

Ecological site R023XY063NV SHALLOW GRANITIC HILL 10-14 P.Z.

Last updated: 4/10/2025
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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

Ecological site concept

Currently there is only a draft of the initial concept for this ecological site. The initial concept for this site places it within the Loamy Aridic Plateaus Low Production Wyoming and Lahontan Sagebrush sites w Sparse Juniper Ecological Site Group. To view the General STM and other information available for this ESG please go to <https://edit.jornada.nmsu.edu/catalogs/esg/023X/R023XY910NV>

This site is slightly less productive than the modal site with 250 lbs/ac in normal years. The soils in this site are very shallow, well drained, and formed in residuum and colluvium from granitic rocks with additions of calcareous aeolian material. Similar to the modal site, these soils have a very low available water capacity and potential for sheet and rill erosion is high. The plant community is similar to the modal site but with more purple sage (*Salvia dorrii*) and the potential for mature Utah juniper with canopy cover less than 15% and trees averaging less than 12 feet in height. This model is similar to the group modal site with four stable states.

Associated sites

F023XY036NV	JUOS/ARTRV/PSSPS
F023XY045NV	JUOS/ARARL3/ACTH7/ACSP12
F023XY046NV	JUOS/ARTRTW8/ACTH7/ACSP12
R024XY045NV	ERODED SLOPE 6-10 P.Z.

Similar sites

F023XY045NV	JUOS/ARARL3/ACTH7/ACSP12 JUOS average >12 feet in height and >15% tree canopy
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia arbuscula var. longiloba</i>
Herbaceous	(1) <i>Achnatherum thurberianum</i>

Physiographic features

This site occurs on convex backslopes of hills and lower elevation mountains on all aspects. Slope gradients of 15 to 75 percent are typical. Elevations are 4400 to about 5900 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain (2) Hill
Elevation	1,341–1,798 m
Slope	15–75%
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is semiarid and characterized by cool, moist winters and warm, dry summers. Average annual precipitation is 10 to 14 inches. Mean annual air temperature is 48 to 52 degrees F. The average growing season is about 80 to 120 days.

Nevada's climate is predominantly arid, with large daily ranges of temperature, infrequent severe storms, heavy snowfall in the higher mountains, and great location variations with elevation. Three basic geographical factors largely influence Nevada's climate: continentality, latitude, and elevation. Continentality is the most important factor. The strong continental effect is expressed in the form of both dryness and large temperature variations. Nevada lies on the eastern, lee side of the Sierra Nevada Range, a massive mountain barrier that markedly influences the climate of the State. The prevailing winds are from the west, and as the warm moist air from the Pacific Ocean ascend the western slopes of the Sierra Range, the air cools, condensation occurs and most of the moisture falls as precipitation. As the air descends the eastern slope, it is warmed by compression, and very little precipitation occurs. The effects of this mountain barrier are felt not only in the West but throughout the state, with the result that the lowlands of Nevada are largely desert or steppes. The temperature regime is also affected by the blocking of the inland-moving maritime air. Nevada sheltered from maritime winds, has a continental climate with

well-developed seasons and the terrain responds quickly to changes in solar heating. Nevada lies within the mid-latitude belt of prevailing westerly winds which occur most of the year. These winds bring frequent changes in weather during the late fall, winter and spring months, when most of the precipitation occurs. To the south of the mid-latitude westerlies, lies a zone of high pressure in subtropical latitudes, with a center over the Pacific Ocean. In the summer, this high-pressure belt shifts northward over the latitudes of Nevada, blocking storms from the ocean. The resulting weather is mostly clear and dry during the summer and early fall, with scattered thundershowers. The eastern portion of the state receives significant summer thunderstorms generated from monsoonal moisture pushed up from the Gulf of California, known as the North American monsoon. The monsoon system peaks in August and by October the monsoon high over the Western U.S. begins to weaken and the precipitation retreats southward towards the tropics (NOAA 2004).

Average annual precipitation is 16 to over 20 inches. Mean annual air temperature is 41 to 44 degrees F. The average growing season is about 50 to 70 days.

Mean annual precipitation at the Bear Creek, Nevada SNOTEL station (170501020301) is 37.69 inches.

monthly mean precipitation is:

January 3.84; February 3.75; March 4.38; April 4.9;

May 3.99; June 2.82; July .95; August 1.66;

September 1.22; October 2.12;

November 3.67; December 4.38.

