

Ecological site R035XA107AZ Clay Loam Upland 10-14" p.z.

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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.

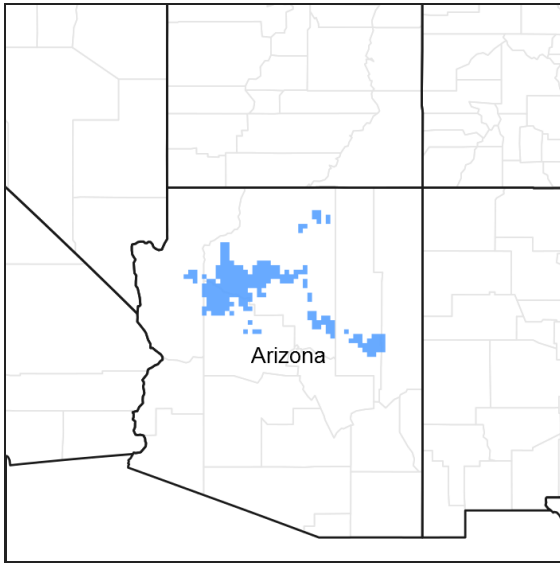


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 035X–Colorado Plateau

This ecological site occurs in Common Resource Area 35.1 - the Colorado Plateau Mixed Grass Plains

Elevations range from 4800 to 6300 feet and precipitation averages 10 to 14 inches per year. Vegetation includes *Stipa* species, Indian ricegrass, galleta, and blue grama, fourwing saltbush, winterfat, and cliffrose. The soil temperature regime is mesic and the soil moisture regime is ustic aridic. This unit occurs within the Colorado Plateau Physiographic Province and is characterized by a sequence of flat to gently dipping sedimentary rocks eroded into plateaus, valleys and deep canyons. Sedimentary rock classes dominate the plateau with volcanic fields occurring for the most part near its margin.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Krascheninnikovia lanata</i> (2) <i>Atriplex canescens</i>
Herbaceous	(1) <i>Bouteloua gracilis</i> (2) <i>Sporobolus airoides</i>

Physiographic features

This ecological site occurs in an upland position on mostly level to slightly sloping plains, mesas, sideslopes of mesas, plateaus, and rolling hills. Slopes are generally from 0 to 8% but can reach up to 15%. It neither benefits significantly from run-in moisture nor suffers excessively from runoff.

Table 2. Representative physiographic features

Landforms	(1) Plain (2) Mesa (3) Plateau
Flooding frequency	None
Elevation	1,463–1,920 m
Slope	0–15%
Aspect	Aspect is not a significant factor

Climatic features

50-60% of moisture falls as rain Jul-Sep and is the most effective moisture for plant growth. The remaining moisture comes as snow during the winter.

Mean temperature for the hottest month (Jul) is 72 F; for the coldest month (Jan) is 32 F. Extreme temperatures of 105 F and -28F have been recorded. Long periods with little or no effective moisture are relatively common.

Cool season plants begin growth in early spring and mature early summer. Warm season plants take advantage of summer rains and are growing and nutritious Jul-Sep.

Table 3. Representative climatic features

Frost-free period (average)	160 days
Freeze-free period (average)	180 days
Precipitation total (average)	330 mm

Influencing water features

This ecological site neither benefits significantly from run-in moisture nor suffers excessively from runoff.

Soil features

Soils in this site are well-drained and moderately deep to deep. They formed in the residuum of weathered basalt, cinders, ash and old mixed colluvium and alluvium. The surface layer is sandy clay loam, clay loam or loam with 0 to 30% coarse fragments. The substratum is clay, clay loam or sandy clay loam with 5 to 30% coarse fragments. Permeability is very slow to moderately slow. Reaction is neutral to strongly alkaline (pH 6.6 to 9.0). Water and wind erosion hazards are very slight to slight.

