

Ecological site R035XC312AZ Loamy Wash 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.

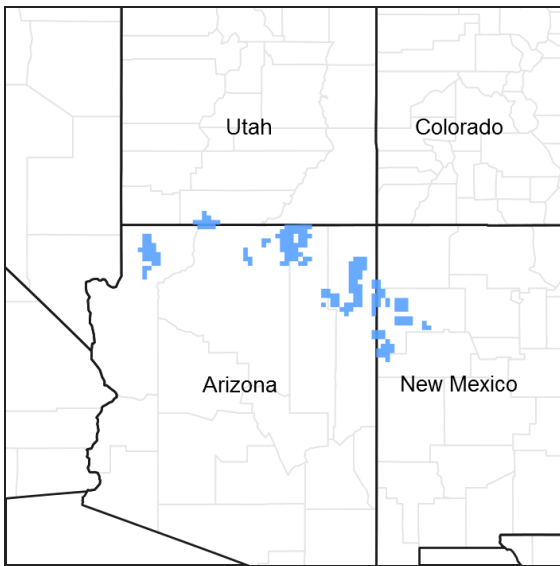


Figure 1. Mapped extent

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 is found in Common Resource Area 35.3 – the Colorado Plateau Sagebrush – Grasslands.

The Common Resource Area occurs within the Colorado Plateau Physiographic Province. It is characterized by a sequence of flat to gently dipping sedimentary rocks eroded into plateaus, valleys and deep canyons. Elevations range from 4800 to 6700 feet and precipitation averages 10 to 14 inches. The elevation range is lower (about 4500 to 6000) on the western side of the Colorado Plateau along the Grand Canyon, and moves up about 500 to 800 feet higher on the eastern side in the areas of the Navajo and Hopi Indian Reservations due to rain shadow effects from the Kaibab Plateau and Mogollon Rim. Common vegetation in this region 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. Sedimentary rock classes dominate the plateau with volcanic fields occurring for the most part near its margin. The soil temperature regime is mesic and the soil moisture regime is ustic aridic.

Ecological site concept

This site appears to be both clayey/Salty/and wash and or bottom type sites. The model for XC calls for big sagebrush to exist on the site. It would not be expected to see big sagebrush on this site except for an occasional basin big sagebrush which occurs in areas of a higher water table. The soil components listed in the site exist in

LRU 35XA and XB or more appropriately a transitional area between the two i.e. lower end of precip in 10-14" and upper end of precip in 6-10". Only one of the soil components listed occurs with any kind of sagebrush, and is basin big sagebrush in that case.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Atriplex canescens</i>
Herbaceous	(1) <i>Pascopyrum smithii</i> (2) <i>Bouteloua gracilis</i>

Physiographic features

This ecological site is found on flood plains, stream terraces and alluvial fans. The site receives run-on moisture. The soils are deep to very deep to any plant root restricting layer. The surface texture of the soil is loam to very fine sandy loam. Slopes range from 0 to 15 percent.

Table 2. Representative physiographic features

Landforms	(1) Swale (2) Flood plain (3) Stream terrace
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Occasional to frequent
Ponding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Ponding frequency	None to rare
Elevation	1,463–2,042 m
Slope	0–15%
Aspect	Aspect is not a significant factor

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

The soil moisture on this ecological site comes from precipitation and run-on moisture following storm events. The site may also benefit from lateral underground water movement from the streambed for periods of time after the surface water has drained off. This additional moisture allows this site to produce significantly more vegetation than upland sites that depend entirely on rainfall.

Soil features

Soils are moderately deep to very deep. Surface texture ranges from very fine sandy loam to sandy clay loam. Subsurface horizons have textures of clay loam to sandy loam and contain less than 35% gravel by volume. There may be stratified layers of coarser or finer soils in the profile. Permeability ranges from moderately slow to moderate. The soil reaction ranges from neutral to moderately alkaline (pH 6.6-8.4). The soil surface and subsurface horizons are non to strongly effervescent. Plant soil moisture relationships are better than average.