Table 3. Representative climatic features

Frost-free period (average)	100 days
Freeze-free period (average)	
Precipitation total (average)	305 mm

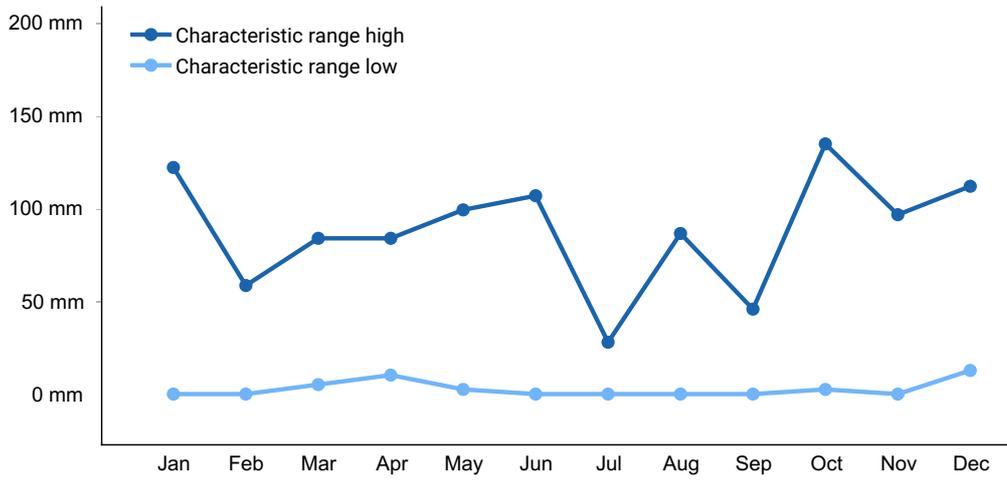


Figure 1. Monthly precipitation range

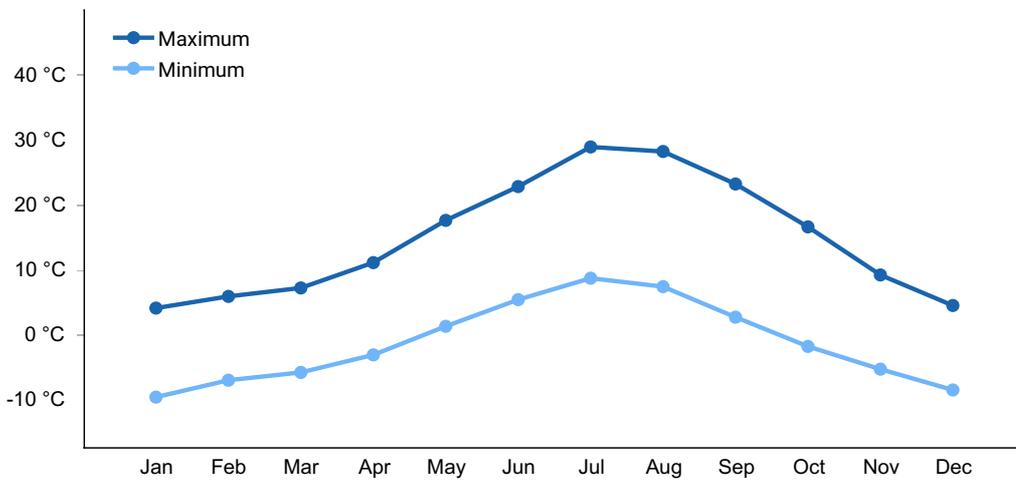


Figure 2. Monthly average minimum and maximum temperature

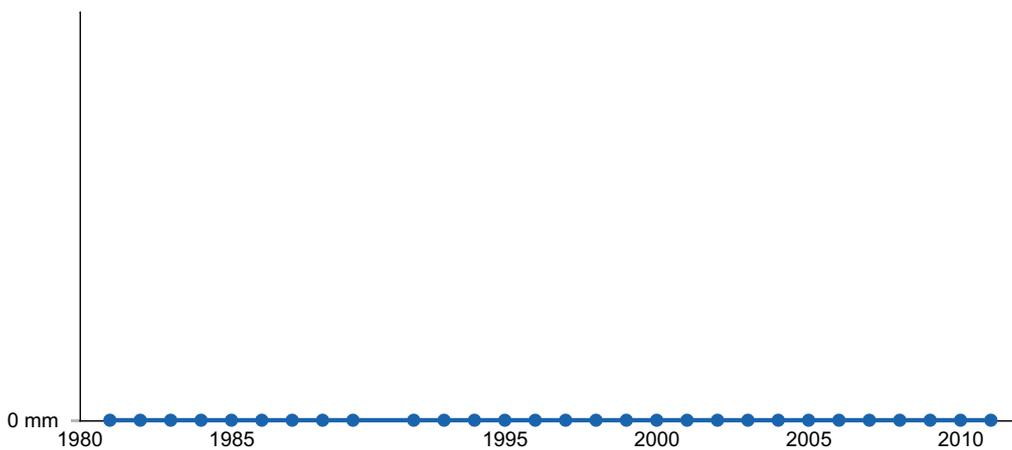


Figure 3. Annual precipitation pattern

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are very shallow, well drained, and formed in residuum and colluvium from granitic rocks or shale. These soils have a very low available water capacity. Runoff is high to very high and the potential for sheet and rill erosion is high. The soils have an ochric epipedon. The soil series associated with this site include Copperid and Kaffur.

Table 4. Representative soil features

Surface texture	(1) Very gravelly sandy loam (2) Gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Soil depth	10–25 cm
Surface fragment cover ≤3"	30–35%
Surface fragment cover >3"	2–10%
Available water capacity (0-101.6cm)	0.76–3.3 cm
Calcium carbonate equivalent (0-101.6cm)	1–15%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	7.9–9
Subsurface fragment volume ≤3" (Depth not specified)	17–51%
Subsurface fragment volume >3" (Depth not specified)	0–15%

Ecological dynamics

As ecological condition declines, annual weeds such as mustard, cheatgrass and bristly fiddleneck replace native perennial herbaceous plants and woody species increase in density.

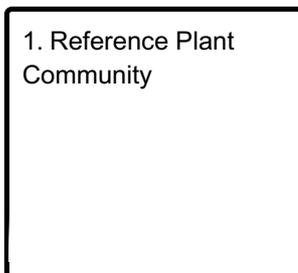
Fire Ecology:

The mean fire return intervals for Lahontan sagebrush communities have been estimated

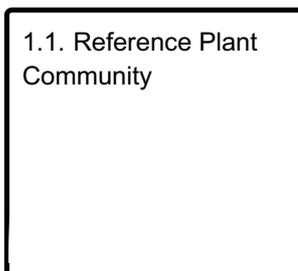