Typical taxonomic units include:

Central Coconino County (AZ631) - Map Units - 15-Disterheff, 16-Disterheff, 038-Disterheff; 45-Tajo ; 48-Thunderbird; 1-Ashfork; 22-Servilleta, 39-Servilleta, 40-Servilleta;

Western Yavapai County (AZ637)- Map Units - Pd-Partri, Pe-Partri, Pf-Partri, Pp-Partri, TaB-Partri, TcC-Partri; Hualapai/Havasupai (AZ699) - Map Units - 4-Barx, 35-Poley;

Navajo Mountain Area (AZ711)- Map Units - 46 Sandoval family and Ustic haplocambids, 27-Tekapo

Table 4. Representative soil features

Parent material	(1) Alluvium–basalt
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Surface texture	(1) Clay loam (2) Sandy clay loam (3) Clay
Family particle size	(1) Clayey
Drainage class	Moderately well drained to well drained
Permeability class	Very slow to moderately slow
Soil depth	51–152 cm
Surface fragment cover <=3"	0–30%
Available water capacity (0-101.6cm)	7.62–22.86 cm
Soil reaction (1:1 water) (0-101.6cm)	6.6–9
Subsurface fragment volume <=3" (Depth not specified)	5–30%

Ecological dynamics

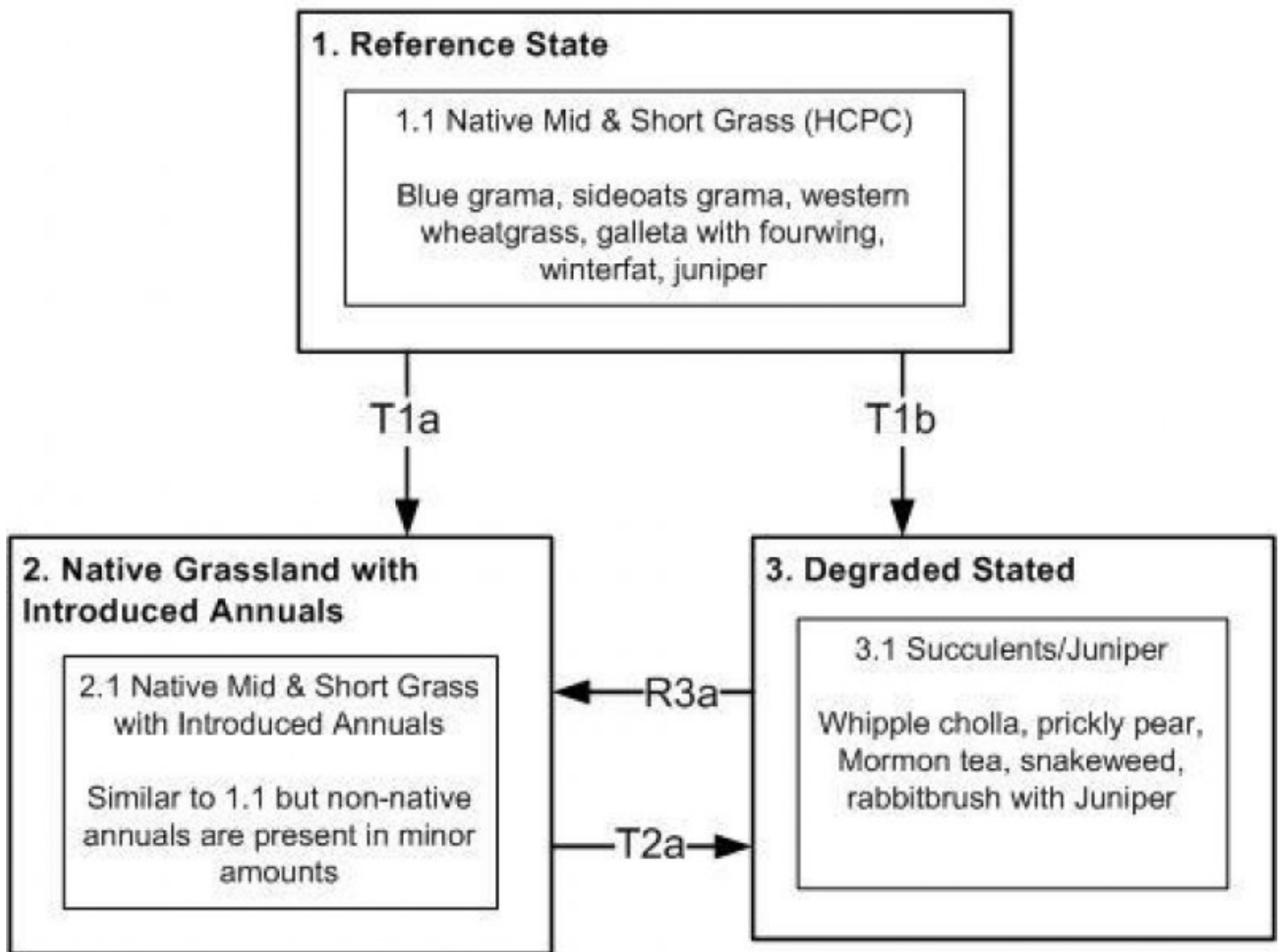
The plant communities found on an ecological site are naturally variable. Composition and production will vary with yearly conditions, location, aspect, and the natural variability of the soils. The historical climax plant community represents the natural potential plant communities found on relict or relatively undisturbed sites. Other plant communities described here represent plant communities that are known to occur when the site is disturbed by factors such as grazing, fire, or drought.

