

# Ecological site R042AB736TX

## Arroyo, Hot Desert Shrub

Accessed: 05/20/2026

### 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.

### Associated sites

<b>R042AB733TX</b>	<p><b>Loamy Bottomland, Hot Desert Shrub</b></p> <p>This site is located at a lower position and receives runoff from the Arroyo site.</p>
<b>R042AB735TX</b>	<p><b>Gravelly, Hot Desert Shrub</b></p> <p>This site is located on older terraces above the flood plain.</p>

### Similar sites

<b>R042AB735TX</b>	<p><b>Gravelly, Hot Desert Shrub</b></p> <p>The terrace of the Arroyo site is similar to the Gravelly site, but is more productive and has plant species that require extra water.</p>
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**Table 1. Dominant plant species**

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

### Physiographic features

The site occurs on nearly level to moderately sloping drainageways, arroyos, stream terraces, and alluvial fans. Slopes range from 0 to 8 percent. The drainageways are incised from 1 to 15 feet into piedmont slopes. The degree of incision on this site depends on the intensity of summer rainfall events and the size of the watershed in the surrounding mountains that can cause flash floods that last for short periods.

**Table 2. Representative physiographic features**

Landforms	(1) Arroyo (2) Drainageway (3) Terrace
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Occasional to frequent
Ponding frequency	None
Elevation	580 – 1,190 m
Slope	0 – 10 %
Aspect	Aspect is not a significant factor

### Climatic features

The average annual precipitation ranges from 10 to 13 inches and highly variable from 2 to 21 inches. Most of the precipitation occurs as widely scattered thunderstorms of high intensity and short duration during the summer. Occasional precipitation occurs as light rainfall during the cool season. Negligible amounts of precipitation falls in the form of sleet or snow.

Mean annual air temperature is 70° F. Daytime temperatures exceeding 100° F are common from May through September. Frost free period ranges from 254 to 295 days.

The average relative humidity in mid-afternoon is about 25 percent. Relative humidity is higher at night, and the average at dawn is about 57 percent. The sun shines 81 percent of the time in summer and 75 percent in winter. The prevailing wind is from the southwest. Average wind speed is highest, around 11 miles per hour, in March and April.

The combination of low rainfall and relative humidity, warm temperatures, and high solar radiation creates a significant moisture deficit. The annual Class-A pan evaporation is approximately 94 inches.

**Table 3 Representative climatic features**

Frost-free period (average)	300 days
Freeze-free period (average)	330 days
Precipitation total (average)	330 mm

### Influencing water features

#### Soil features

The site consists of very deep, well-drained, calcareous, highly permeable soils. These soils formed in Young (Holocene) Quaternary aged loamy and gravelly alluvium from igneous and sedimentary rock. Permeability is moderately rapid to rapid. Available water capacity

is low. Potential for wind and water erosion is slight. Typically, the surface layer is light brownish gray, very gravelly sandy loam about 15 inches thick. The underlying material to a depth of 60 inches is pale brown, stratified, very gravelly sandy loam. Gravels cover between 35-80 percent of the surface. Subsurface fragment volume was determined to a depth 15 inches. Representative soils include Pantera and Chillon.

**Table 4. Representative soil features**

Parent material	(1) Alluvium – rhyolite
Surface texture	(1) Very gravelly sandy loam (2) Extremely gravelly fine sandy loam (3) Very gravelly loamy sand
Drainage class	Well drained
Permeability class	Moderately rapid to rapid
Soil depth	180 cm
Surface fragment cover <=3"	40 – 80 %
Surface fragment cover >3"	10 – 40 %
Available water capacity (0-101.6cm)	0.1 – 0.2 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 10 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	0 – 30
Soil reaction (1:1 water) (0-101.6cm)	7.9 – 8.4

Subsurface fragment volume ≤3" (Depth not specified)	20 – 50 %
Subsurface fragment volume >3" (Depth not specified)	0 – 20 %

## Ecological dynamics

The reference plant community on the Arroyo, Hot Desert Shrub site consists of bunch and stoloniferous grasses along with a variety of perennial forbs and woody shrubs.

