

## Ecological site F029XY070NV Shallow Loam 10-14 P.Z.

Last updated: 2/20/2025  
Accessed: 02/24/2025

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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.

### MLRA notes

Major Land Resource Area (MLRA): 029X–Southern Nevada Basin and Range

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The Southern Nevada Basin and Range MLRA (29) represents the transition from the Mojave Desert to the Great Basin. It is cooler and wetter than the Mojave. It is warmer and typically receives more summer precipitation than the Great Basin. This area is in Nevada (73 percent), California (25 percent), and Utah (2 percent). It makes up about 26,295 square miles (68,140 square kilometers). Numerous national forests occur in the area, including the San Bernardino, Angeles, Sequoia, Inyo, Humboldt-Toiyabe, and Dixie National Forests. Portions of Death Valley National Monument, the Nuclear Regulatory Commission's Nevada Test Site, the Hawthorne Ammunition Depot, and the Nellis Air Force Range in Nevada and the China Lake Naval Weapons Center in California also are in this MLRA. The northeast part of the Paiute Indian Reservation and the southern third of the Walker River Indian Reservation are in the part of this MLRA in Nevada, and the Lone Pine, Fort Independence, and Big Pine Indian Reservations are in the part in California.

### Physiography:

The entire area is in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus. The area of broad, nearly level, aggraded desert basins and valleys between a series of mountain ranges trending north to south. The basins are bordered by sloping fans and pluvial lake terraces. The mountains are uplifted fault blocks with steep side slopes and not well dissected due to limited annual precipitation. Most of the valleys in this MLRA are closed basins or bolsons containing sinks or playa lakes.

### Geology:

The mountains are dominated by Pliocene and Miocene andesite and basalt rocks, Paleozoic and Precambrian carbonate rocks prominent in some areas. Scattered outcrops of older Tertiary intrusives and very young tuffaceous sediments (Pliocene and Miocene) are in the western and eastern thirds of this MLRA. The valleys consist mostly of alluvial fill and playa deposits at the lowest elevations in the closed basins.

### Climate:

The average annual precipitation is 3 to 12 inches (75 to 305 millimeters) in most of this area. It may be as high as 29 inches (735 millimeters), on the higher mountain slopes. Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. Summers are dry, but sporadic storms are common in July and August.

### Water Resources:

Water resources are scarce. Ground water and surface water sources are limited. Streams are small and intermittent. Quality of surface water is naturally degraded as streams cross area of valley fill effected by dissolved salts. Irrigation water may raise the levels of dissolved salts and suspended sediments causing contamination.

### Soils:

Dominant soil orders include Entisols and Aridisols.

## Ecological site concept

The Shallow Loam 10-14 P.Z. is shallow to a duripan and typically found on hills and mountains. The soil surface texture is loamy sand to fine sandy loam. The slopes are typically less than 30 percent. The dominant plants in reference condition are Utah Juniper (*Juniperus osteosperma*), Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), and Indian ricegrass (*Achnatherum hymenoides*).

The Shallow Loam 10-14 P.Z. was previously known as JUOS WSG 0R0402 10 to 14.

## Associated sites

R029XY008NV	<b>SHALLOW CALCAREOUS LOAM 8-12 P.Z.</b> Found in shallow calcareous soils. Black sagebrush dominated.
R029XY006NV	<b>LOAMY 8-10 P.Z.</b> Found in shallow calcareous soils. Wyoming big sagebrush dominated.

## Similar sites

R029XY006NV	<b>LOAMY 8-10 P.Z.</b> Shallow site but soils are calcareous.
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Table 1. Dominant plant species

Tree	(1) <i>Juniperus osteosperma</i>
Shrub	(1) <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> (2) <i>Purshia glandulosa</i>
Herbaceous	(1) <i>Achnatherum hymenoides</i>

## Physiographic features

The Shallow Loam 10-14 P.Z. occurs on summits and sideslopes of upper fan piedmonts, hills, and lower mountains. This site occurs on all aspects. at mid- to lower elevations and on southerly aspects at higher elevations. Slopes are typically 2 to 30 percent. Elevations are 5000 to about 6500 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan piedmont (2) Hill (3) Mountain
Runoff class	High
Flooding frequency	None
Ponding frequency	None
Elevation	5,000–6,500 ft
Slope	2–30%
Water table depth	72 in
Aspect	Aspect is not a significant factor

## Climatic features

Average annual precipitation is 10 to 14 inches. Mean annual air temperature is 47 to 52 degrees F. The average frost-free period is 80 to 130 days.

