Ecological site R040XC312AZ
Loamy Swale 3"-7" p.z.

Accessed: 05/11/2025

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.

MLRA notes

Major Land Resource Area (MLRA): 040X–Sonoran Basin and Range

AZ 40.3 – Colorado Sonoran Desert

Elevations range from 300 to 1200 feet and precipitation averages 3 to 7 inches per year. Vegetation includes creosotebush, white bursage, brittlebush, Mormon tea, teddybear cholla, elephant tree, smoke tree, ocotillo, and big galleta. The soil temperature regime is hyperthermic and the soil moisture regime is typic aridic. This unit occurs within the Basin and Range Physiographic Province and is characterized by numerous mountain ranges that rise abruptly from broad, plain-like valleys and basins. Igneous and metamorphic rock classes dominate the mountain ranges and sediments filling the basins represent combinations of fluvial, lacustrine, colluvial and alluvial deposits.

Table 1. Dominant plant species

Tree	(1) *Parkinsonia florida* (2) *Parkinsonia microphylla*
Shrub	(1) *Viguiera dentata* (2) *Ambrosia dumosa*
Herbaceous	(1) *Pleuraphis rigida* (2) *Muhlenbergia porteri*

Physiographic features

This range site occurs in a bottom position. It benefits significantly from run-in moisture from adjacent areas and it suffers from moderate to rapid loss of run-off. It occurs on floodplains, alluvial fans and low terraces.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Alluvial fan (3) Terrace
Elevation	75–1,000 ft
Slope	0–1%

Climatic features

Precipitation in this common resource area ranges from 3-7 inches yearly. Despite historical averages in rainfall amounts, as one moves from east to west in this resource area rains become more unpredictable and variable with Coefficients of Variation of annual rainfall equal to 44% at Gila Bend and 65% at Mohawk. Winter-Summer rainfall ratios are 40-60%. Summer rains fall July-September, originate in the Gulf of Mexico and are convective, usually brief intense thunderstorms. Summer thunderstorms usually form over the mountains in the afternoon and spread to

the valleys and plains in the evening. The intensity of this precipitation is moderate to heavy, but rarely lasts more than half an hour. Many times these storms produce little more than gusty winds and light showers. Cool season moisture tends to be frontal, originate in the Pacific and Gulf of California and falls in widespread storms with long duration and low intensity. Snow is very rare and falls normally only in the higher mountains.

Mean temperatures for the hottest month (Jul) is 93 F; the coldest month (Jan) is 53 F. Extreme temperatures of 125 F and 10 F have been recorded. Long periods with little or no effective moisture occur frequently.

The winter-spring precipitation is the most dependable on the site. Perennial grasses, though classed as warm season growers, grow actively year-round when moisture is available. Shrubs and trees generally respond to seasonal moisture. The two rainy periods bring about their respective production of either winter or summer annual grasses and forbs.

Table 3. Representative climatic features

Frost-free period (average)	363 days
Freeze-free period (average)	0 days
Precipitation total (average)	7 in