to be from 35 to over 100 years. Fire most often occurs during wet years with high forage production. Lahontan sagebrush is very susceptible to fire damage. Lahontan sagebrush is usually killed by fire and does not re-sprout. The recovery in burned areas is usually via small, light, wind-dispersed seed for all low sagebrush subspecies. Partially injured Lahontan sagebrush may re-grow from living branches, but sprouting does not occur. Purple sage has a high tolerance to fire and will resprout following fire. Common pricklygilia is severely damaged by fire. Thurber's needlegrass is classified as moderately resistant, but depending on season of burn, phenology, and fire severity, this perennial bunchgrass is moderately to severely damaged by fire. Early season burning is more damaging to this needlegrass than late season burning. Desert needlegrass has persistent dead leaf bases, which make it susceptible to burning. Fire removes the accumulation; a rapid, cool fire will not burn deep into the root crown. Most perennial grasses have root crowns that can survive wildfire. Bottlebrush squirreltail's small size, coarse stems, and sparse leafy material aid in its tolerance of fire. Postfire regeneration occurs from surviving root crowns and from on- and off-site seed sources. Frequency of disturbance greatly influences postfire response of bottlebrush squirreltail. Undisturbed plants within a 6 to 9 year age class generally contain large amounts of dead material, increasing bottlebrush squirreltail's susceptibility to fire. Sandberg bluegrass is generally unharmed by fire. It produces little litter, and its small bunch size and sparse litter reduces the amount of heat transferred to perennating buds in the soil. Its rapid maturation in the spring also reduces fire damage, since it is dormant when most fires occur.