Soil survey map unit components that have been correlated to this ecological site include

SSA 623 Shivwits Area MU 63 Radnik;

SSA 707 Little Colorado River 41-Radnik/Escavada

SSA 711 Navajo Mountain Area 6-Tsosie, 28-Radnik;

SSA 713 Chinle Area 64-Ustifluventic Haplocambids

SSA 715 Fort Defiance Area 2-Aquima, 114-Sparank/San Mateo

Table 4. Representative soil features

Parent material	(1) Flow deposits—sandstone and shale
Surface texture	(1) Loam (2) Very fine sandy loam (3) Sandy clay loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Soil depth	102–203 cm
Surface fragment cover <=3"	0–1%
Available water capacity (0-101.6cm)	17.78–26.67 cm
Calcium carbonate equivalent (0-101.6cm)	0–20%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–10%

Ecological dynamics

An ecological site is not a precise assemblage of species for which the proportions are the same from place to place or from year to year. In all plant communities, variability is apparent in productivity and occurrence of individual species. Spatial boundaries of the communities; however, can be recognized by characteristic patterns of species composition, association, and community structure. The historic climax plant community for this ecological site has been described by sampling relict or relatively undisturbed sites and/or reviewing historic records. The historic climax plant community is the plant community that evolved over time with the soil forming process and long term changes in climatic conditions of the area. It is the plant community that was best adapted to the unique combination of environmental factors associated with the site.

Natural disturbances, such as drought, fire, grazing of native fauna, and insects, are inherent in the development and maintenance of these plant communities. The effects of these disturbances are part of the range of characteristics of the ecological site. Fluctuations in plant community structure and function caused by the effects of natural disturbances help establish the boundaries and characteristics of an ecological site. They are accounted for as part of the range of characteristics of the ecological site. Recognizable plant community phases are identified in the reference state of the ecological site. Some sites may have a small range of variation, while others have a large range. Some plant community phases may exist for long periods of time, while others may only occur for a couple of years after a disturbance.

Deterioration of the plant community, hydrology, or soil site stability on an ecological site can result in crossing a threshold or potentially irreversible boundary to another state, or equilibrium. This can occur as a result of the loss of soil surface through erosion, the loss of the stability of the site due to disturbances that cause active erosion on the site, increases in the amounts and/or patterns or runoff from rainstorms, changes in availability of surface and subsurface water, significant changes in plant structural and functional types, or the introduction of non-native species. When these thresholds are crossed, the potential of the ecological site to return to the historic climax plant community can be lost, or restoration will require significant inputs. There may be multiple states possible for an ecological site, determined by the type and or severity of disturbance.

The known states and transition pathways for this ecological site are described in the state and transition model. Within each state, there may be one or more known plant community phases. These community phases describe the different plant community that can be recognized and mapped across this ecological site. The state and transition model is intended to help land users recognize the current plant community on the ecological site, and the management options for improving the plant community to the desired plant community.

Plant production information in this site description is standardized to the annual production on an air-dry weight basis in near normal rainfall years.

The State and Transition model shows the most common occurring plant communities likely to be encountered on this ecological site. This model may not show every possible plant community, but only those that are most prevalent and observed through field inventory. As more data is collected and research is available, these plant communities may be revised, removed, and even added to reflect the ecological dynamics of this site.

