USDA Natural Resources
Conservation Service

Ecological site R035XC339AZ
Shallow Sandy Loam 10-14" p.z. Calcareous

Accessed: 05/13/2025

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.

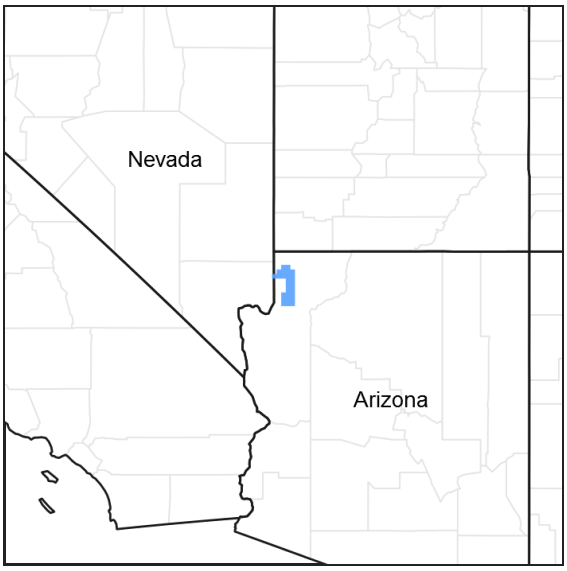

Figure 1. Mapped extent

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

AZ CRA 35.3 – Colorado Plateau Sagebrush – Grasslands

Elevations range from 4500 to 6000 feet and precipitation averages 10 to 14 inches. Vegetation includes Wyoming big sagebrush, Utah juniper, Colorado pinyon - cliffrose, Mormon tea, fourwing saltbush, blackbrush Indian ricegrass, needle and thread, western wheatgrass Galleta, black grama, blue grama, and sand dropseed. 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.

Associated sites

R035XC331AZ	**Shallow Upland 10-14" p.z. Warm** Shallow Upland, Calcareous
R035XC333AZ	**Sandstone Upland 10-14" p.z. Warm** Sandstone Upland, Calcareous

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Coleogyne ramosissima* (2) *Purshia stansburiana*
Herbaceous	Not specified

Physiographic features

This blackbrush-desert shrub site occurs in an upland position. It does not benefit from run-on moisture but, on steeper slopes, excessive run-off can occur.

On hotter south and west aspects near lower elevation limits, this site will more closely resemble the thermic site D30-2 Shallow Sandyloam, gravelly 9-12" pz. Near higher elevation limit, trees will increase; as will other shrubs, while the blackbrush componnent begins to drop out.

Table 2. Representative physiographic features

Landforms	(1) Plateau (2) Mesa (3) Cuesta
Flooding frequency	None
Ponding frequency	None
Elevation	1,372–1,829 m
Slope	4–35%
Ponding depth	0 cm
Aspect	N, NE, E

Climatic features

Winter summer moisture ratios range from 70:30 to 60:40. Late spring is usually the driest period, and early fall moisture can be sporadic. Summer rains fall from June through September; moisture originates in the Gulf of Mexico and creates convective, usually brief, intense thunderstorms. Cool season moisture from October through May tends to be frontal; it originates in the Pacific and the Gulf of California and falls in widespread storms with longer duration and lower intensity. Precipitation generally comes as snow from December through February. Accumulations above 12 inches are not common but can occur. Snow usually lasts for 3-4 days, but can persist much longer. Summer daytime temperatures are commonly 95 - 100 F and on occasion exceed 105 F. Winter air temperatures can regularly go below 10 F and have been recorded below - 20 F.

Table 3. Representative climatic features

Frost-free period (average)	168 days
Freeze-free period (average)	193 days
Precipitation total (average)	356 mm

Influencing water features

Associated water features:
Wetland description - Cowardin System
Stream types: Rosgen system

Soil features

Soil moisture regime is ustic aridic. Soil temperature regime is mesic. Soils are well-drained. Soils are non-sodic, slightly to moderately alkaline. pH range is 7.8-8.4. Plant-soil moisture relationship has a moderatelly quick intake rate, but low plant-available water due to shallow soils and coarse textures.

Typical taxonomic units on this site include:

SSA 623 Shivwits Area MU's 18 Rizno, 65 Bond & Rizno, and 76 Rizno.