No climate stations are available.

**Table 3. Representative climatic features**

Frost-free period (characteristic range)	100-130 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	
Frost-free period (average)	130 days
Freeze-free period (average)	
Precipitation total (average)	14 in

## Influencing water features

There are no influencing water features associated with this site.

## Soil features

Soils are shallow and well drained. These soils are skeletal, with 35 to over 50 percent gravels, cobbles or stones, by volume, distributed throughout their profile. Available water capacity is low. Runoff is rapid and potential for sheet and rill erosion is moderate to severe depending on slope. Coarse fragments on the soil surface provide a stabilizing affect on surface erosion conditions. The soil series associated with this site are Acoma, Handpah, Shroe, and Lithic Xeric Haplargids.

**Table 4. Representative soil features**

Parent material	(1) Colluvium (2) Residuum
Surface texture	(1) Gravelly sandy loam (2) Gravelly loam
Drainage class	Well drained
Permeability class	Slow
Soil depth	10–20 in
Surface fragment cover ≤3"	10–25%
Surface fragment cover >3"	0–2%
Available water capacity (0-40in)	3.3–4.4 in
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume ≤3" (Depth not specified)	9–54%
Subsurface fragment volume >3" (Depth not specified)	1–2%

## Ecological dynamics

Utah juniper is not shade tolerant. It is a climax species in harsh areas where stands are open and regeneration can occur without competition for light.

Across the West, junipers have expanded their historical range in the years since European settlement, especially

into sagebrush-grass communities below areas of traditional pinyon-juniper. Overgrazing, fire suppression, and climatic change have been identified as potential causes of juniper invasion. In the absence of fire or other disturbances, trees eventually dominate the site and crowd out herbaceous and shrub species.

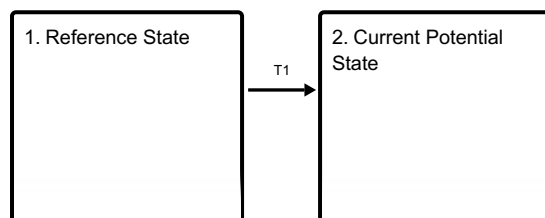
Juniper litter has an allelopathic effect on some understory species, especially blue grama. This effect is particularly evident on heavy, poorly drained clay soils.

#### Fire Ecology:

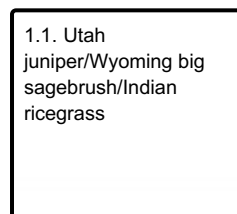
The historical fire return interval for Utah juniper stands range from 20 to over 100 years. Utah juniper is usually killed by fire, especially when trees are small. Utah juniper habitat types rarely have sufficient fine fuels to produce severe or continuous fires. Wyoming big sagebrush is killed by fire and establishes after fire from a seedbank; from seed produced by remnant plants that escaped fire; and from plants adjacent to the burn that seed in. Fire effects on Stansbury cliffrose are variable. Fire may kill or severely damage plants. Late-season fire also increases the risk of mortality. Stansbury cliffrose is a weak sprouter that is generally killed by severe fire. Desert bitterbrush is considered fire tolerant. Desert bitterbrush recovers from fire by sprouting from undamaged root crowns below the soil surface and by establishing from seeds cached by rodents. Desert bitterbrush often sprouts vigorously following fire, even in dry conditions. Indian ricegrass can be killed by fire, depending on severity and season of burn. Indian ricegrass reestablishes on burned sites through seed dispersed from adjacent unburned areas.