The boundary of the site includes a dynamic arroyo channel and its first terrace, or active floodplain. The riverwash, or streambed, is a component of the arroyo and is not correlated with an ecological site because it lacks stable vegetation. However, vegetation does begin to establish once alluvial deposits begin to stabilize. Vegetation is then interspersed within and along the arroyo. Vegetation along arroyos is a dynamic complex of discontinuous plant communities responding to numerous environment controls such as watershed area, arroyo channel shape, width, and location, nature and relative position of depositional features such as terraces, gravel bars, frequency and amount of runoff, alluvial fragment size, depth of bedrock, and presence of perennial water sources. With the exception of perennial springs in some locations, arroyos within the Hot Desert Shrub Land Resource Unit are dry most of the year. Arroyos are subject to flash floods during the summer rainy season. It may be reasonable to assume that during pre-settlement times, plant communities along arroyos existed as a shifting mosaic. Common species within the arroyo channels include burrobrush, catclaw acacia, shrubby poreleaf, desert willow, sideoats grama, tanglehead, and annual forbs/grasses.

The terrace immediately adjacent to the channel has the potential to flood, but generally receives run-on water in a braided overland flow pattern from the surrounding landscape. Since water availability can be less within the terrace than in the arroyo channel, plant species able to withstand drier conditions become established. Plants that have intermediate water requirements become established on the terrace and banks of the channel. Existing plant species composition and production varies with the interaction of yearly weather conditions, location, aspect, elevation, watershed area, and the natural variability of the soils. A higher density of woody plant cover exists along the banks of the arroyo channel than on the adjacent terrace. Production is higher in an Arroyo Ecological Site than associated ecological sites (i.e. Gravelly) because the site is in a water receiving position on the landscape.

Present climatic and vegetation regimes of the region were established about 8000 years ago when a trend of increased aridity developed and may possibly be continuing today. Overutilization of rangelands during the past 150 years by early settlers may have accentuated a trend toward greater aridity already in existence. Early records suggest cattle, sheep, and horses were introduced into the southwest from Mexico in the mid-1500's. Livestock numbers peaked in the late 1880's following the arrival of railroads. Historical accounts document ranches with stocking rates as high as one animal unit per four acres; this was far from sustainable in this environment.

The impact of improper grazing within this site specifically will lead to the loss of mostly grasses, reduction of litter, increased stream bank instability, and soil erosion. Vegetation on the terrace will shift from a mixed shrub / grama grass community (1.1) to a mixed shrub/shortgrass community (1.2).

Probably the factor that most influenced the historic vegetative composition of the site was extended dry weather. High rainfall events did occur but were episodic. Fire is not considered to have had a significant influence in shaping current plant communities mostly due to the inherently low fine fuels needed to carry a widespread fire and the presence of fire intolerant species such as black grama and ocotillo. In addition, bison were not considered to have had an influence on vegetation mostly due to rough terrain, scarce water, and less grass cover than the Great Plains. Native herbivory is currently limited to mule deer and small mammals.

The following diagram suggests general pathways that the vegetation on this site might follow. There may be other states not shown on the diagram. This information is intended to show what might happen in a given set of circumstances; it does not mean that this would happen the same way in every instance. Local professional guidance should always be sought before pursuing a treatment scenario.