State and transition model

35.3 Loamy Wash 10-14" p.z. (R035XC312AZ)

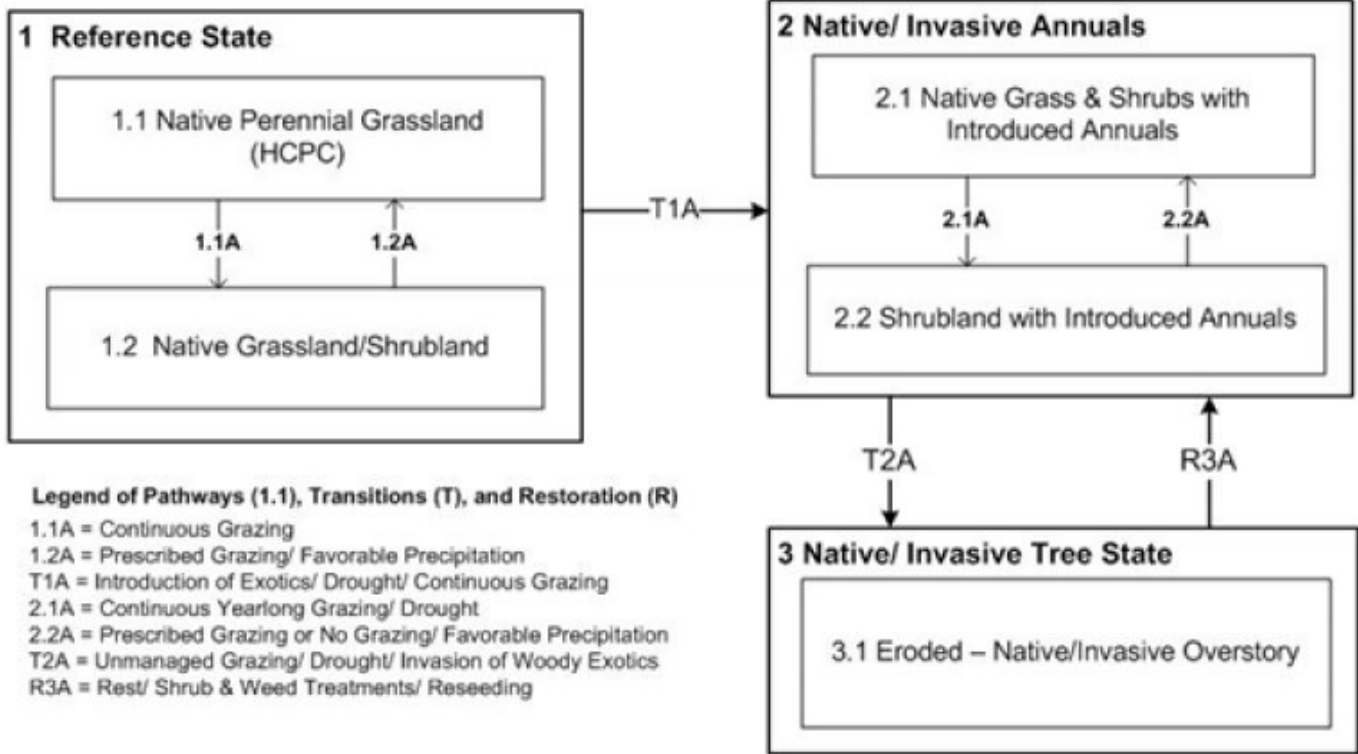


Figure 4. STM - R035XC312AZ

State 1 Reference State

Community 1.1 Native Perennial Grassland

The historic climax plant community consists predominately of cool and warm season grasses with a small percentage of shrubs and forbs. In the original plant community there is a mixture of both cool and warm season grasses. 1.1 Native Perennial Grassland: The site consist of perennial Native grasses and forbs with minor amounts of shrub cover. Dominant plants species include: James' galleta, Indian ricegrass, sand dropseed, and western wheat grass. 1.1A:Continuous yearlong herbivory. T1A: Continuous yearlong herbivory/ Unmanaged Rangelands/ Introduction of Exotics

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	729	1009	1345
Shrub/Vine	140	280	392
Forb	56	84	112
Total	925	1373	1849

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

Community 1.2

Native Grassland and Shrubland

1.2 Palatable cool and warm grasses decreases due to continuous yearlong grazing, thus decreasing the vegetative cover of the native grasses. As the native grasses begin to decline, native shrubs increase their establishment such as fourwing saltbush, broom snakeweed, Greene's rabbitbrush, rubber rabbitbrush, and whipple cholla. Dominant plant species include: James' galleta, Indian ricegrass, western wheat grass and fourwing saltbush. COMMUNITY PATHWAY: 1.2A: No grazing to rest the rangelands and implement a prescribed grazing plan with favorable precipitation TRANSITION: T1A: Continuous yearlong herbivory/ Drought/ Introduction of Exotics

State 2

Native/ Invasive Annuals

The general aspect of this state is a native perennial grassland/shrubland with a mix of native and non-native annuals. Invasive annuals have been introduced and are well established in the understory.