Production data provided in this site description is standardized to air-dry weight at the end of the summer growing season. The plant communities described in this site description are based on near normal rainfall years.

NRCS uses a Similarity Index to compare existing plant communities to the plant communities described here. Similarity Index is determined by comparing the production and composition of a plant community to the production and composition of a plant community described in this site description. To determine Similarity Index, compare the production (air-dry weight) of each species to that shown in the plant community description. For each species, count no more than the maximum amount shown for the species, and for each group, count no more than the maximum shown for the group. Divide the resulting total by the total normal year production shown in the plant community description. If rainfall has been significantly above or below normal, use the total production shown for above or below normal years. If field data is not collected at the end of the summer growing season, then the field data must be corrected to the end of the year production before comparing it to the site description. The growth curve can be used as a guide for estimating production at the end of the summer growing season.

State and transition model

35.1AZ Clay Loam Upland 10-14" p.z. (R035XA107AZ)



Legend

T1a = Introduction of non-native annuals creates an irreversible change in the plant community.

T1b/T2a = Lack of fire, Improper grazing management, reduced herbaceous cover, seed source

R3a = Brush management/Prescribed Burning, Range planting, Prescribed grazing

Figure 4. 35-1 clay loam upland S&T model

State 1

Reference State

The reference state includes the Historic Climax Plant Community. The Historic Climax Plant Community is a perennial grassland with scattered shrubs and juniper.

Community 1.1

Historic Climax Plant Community

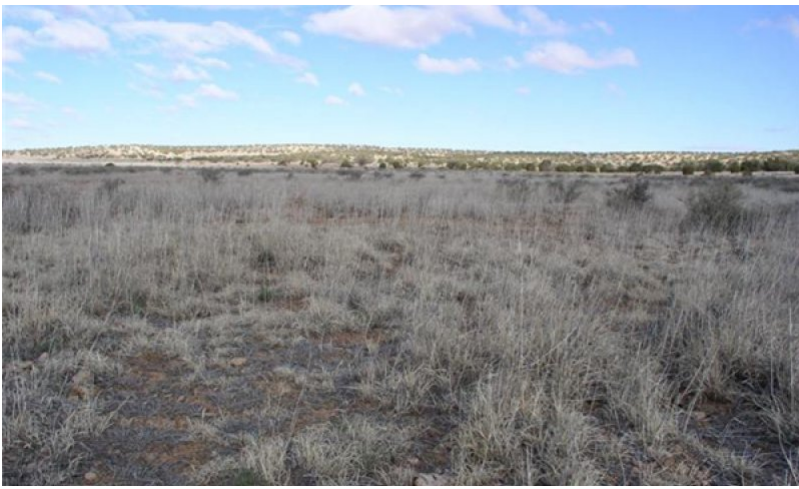


Figure 5. Clay Loam Upland 10-14" p.z.