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 1 Reference Plant Community

Community 1.1

Reference Plant Community

The reference plant community is dominated by Lahontan sagebrush and purple sage under a sparse canopy of Utah juniper. Canopy cover of mature potential Utah juniper is less than 15% and trees average less than 12 feet in height. Grasses present include Sandberg's bluegrass, Thurber's needlegrass and desert needlegrass. Potential vegetative composition is about 25% grasses, 5% forbs, 62% shrubs, and 8% trees. Approximate ground cover (basal and crown) is about 5 to 15 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	69	174	243
Grass/Grasslike	28	71	99
Tree	9	22	31
Forb	6	13	19
Total	112	280	392

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Primary Perennial Grasses			45–96	
	Thurber's needlegrass	ACTH7	<i>Achnatherum thurberianum</i>	28–56	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	6–13	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	6–13	–
	desert needlegrass	ACSP12	<i>Achnatherum speciosum</i>	6–13	–
2	Secondary Perennial Grasses			6–13	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	1–6	–
	bluebunch wheatgrass	PSSPS	<i>Pseudoroegneria spicata ssp. spicata</i>	1–6	–
Forb					
3	Perennial			10–40	
	milkvetch	ASTRA	<i>Astragalus</i>	2–9	–
	skeletonplant	LYGOD	<i>Lygodesmia</i>	2–9	–

	spiny phlox	PHHO	<i>Phlox hoodii</i>	1–6	–
	buckwheat	ERIOG	<i>Eriogonum</i>	1–6	–
Shrub/Vine					
4	Primary Shrubs			103–168	
	little sagebrush	ARARL3	<i>Artemisia arbuscula</i> ssp. <i>longicaulis</i>	84–112	–
	purple sage	SADOI	<i>Salvia dorrii</i> ssp. <i>dorrii</i> var. <i>incana</i>	13–43	–
5	Secondary Shrubs			13–43	
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	3–9	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus</i> <i>viscidiflorus</i>	3–9	–
	jointfir	EPHED	<i>Ephedra</i>	3–9	–
	buckwheat	ERIOG	<i>Eriogonum</i>	3–9	–
	littleleaf horsebrush	TEGL	<i>Tetradymia glabrata</i>	3–9	–
Tree					
6	Evergreen			13–28	
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	13–28	–

Animal community

Livestock Interpretations:

This site has limited value for livestock grazing due to low forage production and steep slopes. Thurber's needlegrass species begin growth early in the year and remain green throughout a relatively long growing season. This pattern of development enables animals to use Thurber's needlegrass when many other grasses are unavailable. Cattle prefer Thurber's needlegrass in early spring before fruits have developed as it becomes less palatable when mature. Thurber's needlegrasses are grazed in the fall only if the fruits are softened by rain. Young desert needlegrass is palatable to all classes of livestock. Mature herbage is moderately grazed by horses and cattle, but rarely grazed by sheep.

Bottlebrush squirreltail is very palatable winter forage for domestic sheep of Intermountain ranges. Domestic sheep relish the green foliage. Overall, bottlebrush squirreltail is considered moderately palatable to livestock. Sandberg bluegrass is a widespread forage grass. It is one of the earliest grasses in the spring and is sought by domestic livestock and several wildlife species. Sandberg bluegrass is a palatable species, but its production is closely tied to weather conditions. It produces little forage in drought years, making it a less dependable food source than other perennial bunchgrasses. Lahontan sagebrush is considered a valuable browse plant during the spring, fall and winter months. In some areas it is of little value in winter due to heavy snow. Purple sage has low to medium

palatability for livestock. The palatability for common pricklygilia is poor for cattle and horses and poor to fair for sheep. Common pricklygilia is moderately grazed by sheep in early and late summer. Utah juniper is used by and livestock for cover and food.

Stocking rates vary over time depending upon season of use, climate variations, site, and previous and current management goals. A safe starting stocking rate is an estimated stocking rate that is fine tuned by the client by adaptive management through the year and from year to year.

Wildlife Interpretations:

Utah juniper is used by many birds and wildlife for cover and food. The foliage is grazed by mule deer when other foliage is scarce and during periods of deep snow. Juniper "berries" or berry-cones are eaten by jackrabbits and coyotes. Many bird species depend on juniper berry-cones for fall and winter food. Lahontan sagebrush is considered a valuable browse plant during the spring, fall and winter months. In some areas it is of little value in winter due to heavy snow. Mule deer utilize and sometimes prefer Lahontan sagebrush, particularly in winter and early spring. Sagebrush-grassland communities provide critical sage-grouse breeding and nesting habitats. Meadows surrounded by sagebrush may be used as feeding and strutting grounds. Sagebrush is a crucial component of their diet year-round, and sage-grouse select sagebrush almost exclusively for cover. Sage-grouse prefer mountain big sagebrush and Wyoming big sagebrush communities to basin big sagebrush communities. Purple sage has low to medium palatability for wildlife. Common pricklygilia is used by bighorn sheep in December and by mule deer in February and April. Thurber needlegrass is valuable forage for wildlife. Young desert needlegrass is palatable to many species of wildlife. Desert needlegrass produces considerable basal foliage and is good forage while young. Desert bighorn sheep graze desert needlegrass. Bottlebrush squirreltail is a dietary component of several wildlife species. Sandberg bluegrass is desirable for pronghorn antelope and mule deer in the spring and preferable in the spring, summer, and fall for elk and desirable as part of their winter range.