Community 2.1

Native Grasses & Shrubs with Introduced Annuals



Figure 7. 2.1 Plant Community

2.1 If left unmanaged from continuous grazing, undesirable exotic plant species will establish and continue to increase in the understory. Introduced invasive species most likely to establish themselves when the site deteriorates are prickly Russian thistle, weed Kochia, cheatgrass, filaree and other exotic annuals. There will be a low component of these exotic annuals in the understory, and beginning the process of exotic annuals establishing themselves on site. COMMUNITY PATHWAY: 2.1A: Continuous yearlong grazing/ Drought/ Decrease of perennial grass cover/ Higher bare ground/ Active erosion

Community 2.2

Shrubland with Introduced Annuals

2.2 In addition to unmanaged rangelands on the adjacent uplands, extensive grazing drives the native plant community on a downward trend, and exotic annuals continue an upward trend. Invasive native shrubs most likely to increase and invade are broom snakeweed, Greene's rabbitbrush, rubber rabbitbrush, pricklypear and whipple cholla. Dominant plant species will include: James' galleta, Indian ricegrass, broom snakeweed, Greene's rabbitbrush, rubber rabbitbrush, pricklypear whipple cholla, Russian thistle, weed Kochia, Rocky Mountain beeplant, cheatgrass, thistles, mustards, filaree and other exotic annuals. COMMUNITY PATHWAY: 2.2A: Rest/ Prescribed grazing/ Favorable precipitation TRANSITION PATHWAY: T2A: Unmanaged Continuous Grazing/ Severe Prolonged Drought/ Unmanaged Uplands - increased run-on & sediments/ Invasive of Woody Exotics

State 3

Native/ Invasive Tree State

The plant community in this state is dominated by a mix of native and non-native trees and shrubs with scattered patches of grasses and forbs. There is active channel downcutting and deposition.

Community 3.1

Eroded - Native/ Invasive Overstory

3.1 As native grasses and shrubs are grazed continuously, the native vegetative cover decreases rapidly and the understory is transformed into an exotic plant community. There will be a higher component of exotic trees, annual grasses and forbs eventually stressing and outcompeting the native plant community. Invasive dominant species include: Tamarisk, Russian olive, broom snakeweed, rubber rabbitbrush, Greene's rabbitbrush, prickly Russian thistle, common sunflower, weed Kochia, mustards, beeplant, thistles, cheatgrass, foxtail barley, field bindweed, filaree and other exotic annuals. Distribution of these exotics species will be extensive and eventually displace most of the native herbaceous species, as the native species are not given time to reproduce. Bare interspaces with less vegetative cover are visible on the surface resulting in the increased erosion process allowing for more rainfall runoff
TRANSITION PATHWAY: R3A: Rest/ Prescribe grazing/ Reseeding/ Integrated Shrub & Weed treatment

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			673–1121	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	336–504	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	224–336	–
	squirreltail	ELELE	<i>Elymus elymoides ssp. elymoides</i>	56–168	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	56–168	–
	muttongrass	POFE	<i>Poa fendleriana</i>	56–168	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	56–168	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	56–112	–
	common wolfstail	LYPH	<i>Lycurus phleoides</i>	56–112	–
	spike muhly	MUWR	<i>Muhlenbergia wrightii</i>	56–112	–
2	Other Grasses			56–224	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	22–56	–
	threeawn	ARIST	<i>Aristida</i>	22–56	–
	mat muhly	MURI	<i>Muhlenbergia richardsonis</i>	22–56	–
	tumblegrass	SCPA	<i>Schedonnardus paniculatus</i>	11–28	–
	Grass, annual	2GA	<i>Grass, annual</i>	11–28	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	11–28	–
Forb					
3	Forbs			56–112	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	56–168	–
	Forb, annual	2FA	<i>Forb, annual</i>	0–56	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–56	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	0–56	–
	milkvetch	ASTRA	<i>Astragalus</i>	0–56	–
	menodora	MENOD	<i>Menodora</i>	0–56	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	0–56	–
Shrub/Vine					
4	Shrubs			140–392	
	squirreltail	ELELE	<i>Elymus elymoides ssp. elymoides</i>	56–168	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	56–168	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	56–112	–
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	56–112	–
	rabbitbrush	CHRY9	<i>Chrysothamnus</i>	11–56	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	11–56	–