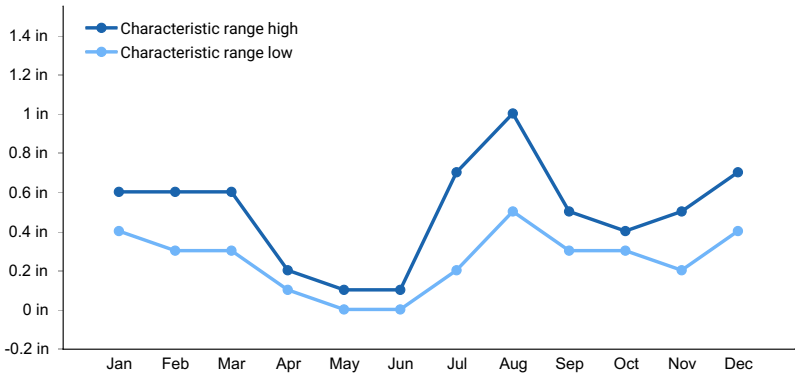

Figure 1. Monthly precipitation range

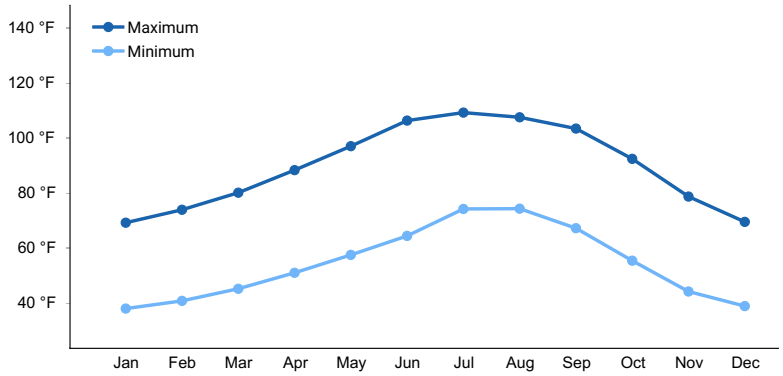

Figure 2. Monthly average minimum and maximum temperature

Influencing water features

Soil features

Soils that are grouped together in this range site are deep to bedrock or other plant root restricting layers. Surface soil texture has a minimum depth of 10-15 inches and range in texture from loam to silty clay loam. Underlying layers have moderate to moderately slow permeability rates, but can absorb and hold all the moisture the climate supplies. Soluble salt accumulations are low. pH ranges from 7.9-8.4. With good vegetative cover, infiltration rates are high. Stability against erosion processes is moderate and plant-soil moisture relationships are good. Gravel may occur throughout the soil, but is less than 35% of the total soil volume.

Soils mapped on this site include: in SSA-649 Yuma-Wellton area MU's Gilman-9, Glenbar-10, Indio-16, Lagunita-19 & Ripley-16; SSA-653 Gila Bend-Ajo area MU Mohall Loam occasionally flooded-46.

Table 4. Representative soil features

Parent material	(1) Alluvium–granite
Surface texture	(1) Loam (2) Silty clay loam
Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	60 in
Surface fragment cover <=3"	0–35%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	8.4–11.4 in
Calcium carbonate equivalent (0-40in)	1–10%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	7.9–8.4
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

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 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

The State and Transition Model and Accompanying Narrative Descriptions are Still To Be Developed for this Ecological Site. For More Information Contact The Arizona NRCS State Rangeland Management Specialist.

State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

The plant community is a mixture of annual and perennial grasses and forbs, and scattered shrubs. This site is favored by livestock due to accessibility, longer green period and nearness to water. When the plant cover is depleted, the site is very susceptible to sheet and gully erosion and woody plant invasion or increase, notably by mesquite and creosotebush. When gullied, much of the area once flooded no longer receives the extra moisture.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	215	315	415
Shrub/Vine	50	85	120
Forb	35	53	70
Tree	4	12	20
Total	**304**	**465**	**625**

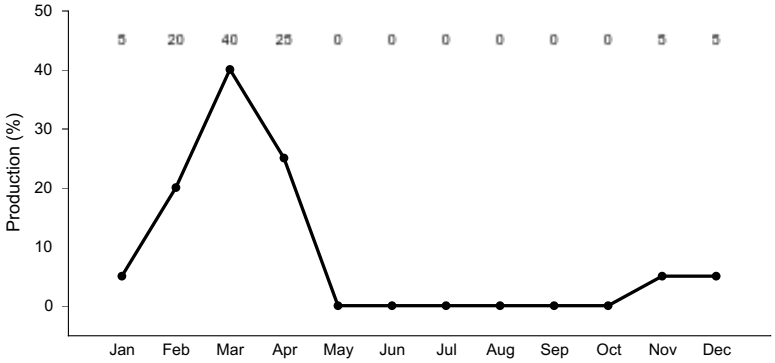

Figure 4. Plant community growth curve (percent production by month). AZ4041, 40.3 3-7" p.z. all sites. Most growth occurs in the winter to early spring, plants are dormant May through October..