## State and transition model

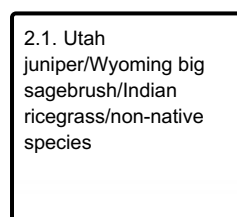
### Ecosystem states



### State 1 submodel, plant communities



### State 2 submodel, plant communities



## State 1 Reference State

Major Successional Stages of Forestland Development: **HERBACEOUS:** Vegetation is dominated by grasses and forbs under full sunlight. This stage is experienced after a major disturbance such as crown fire. **Skeleton forest** (dead trees) remaining after fire or residual trees left following harvest have little or no affect on the composition and production of the herbaceous vegetation. **SHRUB-HERBACEOUS:** Herbaceous vegetation and woody shrubs dominate the site. Various amounts of tree seedlings (less than 20 inches in height) may be present up to the point where they are obviously a major component of the vegetal structure. **SAPLING:** In the absence of disturbance the tree seedlings develop into saplings (20 inches to 4.5 feet in height) with a range in canopy cover of about 5 to 10 percent. Vegetation consists of grasses, forbs and shrubs in association with tree saplings. **IMMATURE FOREST:** The visual aspect and vegetal structure are dominated by Utah juniper trees greater than 4.5 feet in height. The upper crown of dominant and co-dominant trees are cone or pyramidal shaped. Seedlings and saplings of Utah

juniper are present in the understory. Dominants are the tallest trees on the site; co-dominants are 65 to 85 percent of the highest of dominant trees. Understory vegetation is moderately influenced by a tree overstory canopy of about 10 to 20 percent. **MATURE FOREST:** The visual aspect and vegetal structure are dominated by Utah juniper that have reached or are near maximal heights for the site. Dominant trees average greater than five inches in diameter at one-foot stump height. Upper crowns of Utah juniper are typically either irregularly or smoothly flat-topped or rounded. Tree canopy cover ranges from 20 to 35 percent. Understory vegetation is strongly influenced by tree competition, overstory shading, duff accumulation, etc. Few tree seedlings and/or saplings occur in the understory. Infrequent, yet periodic, wildfire is presumed to be a natural factor influencing the understory of mature juniper forestlands. This stage of community development is assumed to be representative of this forestland site in the pristine environment. **OVER-MATURE FOREST:** In the absence of wildfire or other naturally occurring disturbances, the tree canopy on this site can become very dense. This stage is dominated by Utah juniper that have reached maximal heights for the site. Dominant and co-dominant trees average greater than five inches in diameter at one-foot stump height. Upper crowns are typically irregularly flat-topped or rounded. Understory vegetation is sparse or absent due to tree competition, overstory shading, duff accumulation, etc. Tree canopy cover is commonly greater than 50 percent.

## Community 1.1

### Utah juniper/Wyoming big sagebrush/Indian ricegrass

The reference plant community is dominated by Utah juniper. Wyoming big sagebrush, desert bitterbrush an/or Stansbury's cliffrose are the principal understory shrubs. Indian ricegrass, muttongrass and bottlebrush squirreltail are the most prevalent understory grasses. Mountain big sagebrush occurs at the upper elevations of this site. Overstory tree canopy composition is 95 to 100 percent Utah juniper and less than 5 percent singleleaf pinyon. An overstory canopy cover of 20 to 35 percent is assumed to be representative of tree dominance on this site in the pristine environment.

**Forest overstory.** **MATURE WOODLAND:** The visual aspect and vegetal structure are dominated by Utah juniper that have reached or are near maximal heights for the site. Dominant trees average greater than five inches in diameter at one-foot stump height. Upper crowns of Utah juniper are typically either irregularly or smoothly flat-topped or rounded. Tree canopy cover ranges from 20 to 35 percent. Understory vegetation is strongly influenced by tree competition, overstory shading, duff accumulation, etc. Few tree seedlings and/or saplings occur in the understory. Infrequent, yet periodic, wildfire is presumed to be a natural factor influencing the understory of mature juniper forestlands. This stage of community development is assumed to be representative of this forestland site in the pristine environment.