Animal community

This site is favorable for livestock grazing during most of the grazing periods except when snow cover restricts availability of forage.

When this site is located adjacent to upland wooded sites, it becomes increasingly important for wildlife by forming an 'edge'. this site, in excellent condition, provides early green feed for wildlife.

Recreational uses

This site occurs as swales. It is open grassland interspersed with shrubs. Winters are cold and springs tends to be dry and quite windy. Late spring, summer, and fall are the most pleasant seasons for outdoor activities such as sport hunting, cross-country riding and wildlife observation.

Other information

T&E Species: Golden eagles and prairie falcons may use these areas for feeding.

Other references

Updates and revisions for this ESD were conducted as part of a 2007-2012 Interagency Technical Assistance Agreement between the Bureau of Indian Affairs–Navajo Region and the NRCS-Arizona.

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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	08/27/2012
Approved by	Steve Barker
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

- 1. Number and extent of rills:** Some minor rill formation is possible due to loamy textures, moderate permeability and occasional flooding. Rills present should be widely spaced and not connected.

- 2. Presence of water flow patterns:** A few are expected due to the site's position on the landscape. This site receives run-on moisture and is subject to occasional flooding. Flow patterns are usually sinuous and fairly long (>12 feet).

- 3. Number and height of erosional pedestals or terracettes:** Some pedestals and terracettes are present, but should be minor and stable. No roots should be exposed around pedestals. Terracettes should be associated with litter and plant debris.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground ranges from 15 – 35 percent.
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5. **Number of gullies and erosion associated with gullies:** Few expected. Due to occasional flooding and extra run-on moisture a few gullies can form in areas where water flow is concentrated from adjacent uplands. There should be no active erosion and the site should have vegetation stabilizing the gully.
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6. **Extent of wind scoured, blowouts and/or depositional areas:** None expected.
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7. **Amount of litter movement (describe size and distance expected to travel):** Due to occasional water disturbance on the surface, herbaceous and woody litter movement is common.
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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):** The expected soil stability rating under plant canopies is 4 to 5 and a rating in the interspaces of 3 to 4. The surface textures are sandy loam to silt loam. When well vegetated and with adequate litter cover these soils have moderate resistance to erosion.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface thickness ranges from 2-5". Soil structure can be either granular or platy. Colors are reddish brown.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** This site is characterized by a dominance of grasses with some shrubs and a few forbs. The distribution of herbaceous cover helps minimize erosion and aids in reducing surface flow to allow for infiltration.
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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. Some soils might have subsurface horizon structure of subangular blocky or platy structure. These are not compacted layers.
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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: Cool season colonizing grasses > Warm season bunch grasses > Cool season bunch grasses >
- Sub-dominant: Warm season colonizing grasses > Shrubs
- Other: Perennial forbs > Half-shrubs > Annual forbs
- Additional:
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or**

decadence): All plants 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.

14. **Average percent litter cover (%) and depth (in):** Litter cover is mostly fines with depths usually less than 1/2". Litter depths will be the greatest under canopies.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Average annual production on this site is expected to be 1100 to 1300 lbs/ac. in a year of average annual precipitation.

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:** Broom snakeweed, rubber rabbitbrush and big sagebrush are all native to the site, but have the potential to increase and co-dominate the site after disturbance. Tamarisk, cheatgrass and Russian thistle are non-native species that have potential to invade the site.

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.