## State and transition model

## Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Midgrasses - Bunchgrass</b>			67-135	
	tanglehead	HECO10	<i>Heteropogon contortus</i>	34-106	-
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	34-95	-
2	<b>Shortgrasses - Stoloniferous</b>			54-108	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	22-50	-
	false grama	CAER2	<i>Cathastecum erectum</i>	20-39	-
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	11-22	-
3	<b>Midgrasses - Bunchgrass</b>			40-81	
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	17-50	-
	mesa dropseed	SPFL2	<i>Sporobolus flexuosus</i>	13-39	-
	spike dropseed	SPCO4	<i>Sporobolus contractus</i>	10-22	-
4	<b>Midgrass - Bunchgrass</b>			27-54	
	Chino grama	BORA4	<i>Bouteloua ramosa</i>	27-54	-
5	<b>Midgrasses - Bunchgrass</b>			34-67	
	cane bluestem	BOBA3	<i>Bothriochloa barbinodis</i>	17-67	-
	whiplash pappusgrass	PAVA2	<i>Pappophorum vaginatum</i>	6-17	-
	alkali sacaton	SPAI	<i>Sporobolus airoides</i>	6-17	-
	false Rhodes grass	TRCR9	<i>Trichloris crinita</i>	6-17	-
6	<b>Mid/Shortgrasses - Bunchgrass</b>			20-40	
	nineawn pappusgrass	ENDE	<i>Enneapogon desvauxii</i>	4-17	-
	streambed bristlegrass	SELE6	<i>Setaria leucopila</i>	4-11	-
	slim tridens	TRMU	<i>Tridens muticus</i>	6-11	-
	fall witchgrass	DICO6	<i>Digitaria cognata</i>	4-11	-
7	<b>Mid/Shortgrass - Bunchgrass</b>			13-27	
	threeawn	ARIST	<i>Aristida</i>	4-13	-
	low woollygrass	DAPU7	<i>Dasyochloa pulchella</i>	4-11	-
	red grama	BOTR2	<i>Bouteloua trifida</i>	4-9	-
8	<b>Annuals</b>			0-13	
	Grass, annual	2GA	<i>Grass, annual</i>	0-13	-
<b>Shrub/Vine</b>					
9	<b>Tall Shrubs</b>			61-121	
	catclaw acacia	ACGR	<i>Acacia greggii</i>	11-50	-
	desert willow	CHLI2	<i>Chilopsis linearis</i>	0-28	-
	stretchberry	FOPU2	<i>Forestiera pubescens</i>	6-22	-
	Texas lignum-vitae	GUAN	<i>Guaiacum angustifolium</i>	6-22	-
	Berlandier's wolfberry	LYBE	<i>Lycium berlandieri</i>	6-22	-
	catclaw mimosa	MIACB	<i>Mimosa aculeaticarpa var. biuncifera</i>	6-22	-
	littleleaf sumac	RHMI3	<i>Rhus microphylla</i>	6-17	-
	Torrey's yucca	YUTO	<i>Yucca torreyi</i>	6-17	-
	Texas persimmon	DITE3	<i>Diospyros texana</i>	0-17	-
	whitebrush	ALGR2	<i>Aloysia gratissima</i>	6-17	-
	spiny hackberry	CEEH	<i>Celtis ehrenbergiana</i>	6-17	-
	baccharis	BACCH	<i>Baccharis</i>	0-11	-
	willow	SALIX	<i>Salix</i>	0-11	-

