is a rhizomatous shrub 2 to 4 feet tall with arching branches. Young stems and puberulent, coated in small fuzzy hairs. Old bark has a shredded appearance. Leaves are opposite, elliptic $\frac{1}{4}$ to $\frac{3}{4}$ inches long and relatively thin. Flowers are white and bell shaped. Fruit are white berry like drupes about $\frac{1}{2}$ " wide.



Image 1–Shows the general form of roundleaf snowberry. © 2010 Jean Pawek (CC BY 3.0). Image 2–Shows the thin pale green leaves of roundleaf snowberry and the bell like flowers © 2017 Thayne Tuason (CC BY-NC 3.0). Image 3–Shows the white berry like drupes © 2025 Jason Matthias Mills (CC BY-NC-ND 3.0). Image 4–Shows the opposite arrangement of the leaves and the puberulent stems of younger branches Gabriel Campbell (Public Domain)

[From Forest Service Fire Effects Information System for mountain snowberry \(*S. oreophilus*\).](#)

Serviceberry–Amelanchier

Saskatoon Serviceberry–*Amelanchier alnifolia* (AMAL2)

Common Names: saskatoon serviceberry; shadbush; saskatoon; saskatoon service-berry, service-berry, juneberry, western serviceberry; pallid serviceberry

Subordinate Taxa: *Amelanchier alnifolia* var. *pumila*; *Amelanchier alnifolia* var. *semiintergrifolia*

Description: Saskatoon serviceberry is a deciduous erect shrub 3-26' tall that often forms thickets. The branches glabrous and typically grey though they can get red tinges. The leaves are ovate with only at the tips to just past the middle of the leaf. The underside of the leaves are glabrous in fruit. The flowers white 5 petals with petals strap-like. Styles are 4 to 5. Berries are purple black often with a waxy bloom. The flesh of the berry can be pulpy.



Image 1–General upright appearance of saskatoon serviceberry © 23021 Jean Pawek (CC BY 3.0).

Image 2–The leaves of saskatoon serviceberry are typically toothed to just past the middle. (c) 2021

Jean Pawek (CC BY 3.).

Image 3–The white strap like petals of saskatoon serviceberry often make

them look messy © 2019 John Doyen (CC BY-NC 3.0). Image 4–The blue-black berries of saskatoon

serviceberry often have a waxy bloom on them © 2016 Keir Morse (CC BY-NC-SA 3.0)

[USDA NRCS Plant Guide](#)

[Information available at Forest Service Fire Effects Information System.](#)

Utah serviceberry– *Amelanchier utahensis* (AMUT)

Common Names: Utah serviceberry; Utah service-berry; Utah service berry; Utah serviceberry; Utah serviceberry; Utah juneberry; Utah Juneberry; Utah shadberry; pale-leaved serviceberry; pallid serviceberry [*Amelanchier pallida*]; pallid service-berry [*Amelanchier pallida*]; pallid service berry [*Amelanchier pallida*]; pale serviceberry [*Amelanchier pallida*]; pale service-berry [*Amelanchier pallida*]; slender service-berry [*Amelanchier pallida*]

Synonyms: *Amelanchier pallida* Note: *Amelanchier pallida* is recognized as unique species in the USDA Plants database and where it has a listed synonym of *Amelanchier florida* var. *gracilis*. *Amelanchier florida* is listed as synonym for *Amelanchier alnifolia* var. *semiintegrifolia*. Utah serviceberry also hybridizes with saskatoon serviceberry.

Descriptions: : Utah serviceberry is a deciduous erect shrub 1-15' tall that often forms thickets. The branches white hairy and typically grey though they can get red tinges. The leaves are ovate with only at the tips to just past the middle of the leaf. The underside of the leaves are finely hairy in fruit. The flowers white 5 petals with petals strap-like. Styles are 2-4 occasionally 5. Berries are purple black often with a waxy bloom. The flesh of the berry can be pulpy.



Image 1–General form of Utah serviceberry © 2013 Jean Pawek (CC BY 3.0). Image 2–Underside of the leaf of Utah serviceberry © 2021 gilbertj (CC BY-NC 3.). Image 3–Flower of Utah serviceberry © 2010 Barry Breckling (CC BY-NC-SA 3.0). Image 4– Blue-black fruit of Utah serviceberry. © 2018 Dayan J. Anderson

Appendix

Useful Links and Resources

The USDA PLANTS Database is useful to get species names find plant guides, determine a plants status and locate other resources.