Table 4. Representative soil features

Surface texture	(1) Gravelly sandy loam (2) Channery fine sandy loam (3) Very channery
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Soil depth	25–41 cm
Surface fragment cover <=3"	15–20%
Surface fragment cover >3"	10–40%
Available water capacity (0-101.6cm)	2.03–3.3 cm
Calcium carbonate equivalent (0-101.6cm)	10–35%
Electrical conductivity (0-101.6cm)	1–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	7.8–8.4
Subsurface fragment volume <=3" (Depth not specified)	5–15%
Subsurface fragment volume >3" (Depth not specified)	5–20%

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 fire, grazing, 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 amount shown for each group. Divide the resulting total by the total normal year production shown in the plant community description. If the rainfall has ben 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

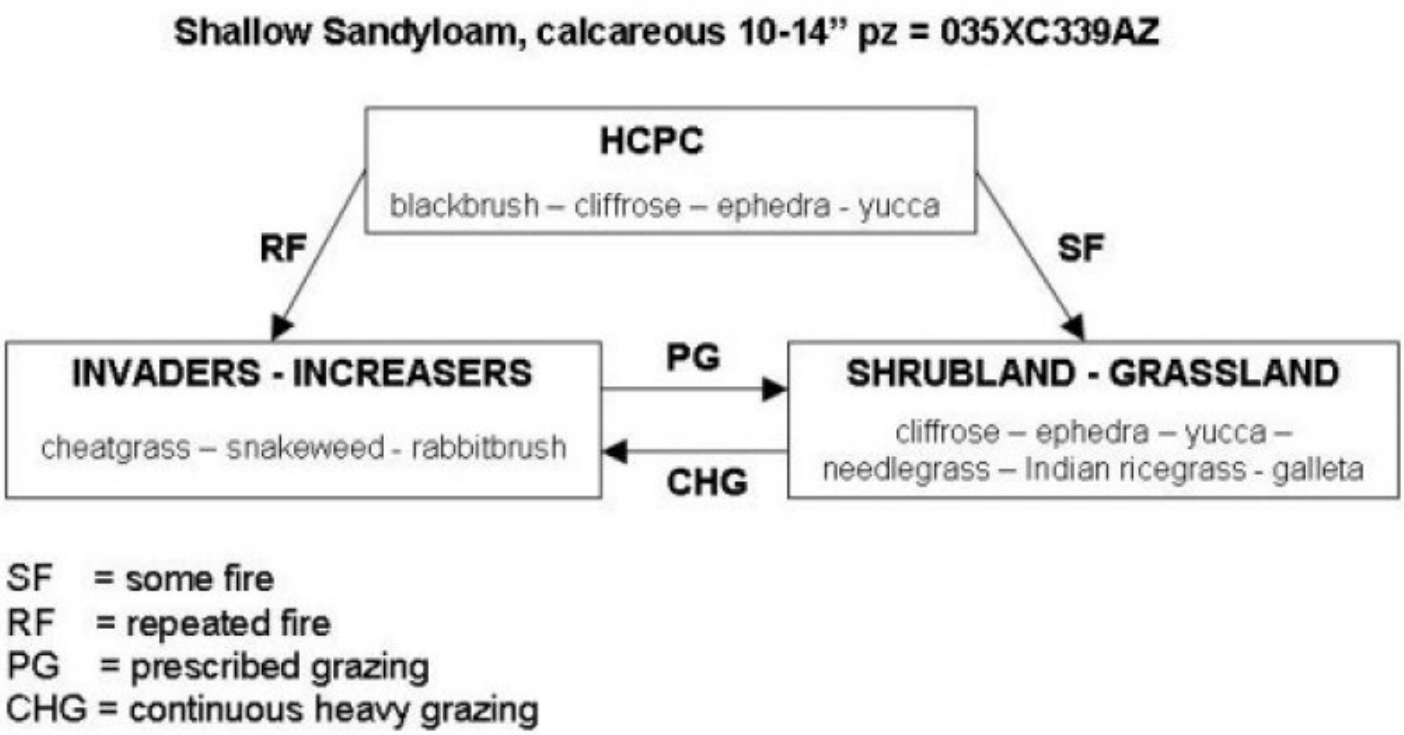

Figure 4. Shallow Sandyloam, calcareous 10-14" pz = 035XC339

State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

This site is dominated by blackbrush and other desert shrubs (cliffrose, ephedra and yucca). Trees are scattered, but increase with elevation and cool aspect. Perennial grasses are very scattered and are primarily cool season. Forbs are also infrequent. Annuals will be somewhat abundant only in years of very favorable winter-spring moisture. Typical perennial plant space is 1.0-1.5 feet. Because of the scattered canopy and very sparse undestory, this site does not have a history of regular fire disturbance. Blackbrush plant communities ae often quite old and tend to be stable. If removed, blackbrush will not readily return to the site - there will be an increase in the other major shrubs of the site, and a significant increase of cool-season grasses, with some warm-season grasses as well.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	325	369	412
Tree	31	36	40
Forb	24	26	29
Grass/Grasslike	10	12	13
Total	**390**	**443**	**494**