Hydrological functions

Runoff is high to very high. Permeability is moderate to moderately rapid. Hydrologic soil group is D.

Recreational uses

Aesthetic value is derived from the diverse floral and faunal composition and the colorful flowering of wild flowers and shrubs during the spring and early summer. This site offers rewarding opportunities to photographers and for nature study. This site is used for hiking and has potential for upland and big game hunting.

Other information

Bottlebrush squirreltail is tolerant of disturbance and is a suitable species for revegetation.

Type locality

Location 1: Washoe County, NV	
Township/Range/Section	T33N R23E S33
UTM zone	N
UTM northing	298802
UTM easting	4508197
Latitude	40° 42' 0"
Longitude	119° 22' 53"
General legal description	SE 1/4 NE 1/4, About 3.5 miles northwest of Gerlach, Granite Range, Washoe County, Nevada. This site also occurs in Humboldt County, Nevada.

Other references

Fire Effects Information System (Online; <http://www.fs.fed.us/database/feis/plants/>).

USDA-NRCS Plants Database (Online; <http://www.plants.usda.gov>).

Great Basin Ecological Site Development Project: State and Transition Models for Major Land Resource Area 23, Nevada and portions of California (Online; <https://naes.agnt.unr.edu/PMS/Pubs/2019-4060.pdf>)

Contributors

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Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	P NOVAK-ECHENIQUE
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Contact for lead author	State Rangeland Management Specialist
Date	07/12/2012
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** A few rills may be expected on steeper slopes in areas subjected to summer convection storms or rapid spring snowmelt.

2. **Presence of water flow patterns:** Water flow patterns are short (<5') between shrubs and grasses. Some flow patterns may be connected to form small rills.

3. **Number and height of erosional pedestals or terracettes:** Pedestals are typically non-existent. Frost heaving of shallow rooted plants should not be considered a "normal" condition.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground 25-35% depending on amount of surface rock fragments

5. **Number of gullies and erosion associated with gullies:** None

6. **Extent of wind scoured, blowouts and/or depositional areas:** None

7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter (foliage from grasses and annual & perennial forbs) expected to move distance of slope length during intense summer convection storms or rapid snowmelt events. Persistent litter (large woody material) will remain in place except during large rainfall events.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil stability values should be 3 to 6 on most soil textures found on this site. (To be field tested.)

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface structure is weak, fine subangular blocky. Soil surface colors are light brownish gray or gray and soils are typified by an ochric epipedon. Organic matter content is 1 to 3 percent under shrub canopy.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Perennial herbaceous plants (especially deep-rooted grasses [i.e., needlegrasses] slow runoff and increase infiltration. Shrub canopy and associated litter break raindrop impact and provide opportunity for snow catch and accumulation on site.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** Compacted layers are none.

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

Dominant: Deep-rooted, cool season, perennial grasses >> low-statured shrubs (Lahontan sagebrush) > associated shrubs

Sub-dominant: deep-rooted, cool season, perennial forbs > fibrous, shallow-rooted, cool season, perennial and annual forbs = shallow-rooted, cool season, perennial grasses (Sandberg's bluegrass); Shrub State: will have shrubs dominant > associated shrubs

Other: deep-rooted, cool-season perennial bunchgrasses

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Dead branches within individual shrubs common and standing dead shrub canopy material may be as much as 25% of total woody canopy; some of the mature bunchgrasses (<10%) have dead centers.
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14. **Average percent litter cover (%) and depth (in):** Under canopy and between plant interspaces ($\pm 25\%$) and litter depth is $\pm 1/4$ inch.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** For normal or average growing season (through June) ± 250 lbs/ac; Favorable years ± 350 lbs/ac and unfavorable years ± 100 lbs/ac
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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Potential \pm invaders on this site include cheatgrass, annual mustards, and knapweeds. Utah juniper is an increaser on this site.
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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average (or normal) and above average growing season years
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