[USDA Plants Database](#)

CalFlora is a great way to obtain county checklists determine where a species is located in California .

[Calflora - A nonprofit database providing information on wild California plants](#)

The Jepson eFlora is a great resource to help identify plants.

[California Flora, Jepson eFlora Main Page](#)

CalPhotos has hundreds of photos of plants to help with identification:

[CalPhotos](#)

iNaturalist is a great resource but be wary that it can have images misidentified.

[A Community for Naturalists · iNaturalist](#)

The fire effects information system is a great resource to find information about how fire impacts a species or how it impacts fire regimes. Can be technical and is designed primarily for managers.

[Home page, Fire Effects Information System](#)

List of Shrubs Observed in Alpine County

Genera Common Name	Common Name	Taxon	Symbol	Plant Guide	Fire Effects
Alder	Creek alder	<i>Alnus incana</i> ssp. <i>tenuifolia</i>	ALINT	n	n
Alder	Gray alder	<i>Alnus incana</i>	ALIN2	y	y
Alder Buckthorn	Obtuse buckthorn	<i>Frangula rubra</i> ssp. <i>obtusissima</i>	FRRUO	n	n
Alder Buckthorn	Red buckthorn	<i>Frangula rubra</i>	FRRU	n	n
Alder Buckthorn	Red buckthorn	<i>Frangula rubra</i> ssp. <i>rubra</i>	FRRUR	n	n
Barberry	Creeping oregon grape	<i>Berberis aquifolium</i> var. <i>repens</i>	MARE11	n	y
Barberry	Mountain grape	<i>Berberis aquifolium</i>	MAAQ2	n	n
Birch	Water birch	<i>Betula occidentalis</i>	BEOC2	y	y
Bitterbrush	Antelope bitterbrush	<i>Purshia tridentata</i> var. <i>tridentata</i>	PUTR2	y	y
Bitterbrush	Antelope bush	<i>Purshia tridentata</i>	PUTR2	y	y
Blackberry	Himalayan blackberry	<i>Rubus armeniacus</i>	RUAR9	y	y
Blackberry	Thimbleberry	<i>Rubus parviflorus</i>	RUPA	n	y
Blackberry	White bark raspberry	<i>Rubus leucodermis</i>	RULE	n	n
Blueberry	Blueberry	<i>Vaccinium uliginosum</i>	VAUL	n	y
Blueberry	Dwarf bilberry	<i>Vaccinium cespitosum</i>	VACE	n	y
Blueberry	Western blueberry	<i>Vaccinium uliginosum</i> ssp. <i>occidentale</i>	VAUL	n	y
Brickelbushes	California brickellia	<i>Brickellia californica</i>	BRCA3	n	n
Buckthorn	Redberry	<i>Rhamnus crocea</i>	RHCR	n	n
Buckwheat	Alpine slender buckwheat	<i>Eriogonum microthecum</i> var. <i>alpinum</i>	ERMIA	n	n
Buckwheat	Marum leaved buckwheat	<i>Eriogonum marifolium</i>	ERMA4	n	n
Buckwheat	Marum leaved buckwheat	<i>Eriogonum marifolium</i> var. <i>marifolium</i>	ERMA4	n	n
Buckwheat	Naked buckwheat	<i>Eriogonum nudum</i>	ERNU3	y	n
Buckwheat	Naked buckwheat	<i>Eriogonum nudum</i> var. <i>deductum</i>	ERNUD2	n	n