Table 6. Ground cover

Tree foliar cover	0-30%

Shrub/vine/liana foliar cover	5-25%
Grass/grasslike foliar cover	0-1%
Forb foliar cover	0%
Non-vascular plants	0-5%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	–	–
>0.15 <= 0.3	–	–	0-1%	0-1%
>0.3 <= 0.6	–	5-10%	–	–
>0.6 <= 1.4	–	10-25%	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	0-3%	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Figure 6. Plant community growth curve (percent production by month). AZ3531, 35.3 10-14" p.z. all sites. Growth begins in the spring and continues through the summer..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	3	17	18	10	19	20	10	1	1	0

Figure 7. Plant community growth curve (percent production by month). AZ3532, Desert needlegrass. Makes most growth from April to May.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	15	50	30	0	0	0	0	0	0	0

Figure 8. Plant community growth curve (percent production by month). AZ3533, Nevada mormon tea. Grows mainly in spring and early summer..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	25	25	20	15	10	0	0	0	0

Figure 9. Plant community growth curve (percent production by month). AZ3537, Cliffrose. Growth begins in spring, stem elongation, flowering, seed set in summer..

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

Figure 10. Plant community growth curve (percent production by month).

AZ5105, Blackbrush. Cool season grower, shuts down quickly when it gets hot..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	50	20	5	0	0	0	0	0	0

State 2
Historic Climax Plant Community

Community 2.1
Historic Climax Plant Community

This site is dominated by blackbrush and other desert shrubs (cliffrose, ephedra and yucca). Trees are scattered, but increase with elevation and cool aspect. Perennial grasses are very scattered and are primarily cool season. Forbs are also infrequent. Annuals will be somewhat abundant only in years of very favorable winter-spring moisture. Typical perennial plant spacing is 1-1.5 feet. Because of the scattered canopy and very sparse understory, this site does not have a history of regular fire disturbance. Blackbrush plant communities are often quite old and tend to be stable. If removed, Blackbrush will not readily return to the site; there will be an increase in other major shrubs of the site and a significant increase of cool-season grasses, with some warm-season grasses as well.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	334	369	405
Tree	–	36	72
Forb	4	27	48
Grass/Grasslike	–	12	25
Total	**338**	**444**	**550**

Figure 12. Plant community growth curve (percent production by month). AZ3504, 35.3 10-14" p.z. bottlebrush squirreltail. Growth occurs in late winter, spring, and fall. Plants often remain green through the winter..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	15	35	25	10	0	0	5	5	0	0

Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Tree					
0				0–72	
	Utah juniper	JUOS	*Juniperus osteosperma*	0–27	–
	twoneedle pinyon	PIED	*Pinus edulis*	0–22	–
	singleleaf pinyon	PIMO	*Pinus monophylla*	0–22	–
Shrub/Vine					
0				168–370	
	blackbrush	CORA	*Coleogyne ramosissima*	143–286	–
	Stansbury cliffrose	PUST	*Purshia stansburiana*	15–48	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	8–22	–
	mormon tea	EPVI	*Ephedra viridis*	7–16	–
1				10–34	