Site has a plant community made up primarily of mid and short grasses, forbs, small shrubs and scattered junipers. In the original plant community there is mixture of both cool and warm season grasses with a predominance of warm season. Plant species most likely to invade or increase when this site starts to deteriorate are wooly groundsel, broom snakeweed, annuals and juniper. Continuous grazing use during the winter and spring periods will decrease the cool season grasses, which are replaced by warm season, lower forage value grasses and shrubs.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	224	504	762
Shrub/Vine	45	73	112
Tree	11	45	73
Forb	11	28	39
Total	291	650	986

Figure 7. Plant community growth curve (percent production by month). AZ3511, 35.1 10-14" p.z. all sites. Growth begins in the spring and continues through the summer, most growth occurs during the summer rainy season.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	1	5	11	18	25	24	13	3	0	0

Figure 8. Plant community growth curve (percent production by month). AZ5102, 35.1 10-14" p.z. blue grama. Growth occurs mostly in summer and early fall during the rainy season..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	5	15	30	30	15	0	0	0

Figure 9. Plant community growth curve (percent production by month). AZ5103, 35.1 10-14" p.z. sideoats grama. Most growth occurs in summer and early fall during the rainy season..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	20	30	20	10	5	0	0

State 2 Natives with Introduced Annuals

This plant community is similar to the Historic Climax Plant Community but non-native annuals such as cheatgrass

and russin thistle are present in sufficient amounts to affect the biotic integrity of the site.

Community 2.1 Native Mid and Short Grass with Introduced Annuals

This community is similar to the Historic Climax Plant Community but includes non-native annual grasses and forbs such as cheatgrass and Russian thistle.

State 3 Degraded State

The biotic integrity of the site is changed due to the increase of cacti, shrubs and juniper.

Community 3.1 Succulents/Juniper

This community phase is dominated by Whipple cholla, prickly pear, Mormon tea, snakeweed, rabbitbrush and juniper.

Transition T1A State 1 to 2

The introduction of non-native annuals creates an irreversible change in the plant community.

Transition T1B State 1 to 3

Lack of fire, unmanaged grazing, reduced herbaceous cover, loss of seed source native herbaceous species

Transition T2A State 2 to 3

Lack of fire, unmanaged grazing, reduced herbaceous cover, loss of seed source native herbaceous species.

Restoration pathway R3A State 3 to 2

The plant community may be restored to State 2 through the control of woody species by mechanical methods or controlled burning, seeding native grasses and forbs, and managed grazing.

Conservation practices

Brush Management
Prescribed Burning
Range Planting
Prescribed Grazing

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	Dominant Grasses			179–628	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	56–179	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	22–135	–
	black grama	BOER4	<i>Bouteloua eriopoda</i>	0–78	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	22–78	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	22–78	–
	alkali sacaton	SPAI	<i>Sporobolus airoides</i>	50–78	–
2	Misc. grasses			11–67	
	common wolfstail	LYPH	<i>Lycurus phleoides</i>	6–50	–
	spike muhly	MUWR	<i>Muhlenbergia wrightii</i>	6–28	–
3	Cool Season Grasses			34–67	
	squirreltail	ELELE	<i>Elymus elymoides</i> ssp. <i>elymoides</i>	6–34	–
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	6–34	–
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	6–34	–
4	Other grasses			0–28	
	threeawn	ARIST	<i>Aristida</i>	0–22	–
	ring muhly	MUTO2	<i>Muhlenbergia torreyi</i>	0–11	–
	Grass, annual	2GA	<i>Grass, annual</i>	0–6	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–6	–
Forb					
5	All Forbs			11–39	
	Forb, annual	2FA	<i>Forb, annual</i>	6–22	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	6–22	–
Shrub/Vine					
6	Dominant shrubs			34–73	
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	17–28	–
	buckwheat	ERIOG	<i>Eriogonum</i>	11–22	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	11–22	–
7	Misc. shrubs			0–34	
	rabbitbrush	CHRY9	<i>Chrysothamnus</i>	0–17	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0–11	–
	spineless horsebrush	TECA2	<i>Tetradymia canescens</i>	0–11	–
8	Succulents			6–22	
	pricklypear	OPUNT	<i>Opuntia</i>	6–22	–
Tree					
9	Trees			11–73	
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	11–73	–

Animal community

This site is suitable for grazing during any period of the year by cows and calves, stocker cattle, sheep and horses.