Genera Common Name	Common Name	Taxon	Symbol	Plant Guide	Fire Effects
Buckwheat	Nude buckwheat	Eriogonum nudum var. nudum	ERNUN	n	n
Buckwheat	Wright's buckwheat	Eriogonum wrightii	ERWR	n	n
Buckwheat	Wright's buckwheat	Eriogonum wrightii var. subscaposum	ERWRS	n	n
Buffalo berry	Buffalo berry	Shepherdia argentea	SHAR	y	y
Ceanothus	Buck brush	Ceanothus cuneatus	CECU	y	y
Ceanothus	Buck brush	Ceanothus cuneatus var. cuneatus	CECUC3	n	n
Ceanothus	Deer brush	Ceanothus integerrimus	CEIN3	n	y
Ceanothus	Mahala mat	Ceanothus prostratus var. prostratus	CEPR	n	n
Ceanothus	Mahala mats	Ceanothus prostratus	CEPR	n	n
Ceanothus	Pinemat	Ceanothus diversifolius	CEDI2	n	n
Ceanothus	Tobacco brush, snowbrush	Ceanothus velutinus	CEVE	n	y
Ceanothus	Whitethorn x tobacco brush	Ceanothus Xlorenzenii	CELO2	n	n
Cherry	Bitter cherry	Prunus emarginata	PREM	y	y
Cherry	Chokecherry	Prunus virginiana	PRVI	y	y
Cherry	Desert peach	Prunus andersonii	PRAN2	n	y
Cherry	Western choke cherry	Prunus virginiana var. demissa	PRVID	y	n
Chinquapin	Sierra chinquapin	Chrysolepis sempervirens	CHSE11	n	y
Cinquefoil	Shrubby cinquefoil	Dasiphora fruticosa	DAFR6	n	y
Currant	Alpine gooseberry	Ribes lasianthum	RILA2	n	n
Currant	Desert gooseberry	Ribes velutinum	RIVE	n	y
Currant	Golden currant	Ribes aureum	RIAU	y	y
Currant	Mountain gooseberry	Ribes montigenum	RIMO2	n	y
Currant	Mountain pink currant	Ribes nevadense	RINE	n	n
Currant	Sierra gooseberry	Ribes roezlii	RIRO	n	y
Currant	Sierra gooseberry	Ribes roezlii var. roezlii	RIROR	n	n

Genera Common Name	Common Name	Taxon	Symbol	Plant Guide	Fire Effects
Currant	Sticky currant	Ribes viscosissimum	RIVI3	n	n
Currant	Wax currant	Ribes cereum	RICE	n	y
Currant	Wax currant	Ribes cereum var. cereum	RICEC2	n	n
Currant	White stemmed gooseberry	Ribes inerme	RIIN2	n	n
Currant	White stemmed gooseberry	Ribes inerme var. inerme	RIINI	n	n
Dogwood	American dogwood	Cornus sericea	COSE16	y	y
Dogwood	Red osier dogwood	Cornus sericea ssp. sericea	COSES	y	n
Dogwood	Western dogwood	Cornus sericea ssp. occidentalis	COSEO	y	n
Elderberry	Elderberry	Sambucus mexicana	SANIC4	y	n
Elderberry	Red elderberry	Sambucus racemosa	SARA2	y	y
Elderberry	Red elderberry	Sambucus racemosa var. racemosa	SARAR3	n	n
Elderberry	Rocky mountain elder	Sambucus racemosa var. melanocarpa	SARAM4	n	n
Ephedra	Green ephedra	Ephedra viridis	EPVI	y	y
Goldenbrush	Bloomer's goldenbrush	Ericameria bloomeri	ERBL2	n	n
Goldenbrush	Common rabbitbrush	Ericameria nauseosa var. hololeuca	ERNAH	n	n
Goldenbrush	Greene's goldenbush	Ericameria greenei	ERGR16	n	n
Goldenbrush	Heath goldenrod	Ericameria suffruticosa	ERSU13	n	n
Goldenbrush	Parry's rabbitbrush	Ericameria parryi	ERPA30	n	n
Goldenbrush	Parry's rabbitbrush	Ericameria parryi var. monocephala	ERPAM3	n	n
Goldenbrush	Parry's rabbitbrush	Ericameria parryi var. nevadensis	ERPAN2	n	n
Goldenbrush	Rayless goldenbush	Ericameria discoidea	ERDI14	n	n
Goldenbrush	Rock goldenbush	Ericameria cuneata	ERCU7	n	n
Goldenbrush	Rubber rabbitbrush	Ericameria nauseosa	ERNA10	y	y
Goldenbrush	Rubber rabbitbrush	Ericameria nauseosa var. speciosa	ERNAS2	n	n
Hawthorn	Douglas' hawthorn	Crataegus douglasii	CRDO2	y	y