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Dominant Perennial Grasses**			175–315	
	bush muhly	MUPO2	*Muhlenbergia porteri*	100–180	–
	big galleta	PLRI3	*Pleuraphis rigida*	100–180	–
2	**Threeawns**			20–60	
	Santa Rita threeawn	ARCAG	*Aristida californica var. glabrata*	10–30	–
	poverty threeawn	ARDI5	*Aristida divaricata*	10–30	–
	blue threeawn	ARPUN	*Aristida purpurea var. nealleyi*	10–30	–
	Parish's threeawn	ARPUP5	*Aristida purpurea var. parishii*	10–30	–
	Wright's threeawn	ARPUW	*Aristida purpurea var. wrightii*	10–30	–
	spidergrass	ARTE3	*Aristida ternipes*	10–30	–
	spidergrass	ARTEG	*Aristida ternipes var. gentilis*	10–30	–
3	**Misc. Grasses**			20–40	
	sixweeks threeawn	ARAD	*Aristida adscensionis*	0–10	–
	needle grama	BOAR	*Bouteloua aristidoides*	0–10	–
	sixweeks grama	BOBA2	*Bouteloua barbata*	0–10	–
	Arizona brome	BRAR4	*Bromus arizonicus*	0–10	–
	Arizona cottontop	DICA8	*Digitaria californica*	5–10	–
	little barley	HOPU	*Hordeum pusillum*	0–10	–
	Mexican sprangletop	LEFUU	*Leptochloa fusca ssp. uninervia*	5–10	–
	Devils Canyon muhly	MUAP	*Muhlenbergia appressa*	0–10	–
	littleseed muhly	MUMI	*Muhlenbergia microsperma*	0–10	–
	Bigelow's bluegrass	POBI	*Poa bigelovii*	0–10	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	5–10	–
	spike dropseed	SPCO4	*Sporobolus contractus*	5–10	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	5–10	–
	mesa dropseed	SPFL2	*Sporobolus flexuosus*	5–10	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	0–10	–
Forb					

4	**Misc. Forbs**			20–40	
	blazingstar	MENTZ	*Mentzelia*	3–5	–
	wishbone-bush	MILAV	*Mirabilis laevis var. villosa*	3–5	–
	evening primrose	OENOT	*Oenothera*	3–5	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	3–5	–
	Coulter's globemallow	SPCO2	*Sphaeralcea coulteri*	3–5	–
	spear globemallow	SPHA	*Sphaeralcea hastulata*	3–5	–
	globemallow	SPHAE	*Sphaeralcea*	3–5	–
	brownplume wirelettuce	STPA4	*Stephanomeria pauciflora*	3–5	–
	Louisiana vetch	VILUL2	*Vicia ludoviciana ssp. ludoviciana*	3–5	–
5	**Other Forbs**			7–35	
	dwarf desertpeony	ACNA2	*Acourtia nana*	0–1	–
	trailing windmills	ALIN	*Allionia incarnata*	0–1	–
	weakleaf bur ragweed	AMCO3	*Ambrosia confertiflora*	0–1	–
	Menzies' fiddleneck	AMME	*Amsinckia menziesii*	0–1	–
	carelessweed	AMPA	*Amaranthus palmeri*	0–1	–
	milkvetch	ASTRA	*Astragalus*	0–1	–
	spiderling	BOERH2	*Boerhavia*	0–1	–
	hoary bowlesia	BOIN3	*Bowlesia incana*	0–1	–
	sand pygmyweed	CRCOC	*Crassula connata var. connata*	0–1	–
	cryptantha	CRYPT	*Cryptantha*	0–1	–
	fingerleaf gourd	CUDI	*Cucurbita digitata*	0–1	–
	desert thorn-apple	DADI2	*Datura discolor*	0–1	–
	American wild carrot	DAPU3	*Daucus pusillus*	0–1	–
	sacred thorn-apple	DAWR2	*Datura wrightii*	0–1	–
	western tansymustard	DEPI	*Descurainia pinnata*	0–1	–
	bluedicks	DICA14	*Dichelostemma capitatum*	0–1	–
	touristplant	DIWI2	*Dimorphocarpa wislizeni*	0–1	–
	fetid marigold	DYPA	*Dyssodia papposa*	0–1	–
	miniature woollystar	ERDI2	*Eriastrum diffusum*	0–1	–
	buckwheat	ERIOG	*Eriogonum*	0–1	–
	spurge	EUPHO	*Euphorbia*	0–1	–
	gilia	GILIA	*Gilia*	0–1	–
	Indian rushpea	HOGL2	*Hoffmannseggia glauca*	0–1	–
	Gordon's bladderpod	LEGO	*Lesquerella gordonii*	0–1	–
	shaggyfruit pepperweed	LELA	*Lepidium lasiocarpum*	0–1	–
	pepperweed	LEPID	*Lepidium*	0–1	–
	desert deervetch	LOMI	*Lotus micranthus*	0–1	–
	coastal bird's-foot trefoil	LOSA	*Lotus salsuginosus*	0–1	–
	Coulter's lupine	LUSP2	*Lupinus sparsiflorus*	0–1	–
	Nuttall's povertyweed	MONU	*Monolepis nuttalliana*	0–1	–
	Florida pellitory	PAFL3	*Parietaria floridana*	0–1	–
	combseed	PECTO	*Pectocarya*	0–1	–
	manybristle chinchweed	PERA2	*Pectis papposa*	0–1	