1				10–34	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	10–24	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	0–8	–
	rubber rabbitbrush	ERNAG	*Ericameria nauseosa ssp. nauseosa var. glabrata*	0–7	–
2				0–45	
	banana yucca	YUBA	*Yucca baccata*	15–34	–
	Whipple cholla	CYWH	*Cylindropuntia whipplei*	0–4	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	0–3	–
	Utah agave	AGUT	*Agave utahensis*	0–3	–
	Joshua tree	YUBR	*Yucca brevifolia*	0–3	–
3				0–48	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–48	–
	water jacket	LYAN	*Lycium andersonii*	0–8	–
	snowberry	SYMPH	*Symphoricarpos*	0–8	–
	Fremont's mahonia	MAFR3	*Mahonia fremontii*	0–7	–
	Sonoran scrub oak	QUTU2	*Quercus turbinella*	0–7	–
	skunkbush sumac	RHTR	*Rhus trilobata*	0–7	–
	desert ceanothus	CEGR	*Ceanothus greggii*	0–7	–
Grass/Grasslike					
0				0–24	
	desert needlegrass	ACSP12	*Achnatherum speciosum*	0–6	–
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	0–4	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–4	–
	Grass, annual	2GA	*Grass, annual*	0–4	–
	Grass, perennial	2GP	*Grass, perennial*	0–4	–
Forb					
0				4–45	
	Forb, annual	2FA	*Forb, annual*	1–7	–
	Forb, perennial	2FP	*Forb, perennial*	1–7	–
	winding mariposa lily	CAFL	*Calochortus flexuosus*	1–7	–
	dyssodia	DYSSO	*Dyssodia*	1–7	–
	buckwheat	ERIOG	*Eriogonum*	1–7	–
	beardtongue	PENST	*Penstemon*	1–7	–

Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				0–24	
	desert needlegrass	ACSP12	*Achnatherum speciosum*	0–24	–
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	0–24	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–24	–
Forb					

Forb					
2				4–48	
	winding mariposa lily	CAFL	*Calochortus flexuosus*	4–48	–
	dyssodia	DYSSO	*Dyssodia*	4–48	–
	buckwheat	ERIOG	*Eriogonum*	4–48	–
	beardtongue	PENST	*Penstemon*	4–48	–
Shrub/Vine					
3				143–286	
	blackbrush	CORA	*Coleogyne ramosissima*	143–286	–
4				15–48	
	Stansbury cliffrose	PUST	*Purshia stansburiana*	15–48	–
5				15–38	
	jointfir	EPHED	*Ephedra*	15–38	–
	mormon tea	EPVI	*Ephedra viridis*	15–38	–
6				15–34	
	banana yucca	YUBA	*Yucca baccata*	15–34	–
7				10–24	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	10–24	–
8				0–15	
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	0–15	–
	rockjasmine buckwheat	ERAN5	*Eriogonum androsaceum*	0–15	–
9				0–15	
	Utah agave	AGUT	*Agave utahensis*	0–15	–
	pricklypear	OPUNT	*Opuntia*	0–15	–
	Joshua tree	YUBR	*Yucca brevifolia*	0–15	–
10				0–48	
	desert ceanothus	CEGR	*Ceanothus greggii*	0–48	–
	water jacket	LYAN	*Lycium andersonii*	0–48	–
	Fremont's mahonia	MAFR3	*Mahonia fremontii*	0–48	–
	Sonoran scrub oak	QUTU2	*Quercus turbinella*	0–48	–
	skunkbush sumac	RHTR	*Rhus trilobata*	0–48	–
	snowberry	SYMPH	*Symphoricarpos*	0–48	–
Tree					
11				0–72	
	Utah juniper	JUOS	*Juniperus osteosperma*	0–72	–
	twoneedle pinyon	PIED	*Pinus edulis*	0–72	–
	singleleaf pinyon	PIMO	*Pinus monophylla*	0–72	–

Animal community

Steep slopes, lack of water and low production of palatable forage limit livestock use on this site. Winter use can be greater because of the palatable shrub component.

This is mostly winter range for mule deer and is not extensively used. Prescribed burning can improve shrub variety and quantity, but is difficult to accomplish. Management should be concentrated on prescribed livestock grazing and

development of wildlife water.

Potential species present include, but are not limited to, great horned owl, common raven, western rattlesnake, fringed myotis, mule deer, white-throated antelope squirrel, red-tailed hawk, rock wren, collared lizard, deer mouse, badger, Cassin's kingbird, gopher snake, leopard lizard, coyote, and black-tailed jackrabbit.

Recreational uses

Hiking, hunting, wildlife observation and photography are suited to this site.

Inventory data references

NRCS Range 417 1
NRCS AZ Range-1 4
NRCS Dry-Weight Rank 2

Type locality

Location 1: Mohave County, AZ	
Township/Range/Section	T33N R14W S10
General legal description	NE 1/4 of section, Grand Gulch Bench 7.5 minute quad

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)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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):**

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

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:**

17. **Perennial plant reproductive capability:**