Genera Common Name	Common Name	Taxon	Symbol	Plant Guide	Fire Effects
Honeysuckle	Coast twinberry	Lonicera involucrata	LOIN5	y	n
Honeysuckle	Purpleflower honeysuckle	Lonicera conjugialis	LOCO5	n	n
Honeysuckle	Sweet berry honeysuckle	Lonicera cauriana	LOCAC3	n	n
Honeysuckle	Twinberry	Lonicera involucrata var. involucrata	LONINI	n	n
Hop Sage	Hop sage	Grayia spinosa	GRSP	n	y
Horsebrush	Gray horsebrush	Tetradymia canescens	TECA2	y	y
Horsebrush	Little leaf horsebrush	Tetradymia glabrata	TEGL	n	y
Ipomopsis	Narrow tube ipomopsis	Ipomopsis tenuituba	IPTE4	n	n
Juniper	Common juniper	Juniperus communis	JUCO6	n	y
Juniper	Common juniper	Juniperus communis var. depressa	JUCOD	n	n
Juniper	Common juniper	Juniperus communis var. jackii	JUCOM2	n	n
Juniper	Common juniper	Juniperus communis var. saxatilis	JUCOM2	n	n
Juniper	Utah juniper	Juniperus osteosperma	JUOS	n	y
Keckiellas	Gaping keckiella	Keckiella breviflora	KEBR	n	n
Keckiellas	Gaping penstemon	Keckiella breviflora var. breviflora	KEBRB	n	n
Keckiellas	Hairless gaping keckiella	Keckiella breviflora var. glabrisepala	KEBRG	n	n
Lupine	Grape lupine	Lupinus excubitus	LUEX	n	n
Lupine	Grape lupine	Lupinus excubitus var. excubitus	LUEXE	n	n
Manzanita	Green leaf manzanita	Arctostaphylos patula	ARPA6	y	y
Manzanita	Pine mat manzanita	Arctostaphylos nevadensis	ARNE	y	y
Manzanita	Pine-mat manzanita	Arctostaphylos nevadensis ssp. nevadensis	ARNE	y	y
Maple	Mountain maple	Acer glabrum	ACGL	y	y
Maple	Mountain maple	Acer glabrum var. diffusum	ACGLD3	n	n
Maple	Rocky mountain maple	Acer glabrum var. glabrum	ACGLG2	n	n
Matrimony Vine	Matrimony vine	Lycium barbarum	LYBA4	n	n

Genera Common Name	Common Name	Taxon	Symbol	Plant Guide	Fire Effects
Meadowsweet	Rose meadowsweet	Spiraea splendens	SPSP2	n	n
Mistletoe	Mistletoe	Phoradendron juniperinum	PHJU	n	n
Mock Orange	Wild mock orange	Philadelphus lewisii	PHLE4	y	y
Moss Heather	Western moss heather	Cassiope mertensiana	CAME7	n	n
Mountain Ash	California mountain ash	Sorbus californica	SOCA8	n	n
Mountain Ash	Western mountain ash	Sorbus sitchensis	SOSI2	n	y
Mountain Heather	Brewer's mountain heather	Phyllodoce breweri	PHBR4	n	n
Mountain Laurel	Mountain laurel	Kalmia polifolia	KAPO	n	n
Mountain Mahogany	Birch leaf mountain mahogany	Cercocarpus betuloides	CEMOG	n	y
Mountain Mahogany	Birch leaf mountain mahogany	Cercocarpus betuloides var. betuloides	CEMOG	n	y
Mountain Mahogany	Curl leaf mountain mahogany	Cercocarpus ledifolius var. ledifolius	CELEL	n	n
Mountain Mahogany	Curl leaved mountain mahogany	Cercocarpus ledifolius var. intermontanus	CELEI	n	n
Mountain Mahogany	Desert mountainmahogany	Cercocarpus ledifolius	CELE3	n	y
Nightshade	Blue witch	Solanum umbelliferum	SOUM	n	n
Nightshade	Hoe nightshade	Solanum physalifolium	SOPH	n	n
Nightshade	Nightshade	Solanum xanti	SOXA	n	n
Oak	Huckleberry oak	Quercus vacciniifolia	QUVA	n	y
Oceanspray	Oceanspray	Holodiscus discolor	HODI	y	y
Oceanspray	Oceanspray	Holodiscus discolor var. discolor	HODI	y	y
Oceanspray	Rock spiraea	Holodiscus discolor var. glabrescens	HODI	y	y
Oceanspray	Small-leaf creambush	Holodiscus discolor var. microphyllus	HODI	y	y
Prickly Phlox	Granite prickly phlox	Linanthus pungens	LIPU11	n	y
Rabbitbrush	Green rabbitbrush	Chrysothamnus viscidiflorus	CHVI8	y	y
Rabbitbrush	Sticky leaved rabbitbrush	Chrysothamnus viscidiflorus ssp. lanceolatus	CHVIL4	n	n