	manybristle chinchweed	PEPA2	*Pectis papposa*	0–1	–
	phacelia	PHACE	*Phacelia*	0–1	–
	desert Indianwheat	PLOV	*Plantago ovata*	0–1	–
	sleepy silene	SIAN2	*Silene antirrhina*	0–1	–
	London rocket	SIIR	*Sisymbrium irio*	0–1	–
	woollyhead neststraw	STMI2	*Stylocline micropoides*	0–1	–
	woolly tidestromia	TILA2	*Tidestromia lanuginosa*	0–1	–
Shrub/Vine					
6	**Misc. Shrubs**			35–70	
	San Felipe dogweed	ADPO	*Adenophyllum porophylloides*	5–11	–
	ambrosia leaf bur ragweed	AMAM2	*Ambrosia ambrosioides*	5–11	–
	burrobush	AMDU2	*Ambrosia dumosa*	5–11	–
	narrowleaf silverbush	ARLA12	*Argythamnia lanceolata*	5–11	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	5–11	–
	cattle saltbush	ATPO	*Atriplex polycarpa*	5–11	–
	desertbroom	BASA2	*Baccharis sarothroides*	5–11	–
	Coulter's brickellbush	BRCO	*Brickellia coulteri*	5–11	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	5–11	–
	longleaf jointfir	EPTR	*Ephedra trifurca*	5–11	–
	slender janusia	JAGR	*Janusia gracilis*	5–11	–
	white ratany	KRGR	*Krameria grayi*	5–11	–
	Mexican bladdersage	SAME	*Salazaria mexicana*	5–11	–
	toothleaf goldeneye	VIDE3	*Viguiera dentata*	5–11	–
7	**Succulents**			4–12	
	saguaro	CAGI10	*Carnegiea gigantea*	1–3	–
	buckhorn cholla	CYACA2	*Cylindropuntia acanthocarpa var. acanthocarpa*	1–3	–
	Arizona pencil cholla	CYAR14	*Cylindropuntia arbuscula*	1–3	–
	teddybear cholla	CYBI9	*Cylindropuntia bigelovii*	1–3	–
	Wiggins' cholla	CYEC3	*Cylindropuntia echinocarpa*	1–3	–
	Christmas cactus	CYLE8	*Cylindropuntia leptocaulis*	1–3	–
	Engelmann's hedgehog cactus	ECEN	*Echinocereus engelmannii*	1–3	–
	candy barrelcactus	FEWI	*Ferocactus wislizeni*	1–3	–
8	**Other Shrubs**			7–35	
	whitethorn acacia	ACCO2	*Acacia constricta*	1–5	–
	catclaw acacia	ACGR	*Acacia greggii*	1–5	–
	crucifixion thorn	CAEM4	*Castela emoryi*	1–5	–
	snakewood	CONDA	*Condalia*	1–5	–
	brittlebush	ENFA	*Encelia farinosa*	1–5	–
	Berlandier's wolfberry	LYBE	*Lycium berlandieri*	1–5	–
	desert-thorn	LYCIU	*Lycium*	1–5	–
	pale desert-thorn	LYPA	*Lycium pallidum*	1–5	–
	desert ironwood	OLTE	*Olneya tesota*	1–5	–