	soaptree yucca	YUEL	<i>Yucca elata</i>	3-11	-
	Warnock's snakewood	COWA	<i>Condalia warnockii</i>	3-11	-
10	<b>Mid Shrubs</b>			47-94	
	creosote bush	LATR2	<i>Larrea tridentata</i>	11-34	-
	American tarwort	FLCE	<i>Flourensia cernua</i>	6-28	-
	resinbush	VIST	<i>Viguiera stenoloba</i>	9-22	-
	Texas barometer bush	LEFR3	<i>Leucophyllum frutescens</i>	6-17	-
	singlewhorl burrobrush	HYMO	<i>Hymenoclea monogyra</i>	0-17	-
	shortleaf jefea	JEBR	<i>Jefea brevifolia</i>	6-17	-
	viscid acacia	ACNE4	<i>Acacia neovernicosa</i>	3-11	-
	Wright's beebrush	ALWR	<i>Aloysia wrightii</i>	3-11	-
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	0-11	-
	desert myrtlecroton	BEOB	<i>Bernardia obovata</i>	0-11	-
	splitleaf brickellbush	BRLA	<i>Brickellia laciniata</i>	0-11	-
	rough jointfir	EPAS	<i>Ephedra aspera</i>	3-11	-
	Apache plume	FAPA	<i>Fallugia paradoxa</i>	0-11	-
	yellow trumpetbush	TEST	<i>Tecoma stans</i>	3-11	-
	Mexican bladdersage	SAME	<i>Salazaria mexicana</i>	2-9	-
11	<b>Half Shrubs</b>			40-81	
	Trans-Pecos poreleaf	POSC6	<i>Porophyllum scoparium</i>	0-17	-
	American threefold	TRCA8	<i>Trixis californica</i>	3-11	-
	Trans-Pecos ayenia	AYFI	<i>Ayenia filiformis</i>	2-11	-
	Rio Grande stickpea	CACO	<i>Calliandra conferta</i>	3-11	-
	featherplume	DAFO	<i>Dalea formosa</i>	3-11	-
	black prairie clover	DAFR2	<i>Dalea frutescens</i>	3-11	-
	littleleaf ratany	KRER	<i>Krameria erecta</i>	4-11	-
	white ratany	KRGR	<i>Krameria grayi</i>	4-11	-
	Arizona blackfoot	MELO	<i>Melampodium longicorne</i>	4-11	-
	rough menodora	MESC	<i>Menodora scabra</i>	4-11	-
	mariola	PAIN2	<i>Parthenium incanum</i>	4-11	-
	glandleaf milkwort	POMA7	<i>Polygala macradenia</i>	3-11	-
12	<b>Short Shrubs</b>			27-54	
	ocotillo	FOSP2	<i>Fouquieria splendens</i>	6-28	-
	leatherstem	JADI	<i>Jatropha dioica</i>	6-22	-
	lechuguilla	AGLE	<i>Agave lechuguilla</i>	6-17	-
	green sotol	DALE2	<i>Dasyllirion leiophyllum</i>	3-11	-
	candelilla	EUAN3	<i>Euphorbia antisiphilitica</i>	1-6	-
13	<b>Succulents</b>			27-54	
	pricklypear	OPUNT	<i>Opuntia</i>	6-22	-
	tree cholla	CYIMI	<i>Cylindropuntia imbricata</i> var. <i>imbricata</i>	6-17	-
	Christmas cactus	CYLE8	<i>Cylindropuntia leptocaulis</i>	6-11	-
	pitaya	ECEN2	<i>Echinocereus enneacanthus</i>	3-11	-
<b>Tree</b>					
14	<b>Trees</b>			101-202	
	western honey mesquite	PRGLT	<i>Prosopis glandulosa</i> var. <i>torreyana</i>	28-151	-
	desert willow	CHLI2	<i>Chilopsis linearis</i>	0-50	-

	Fremont cottonwood	POFR2	<i>Populus fremontii</i>	0-17	-
	western soapberry	SASAD	<i>Sapindus saponaria var. drummondii</i>	0-11	-
<b>Forb</b>					
15	<b>Perennials</b>			67-135	
	croton	CROTO	<i>Croton</i>	17-39	-
	Forb, perennial	2FP	<i>Forb, perennial</i>	6-17	-
	prairie clover	DALEA	<i>Dalea</i>	6-11	-
	pricklyleaf dogweed	THAC	<i>Thymophylla acerosa</i>	6-11	-
	buckwheat	ERIOG	<i>Eriogonum</i>	3-9	-
	pygmy bluet	HOWR	<i>Houstonia wrightii</i>	3-9	-
	lacy tansyaster	MAPIP	<i>Machaeranthera pinnatifida ssp. pinnatifida</i>	3-9	-
	broom milkwort	POSC2	<i>Polygala scoparioides</i>	3-9	-
	Durango senna	SEDUD	<i>Senna durangensis var. durangensis</i>	3-9	-
	pelotazo	ABIN	<i>Abutilon incanum</i>	3-9	-
	hairseed bahia	BAAB	<i>Bahia absinthifolia</i>	3-9	-
16	<b>Annuals</b>			0-11	
	Forb, annual	2FA	<i>Forb, annual</i>	0-6	-
	Havard's ipomopsis	IPHA	<i>Ipomopsis havardii</i>	0-3	-
	bladderpod	LESQU	<i>Lesquerella</i>	0-3	-

Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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## Animal community