**Forest understory.** Understory vegetative composition is about 15 percent grasses, 5 percent forbs and 80 percent shrubs and young trees when the average overstory canopy is medium (20 to 35 percent). Average understory production ranges from 100 to 450 pounds per acre with a medium canopy cover. Understory production includes the total annual production of all species within 4.5 feet of the ground surface.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	32	81	130
Grass/Grasslike	10	25	40
Tree	5	13	20
Forb	3	6	10
<b>Total</b>	<b>50</b>	<b>125</b>	<b>200</b>

## State 2

### Current Potential State

Similar to the Reference State, except non-native plants are present in the plant community.

## Community 2.1

## Utah juniper/Wyoming big sagebrush/Indian ricegrass/non-native species

Similar to Community Phase 1.1, except 2.1 has non-native species present in the plant community.

### Transition T1

#### State 1 to 2

Establishment of non-native species.

### Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Primary Perennial Grasses</b>			6–11	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	6–11	–
2	<b>Secondary Perennial Grasses</b>			11–32	
	muttongrass	POFE	<i>Poa fendleriana</i>	2–6	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	2–6	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	2–6	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	2–6	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	1–2	–
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	1–2	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	1–2	–
<b>Forb</b>					
3	<b>Perennial</b>			6–18	
	buckwheat	ERIOG	<i>Eriogonum</i>	2–6	–
	phlox	PHLOX	<i>Phlox</i>	2–6	–
	goldenweed	PYRRO	<i>Pyrrocoma</i>	2–6	–
<b>Shrub/Vine</b>					
4	<b>Primary Shrubs</b>			30–71	
	Wyoming big sagebrush	ARTRW8	<i>Artemisia tridentata ssp. wyomingensis</i>	12–30	–
	Stansbury cliffrose	PUST	<i>Purshia stansburiana</i>	12–30	–
	desert bitterbrush	PUGL2	<i>Purshia glandulosa</i>	6–11	–
5	<b>Secondary Shrubs</b>			4–12	
	mountain big sagebrush	ARTRV	<i>Artemisia tridentata ssp. vaseyana</i>	2–6	–
	mormon tea	EPVI	<i>Ephedra viridis</i>	2–6	–
<b>Tree</b>					
6	<b>Evergreen</b>			8–17	
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	6–11	–
	singleleaf pinyon	PIMO	<i>Pinus monophylla</i>	2–6	–

### Animal community

Livestock Interpretations:

This site is suited to cattle and sheep grazing where terrain permits. Grazing management should be keyed to

Indian ricegrass production. Indian ricegrass is highly nutritious and remains palatable throughout the grazing season. Indian ricegrass and other desirable forage grasses on this site provide palatable, nutritious feed during the late spring and early summer. New plants of all these grasses are established entirely from seed and grazing practices should allow for ample seed production and seedling establishment.

Livestock will often concentrate on this site taking advantage of the shade and shelter offered by the tree overstory. Many areas are not used because of steep slopes and lack of adequate water. Attentive grazing management is required due to steep slopes and associated erosion hazards. Harvesting trees under a sound management program for fuelwood, posts or other products can open the tree canopy to allow increased production of understory species desirable for grazing.

Stocking rates vary with such factors as kind and class of grazing animal, season of use and fluctuations in climate. Actual use records for individual sites, a determination of the degree to which the sites have been grazed, and an evaluation of trend in site condition offer the most reliable basis for developing initial stocking rates.

Selection of initial stocking rates for given grazing units is a planning decision. This decision should be made ONLY after careful consideration of the total resources available, evaluation of alternatives for use and treatment, and establishment of objectives by the decisionmaker.

The forage value rating is not an ecological evaluation of the understory as is the range condition rating for rangeland. The forage value rating is a utilitarian rating of the existing understory plants for use by specific kinds of grazing animals.

#### Wildlife Interpretations:

This site has high value for mule deer during the winter. Juniper trees provide shelter from winter storms and juniper foliage is also browsed during the winter. Sites where water is available offer good quail habitat and are visited seasonally by mourning dove. It is also used by various song birds, rodents, reptiles and associated predators natural to the area.