Genera Common Name	Common Name	Taxon	Symbol	Plant Guide	Fire Effects
Rabbitbrush	Sticky leaved rabbitbrush	Chrysothamnus viscidiflorus ssp. viscidiflorus	CHVIV2	n	n
Rhododendron	Western labrador tea	Rhododendron columbianum	LECO8	n	y
Rose	Ahart rose	Rosa pisocarpa ssp. ahartii	ROPIA	n	n
Rose	California wild rose	Rosa californica	ROCA2	y	n
Rose	Cluster rose	Rosa pisocarpa	ROPI2	n	n
Rose	Interior rose	Rosa woodsii ssp. ultramontana	ROWOU	y	n
Rose	Tehachapi rose	Rosa woodsii var. gratissima	ROWOG2	y	n
Rose	Wood rose	Rosa bridgesii	ROBR3	n	n
Rose	Woods' rose	Rosa woodsii	ROWO	y	y
Sagebrush	Big sagebrush	Artemisia tridentata ssp. tridentata	ARTRT	y	y
Sagebrush	Black sagebrush	Artemisia arbuscula	ARAR8	y	y
Sagebrush	Bolander's silver sagebrush	Artemisia cana ssp. bolanderi	ARCAB3	n	n
Sagebrush	Common sagebrush	Artemisia tridentata	ARTR2	y	n
Sagebrush	Low sagebrush	Artemisia arbuscula ssp. arbuscula	ARARA	n	n
Sagebrush	Mountain sagebrush	Artemisia tridentata ssp. vaseyana	ARTRV	y	y
Sagebrush	Rothrock sagebrush	Artemisia rothrockii	ARRO4	n	n
Sagebrush	Silver sagebrush	Artemisia cana	ARCA13	n	y
Sagebrush	Threetip sagebrush	Artemisia tripartita	ARTR4	y	y
Sagebrush	Warm springs low sagebrush	Artemisia arbuscula ssp. thermopola	ARART	n	n
Sagebrush	Wyoming sagebrush	Artemisia tridentata ssp. wyomingensis	ARTRW8	y	y
Service Berry	Dwarf service berry	Amelanchier alnifolia var. pumila	AMPU5	n	n
Service Berry	Pale leaved serviceberry	Amelanchier utahensis	AMUT	y	y
Service Berry	Pallid service berry	Amelanchier pallida	AMPA2	n	n
Service Berry	Service berry	Amelanchier alnifolia	AMAL2	y	y

Genera Common Name	Common Name	Taxon	Symbol	Plant Guide	Fire Effects
Silk Tassel	Fremont's silk tassel	Garrya fremontii	GAFR	n	Ƴ
Silverberry	Russian olive	Elaeagnus angustifolia	ELAN	Ƴ	Ƴ
Snowberry	Common snowberry	Symphoricarpos albus	SYAL	Ƴ	Ƴ
Snowberry	Desert snowberry	Symphoricarpos longiflorus	SYLO	n	Ƴ
Snowberry	Mountain snowberry	Symphoricarpos rotundifolius	SYRO	n	n
Snowberry	Snowberry	Symphoricarpos mollis	SYMO	n	Ƴ
Snowberry	Snowberry	Symphoricarpos rotundifolius var. rotundifolius	SYROR	n	n
Tamarisk	Tamarisk	Tamarix ramosissima	TARA	n	Ƴ
Whitethorn	Mountain whitethorn	Ceanothus cordulatus	CECO	Ƴ	Ƴ
Willow	Alpine willow	Salix petrophila	SAPE18	n	n
Willow	Arroyo willow	Salix lasiolepis	SALA6	n	n
Willow	Coulter willow	Salix sitchensis	SASI2	Ƴ	n
Willow	Drummond's willow	Salix drummondiana	SADR	Ƴ	Ƴ
Willow	Dusky willow	Salix melanopsis	SAME2	n	n
Willow	Geyer's willow	Salix geyeriana	SAGE2	n	Ƴ
Willow	Jepson's willow	Salix jepsonii	SAJE	n	n
Willow	Lemmon's willow	Salix lemmonii	SALE	Ƴ	Ƴ
Willow	Mountain willow	Salix eastwoodiae	SAEA	n	n
Willow	Narrowleaf willow	Salix exigua	SAEX	Ƴ	Ƴ
Willow	Sandbar willow	Salix exigua var. hindsiana	SAEX	Ƴ	Ƴ
Willow	Scouler willow	Salix scouleriana	SASC	n	Ƴ
Willow	Sierra willow	Salix orestera	SAOR	n	n
Willow	Snow willow	Salix nivalis	SANI8	n	n
Willow	Strapleaf willow	Salix ligulifolia	SALI	n	n

Genera Common Name	Common Name	Taxon	Symbol	Plant Guide	Fire Effects
Willow	Yellow willow	Salix lutea	SALU2	n	y