The site is suitable for properly managed (appropriate stocking rates) livestock grazing. Abusive grazing causes a gradual decline in range health reducing livestock nutrition and habitat quality for wildlife. Livestock should be stocked at carrying capacity in proportion to the grazeable grass, forbs, and browse. Vegetative growth is episodic mirroring the rainfall. For this reason, stocker type livestock operations may be more suitable than year-round stocking. The site is important for wildlife because it provides access to both seasonal and perennial water and it contains diverse habitat structure. Invertebrates, reptiles, birds, and mammals either use the site as their primary habitat or visit from adjacent sites. Common mammals include mule deer, black-tailed jackrabbit, cottontail rabbit, javelina, coyote, skunk, woodrats, many nocturnal mice, and occasionally mountain lions. Game birds include scaled quail, Gambel's quail, and dove. Numerous songbirds and raptors also occur in the area. Diversity in both plant species and plant communities over short distances is important for healthy wildlife populations. Plant Preference by Animal Kind: This rating system provides general guidance as to animal preference for plant species. Grazing preference varies between animal kinds and classes, and changes over time, especially between seasons. It also depends upon the grazing experience of the animals. Grazing preference does not necessarily reflect the ecological status of the plant within the plant community. Legend: P=Preferred D=Desirable U=Undesirable N=Not Consumed T=Toxic X=Used, but not degree of utilization unknown Preferred – Percentage of plant in animal diet is greater than it occurs on the land Desirable – Percentage of plant in animal diet is similar to the percentage composition on the land Undesirable – Percentage of plant in animal diet is less than it occurs on the land Not Consumed – Plant would not be eaten under normal conditions. Only consumed when other forages not available. Toxic – Rare occurrence in diet and, if consumed in any tangible amounts results in death or severe illness in animal

## Hydrological functions

The Arroyo ecological site is located low on the landscape and drains surrounding watersheds toward the Rio Grande. Scouring flash floods are a natural and common feature of the arroyos during the rainy season. The runoff water that is retained within the site becomes available for plant growth. Water flow patterns, rills, pedestals and/or terracettes, and areas of bare ground are common features throughout the site. The reference plant community (1.1) provides optimal hydrologic function for the site. The shortgrass dominated community (1.2) will have increased soil erosion and decreased stability of the arroyo channel. This results from a decrease in grass cover, mostly from improper grazing management. Deeper rooted perennial midgrasses provide enhanced soil stability compared to shallower rooted shortgrasses and annuals.

## Recreational uses

The site provides limited recreational use. The unpredictable nature of flash floods create dangerous conditions for hikers or campers.

## Wood products

Mesquite trees are used for fence posts, firewood, and furniture.

## Inventory data references

Information presented here has been developed from NRCS clipping, composition, plant cover, and soils data.

## Other references

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## 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.

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Date	04/16/2012
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:** Active rill formation is slight at infrequent intervals, mostly in exposed areas within the stream terrace. The site is located within a drainage area subject to flash floods. Scoured areas within the stream channel is natural.

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2. **Presence of water flow patterns:** Flow patterns are stable and short.

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3. **Number and height of erosional pedestals or terracettes:** None

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**  
5-10 percent bare ground

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

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

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7. **Amount of litter movement (describe size and distance expected to travel):** In drainages, there can be significant amounts of litter moved long distances. On the stream terrace, minimal and short distance (<5ft) of litter movement associated with high intense rainfall.

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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):** Stability values range from 3-4 in the interspaces and 4-5 under plant canopies.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** 0-3 inches thick, brown surface horizon with a weak medium subangular structure. Data from Pantera soil series description

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** A high canopy cover of bunch, rhizomatous, and stoloniferous grasses will help minimize runoff and maximize infiltration. Grasses should comprise approximately 35% of total plant composition by weight. Shrubs will comprise about 50% by weight.

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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):** None.

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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:** Shrubs = dominant stoloniferous = dominant bunchgrasses > subdominant grasses > half shrubs = forbs > succulents > annual forbs = annual grasses

**Additional:**

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** All grasses will show some mortality and decadence in addition to annual forbs. Mid/tall perennial shrubs will show some mortality or decadence only after prolonged and severe droughts. Subshrubs will be less resistant to severe droughts than mid/tall perennial shrubs.

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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):**  
600-1200 lbs/ac depending on annual rainfall.

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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: Buffelgrass and bermudagrass in some locations.**

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**17. Perennial plant reproductive capability: All species should be capable of reproducing.**

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