	honey mesquite	PRGL2	*Prosopis glandulosa*	1–5	–
Tree					
9	**Tree**			4–20	
	blue paloverde	PAFL6	*Parkinsonia florida*	2–10	–
	yellow paloverde	PAMI5	*Parkinsonia microphylla*	2–10	–

Animal community

This site produces forage for year-round use and is easily traversed by all classes of cattle. Because of these factors and water availability, these areas are often overused. Mesquite readily increases on this site when the plant cover has bene depleted. Invader species include creosotebush. These areas are often productive enough to warrant fencing and water development and use as special use pastures. When scattered areas of this site occur with larger areas of unproductive areas (i.e., limy uplands, saline terraces), the entire area should be managed for the loamy bottom inclusions.

This site, being predominantly a grassland area, meets habitat requirements for small mammals and ground birds. Use by larger desert mammals is restricted to feeding and watering.

Recreational uses

Land form consists of large swales, flats in canyon bottoms, components of large desert plains and loamy floodplains of the drainageways. This site is an open grassland with scattered trees and shrubs. In good winter precipitation years, spring wildflowers lend color. Very few days in the fall, winter or spring are too uncomfortable to enjoy outdoor activities. Afternoons Jun-Aug, however, are restricted due to heat. Horseback riding, wildlife observation, hunting, hiking, picnicking and photography are the main uses suited to the site.

Other information

Extensively used for cropland where irrigation water is available.

Type locality

Location 1: Mohave County, AZ	
Township/Range/Section	T11N R12W S9
General legal description	Eagle Tail Ranch

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)	Dave Womack, Dan Robinett, Emilio Carrillo
Contact for lead author	NRCS Tucson Area Office
Date	03/07/2005

Approved by	S. Cassady
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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2. **Presence of water flow patterns:** Water flow patterns are uncommon, highly variable and a function of upland runoff.

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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):** 5-50%. Lower values expected in El Nino years.

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

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6. **Extent of wind scoured, blowouts and/or depositional areas:** No evidence of soil movement by wind.

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7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter can move by water when high flows are received.

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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):** Soil surface resisitance to erosion is good. Expect values of 1-3 in plant interspaces, 4-6 in plant canopies.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Weak thir platy to granular to subangular blocky with depth; 7.5-10YR6/4 dry, 7.5-10YR4/4 moist; thickness to 6 inches.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** 15-25% canopy; 70-75% shrubs, 25-30% trees.

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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: shrubs > trees > winter annuals > summer annuals > perennial forbs.

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):** 30-70% canopy mortality.

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14. **Average percent litter cover (%) and depth (in):** Hervaceous litter is not persistent on the site and may be 35-60% in El Nino years.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 304 lbs/ac unfavorable precipitation; 465 lbs/ac normal precipitation; 625 lbs/ac favorable 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:** Sahara mustard (potential), London Rocket, Cheeseweed.

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17. **Perennial plant reproductive capability:** Not impaired for trees and shrubs.