## Hydrological functions

The hydrologic cover condition of this site is poor in a representative stand. The average runoff curve is about 85 for group C soils and about 90 for group D. Soils.

## Recreational uses

The trees on this site provide a welcome break in an otherwise open landscape. It has potential for hiking, cross-country skiing, camping, and deer and upland game hunting.

## Wood products

Utah juniper wood is very durable. Its primary uses have been for posts and fuelwood. It probably has considerable potential in the charcoal industry and in wood fiber products.

## PRODUCTIVE CAPACITY

This forestland community is of low site quality for tree production. Site index ranges from 35 to 55 (Howell, 1940).

Productivity Class: 0.2 to 0.4

CMAI\*: 2.7 to 4.6 ft<sup>3</sup>/ac/yr;

0.2 to 0.3 m<sup>3</sup>/ha/yr.

Culmination is estimated to be at 100 years.

\*CMAI: is the culmination of mean annual increment or highest average growth rate of the stand in the units specified.

Fuelwood Production: 4 to 7 cords per acre for stands averaging 5 inches in diameter at 1 foot height with a medium canopy cover. There are about 274,000 gross BTUs heat content per cubic foot of Utah juniper. Solid wood volume in a cord varies but usually ranges from 65 to 90 cubic feet. Assuming an average of 75 cubic feet of solid

wood per cord, there are about 20.6 million BTUs of heat value in a cord of Utah juniper fire wood.

Posts (7 foot): About 20 to 30 posts per acre in stands of medium canopy.

## MANAGEMENT GUIDES AND INTERPRETATIONS

### 1. LIMITATIONS AND CONSIDERATIONS

- a. Potential for sheet and rill erosion is moderate to severe depending on slope.
- b. Moderate equipment limitations on steeper slopes and moderate to severe equipment limitations on sites having extreme surface stoniness.
- c. Proper spacing is the key to a well managed, multiple use and multi-product juniper forestland.

### 2. ESSENTIAL REQUIREMENTS

- a. Adequately protect from wildfire.
- b. Protect soils from accelerated erosion.
- c. Apply proper grazing management.

### 3. SILVICULTURAL PRACTICES

Silvicultural treatments are not reasonably applied on this site due to poor site quality and severe limitations for equipment and tree harvest.

## Other products

The berries have been used by Indians for food.

## Other information

Utah juniper wood is very durable. Its primary uses have been for posts and fuelwood. It probably has considerable potential in the charcoal industry and in wood fiber products.

Table 7. Representative site productivity

Common Name	Symbol	Site Index Low	Site Index High	CMAI Low	CMAI High	Age Of CMAI	Site Index Curve Code	Site Index Curve Basis	Citation
Utah juniper	<i>JUOS</i>	35	55	3	5	–	–	–	

## Inventory data references

NASIS data used for abiotic narrative and tables.

## Type locality

Location 1: Lincoln County, NV	
Township/Range/Section	T3S R65E S36
General legal description	About 8 air miles northwest of Caliente, Grey Dome Mountain area, Lincoln County, Nevada. This site also occurs in Clark, Lincoln, and Nye Counties, Nevada.

## Other references

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

Howell, J., 1940. Pinyon and juniper: a preliminary study of volume, growth, and yield. Regional Bulletin 71. Albuquerque, NM: USDA, SCS; 90p.

Jordan, M., 1974. An Inventory of Two Selected Woodland Sites in the Pine Nut Hills of Western Nevada.



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USDA-NRCS. 1980. National Forestry Manual - Part 537. Washington, D.C.

USDA-NRCS. 2004 National Forestry Handbook, Title 190. Washington, D.C.

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

## Contributors

HA/RRK

## Approval

Kendra Moseley, 2/20/2025

## 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)	
Contact for lead author	
Date	02/24/2025
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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

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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:

Sub-dominant:

Other:

Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth ( in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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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:**

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**17. Perennial plant reproductive capability:**

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