When disturbed this site is susceptible to erosion.

The diversity of topography and vegetation from provides habitat for numerous wildlife species. Because of the broken topography frequently found on this site it becomes quite important to adjacent sites for cover and protection from adverse weather.

Recreational uses

This site is located on rolling plains, steep mesas and plateaus. There are occasional escarpments and colluvial slopes along the sides of the mesas. Main activities suited to this site are hunting, hiking, and wildlife observation.

This site is characterized as grassland interspersed with shrubs and juniper. If not severely disturbed, this site has good aesthetic appeal.

Winters are cold, however, relatively mild spring, fall and summer months are attractive to recreationists.

Wood products

Personal firewood cutting.

Other information

Threatened and Endangered Species: Golden eagles and Prairie falcons occasionally use the site for feeding areas.

Type locality

Location 1: La Paz County, AZ	
General legal description	Chevelon Butte, O'Haco ranch, south of Winslow and Right-of-way, Highway 89, 25 miles north of Flagstaff.

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)	Karlynn Huling (2006 author), Kenneth Gishi (2012 revisors)
Contact for lead author	NRCS, State Rangeland Management Specialist, Phoenix, AZ
Date	03/08/2006
Approved by	Byron Lambeth
Approval date	

Indicators

1. **Number and extent of rills:** Rills should not be present on the site.

2. **Presence of water flow patterns:** Water flow patterns may be common due to the slow permeability and runoff characteristics of the soil.

3. **Number and height of erosional pedestals or terracettes:** Some terracettes and pedestals may be present on steeper slopes due to the slow permeability and runoff characteristics.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground ranges from 30-50%. This site has the potential to produce a moderate percentage of plant cover due to the moderate available water capacity (7 inches average). Drought may cause an increase in bare ground.

5. **Number of gullies and erosion associated with gullies:** No gullies are present on the site.

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

7. **Amount of litter movement (describe size and distance expected to travel):** Minor amounts of herbaceous and fine woody litter may be transported in water flow pathways. Coarse woody litter remains under shrub and tree canopies.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** The soils have a moderate to high resistance (stability ratings of 3-6) to water erosion and a moderate to high resistance to wind erosion.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface structure is mostly granular (moderate very fine, fine, medium) to platy (weak fine to medium) with some subangular blocky. Surface thickness is mostly 2 to 3 inches, but ranges from 1 to 8 inches.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** The dominant aspect of the site is a grassland with scattered large and half shrubs followed by lesser amounts of forbs, succulents and occasional trees. The site has a patchy distribution of all plant functional groups. Some locations within the site, especially at higher elevations, may have a light scattered overstory of trees. Canopy cover ranges from 30 to 50% (most cover should be in grasses). Basal cover of plants ranges from 10-20% (most of which is grasses). Both cover values decrease during a prolonged drought.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None expected. Some surface horizons are naturally platy. There may also be a strong developed argillic layer below the surface. These are not compaction layers and should not be considered as such.
-
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: Warm season bunchgrasses >>
- Sub-dominant: Warm season sod forming grasses > cool season bunchgrasses > Shrubs >
- Other: Cool season sod forming grasses > Trees > Cacti
- Additional:
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** All plant functional groups are adapted to survival in all but the most severe droughts. Severe winter droughts affect shrubs the most. Severe summer droughts affect grasses the most.
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14. **Average percent litter cover (%) and depth (in):** Mostly herbaceous litter with some woody litter.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Average annual production on this site is about 580 lbs./acre in a year of average annual precipitation.
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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:** Juniper, cholla, prickly pear, snakeweed, rabbitbrush are all native to the site, but have the potential to increase on the site. Non-native annuals such as cheatgrass and Russian thistle may become dominant on the site and affect biotic integrity and hydrologic function.
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17. **Perennial plant reproductive capability:** All plants native to this site are adapted and are capable of producing seeds, stolons and rhizomes in all but the most severe drought.
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