USDA Natural Resources
Conservation Service

Ecological site R034BY115UT
Desert Sandy Loam (Indian Ricegrass)

Last updated: 3/05/2022
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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.

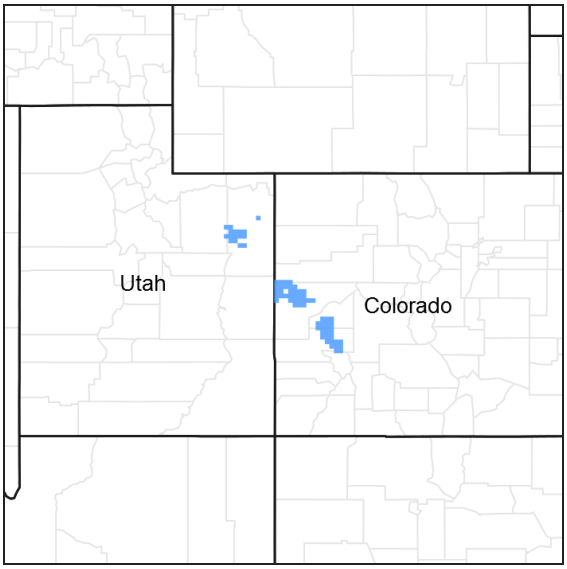


Figure 1. Mapped extent

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): 034B–Warm Central Desertic Basins and Plateaus

MLRA 34B occurs in is in Utah (70 percent) and Colorado (30 percent). It makes up about 12,850 square miles (33,290 square kilometers). A small part of the area is in the High Plateaus of Utah Section of the Colorado Plateaus Province of the Intermontane Plateaus. The northern part of the MLRA occurs in the Uinta Basin Section, which is bounded by the Uinta Mountains to the north, the Wasatch Range to the west, the Roan Plateau to the south, and the Rabbit Hills to the east. The southern part of the MLRA occurs in the northern third of the Canyon Lands Section. This section is bounded by the Roan Plateau to the north, the Wasatch Plateau to the west, the southern end of the San Rafael Swell to the south, and the western slope of the Rocky Mountains to the east. Elevation ranges from 4,100 feet (1,250 meters) near Green River, Utah, to 7,500 feet (2,285 meters) at the base of the Wasatch Range and the Roan Plateau.

Most of this area is covered by residual basin-floor materials and materials washed in from the surrounding mountains and plateaus. Shale and sandstone are the dominant rock types. The Tertiary-age Green River, Uinta, and Duchesne Formations dominate the northern part of the MLRA. The southern part is dominated by Cretaceous-age materials with lesser amounts of Jurassic and Triassic materials. The dominant Cretaceous formations are Mancos Shale, Dakota Sandstone, and the members of the Mesa Verde Group. The dominant Jurassic formations are the Morrison, Entrada, and Navajo. The dominant Triassic formations are the Chinle and Moenkopi. Quaternary alluvial, eolian, and glacial deposits occur in both parts of the MLRA.

The average annual precipitation in most of this area ranges from 6 to 10 inches (150 to 255 millimeters). A small part of this area receives as much as 24 inches of annual precipitation.
Much of the precipitation occurs as high-intensity, convective thunderstorms during the period July through September. May and June are usually the drier months. Precipitation is more evenly distributed throughout the year in the northern part of the MLRA than in the southern part, where there is a significant peak in late summer. The northern part of the MLRA receives more precipitation as snow during winter than the southern part. The average annual temperature ranges from 41 to 54 degrees F (5 to 12 degrees C). The freeze-free period averages 170 days and ranges from 110 to 235 days.

The dominant soil orders in this MLRA are Aridisols and Entisols. Mollisols occur at the higher elevations, particularly in the northern part of the MLRA. The dominant soil temperature regime is mesic, and the dominant soil moisture regime is aridic. The soils receiving less than 8 inches (205 millimeters) of precipitation annually have an aridic soil moisture regime. The soils receiving 8 to 12 inches (205 to 305 millimeters) have an aridic soil moisture regime that borders on ustic. The soils receiving 12 to 16 inches (305 to 405 millimeters) generally have an ustic soil moisture regime that borders on aridic. The dominant soil mineralogy is mixed and soils are formed in slope alluvium or residuum derived from shale or sandstone. Many of the soils are shallow or moderately deep to shale or sandstone bedrock. The soils at the lower elevations generally have significant amounts of calcium carbonate, salts, and gypsum.

Ecological site concept

The soils of this site formed mostly in eolian deposits over alluvium derived from sedimentary rock and quartzite. Surface soils are loamy fine sands, gravelly fine sandy loam, and fine sandy loam in texture. Rock fragments may be present on the soil surface and throughout the profile, but make up less than 35 percent of the soil volume. These soils are deep to very deep, well-drained, and have a moderately to moderately rapid permeability. pH is slightly to strongly alkaline.. Available water-holding capacity ranges from 3 to 6 inches of water in the upper 60 inches of soil. The soil moisture regime is typic aridic and the soil temperature regime is mesic. Precipitation ranges from 5-8 inches annually.

Associated sites

R034BY006UT	**Alkali Flat (Greasewood)** Alkali Flat (Greasewood)
R034BY012UT	**Sandy Bottom (Fourwing salbush)** Sandy Bottom (Fourwing saltbush)
R034BY112UT	**Desert Sand (Fourwing Saltbush)** Desert Sand (Fourwing saltbush)

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Achnatherum hymenoides* (2) *Pleuraphis jamesii*

Physiographic features

Table 2. Representative physiographic features

Landforms	(1) Alluvial flat (2) Fan remnant (3) Structural bench
Runoff class	Very low to medium
Flooding frequency	None

Ponding frequency	None
Elevation	1,219–2,012 m
Slope	0–25%
Ponding depth	Not specified
Water table depth	Not specified

Climatic features

Average annual precipitation is 5 to 8 inches. Approximately 60 to 70 percent occurs as rain from March through September. On the average, November through February are the driest months and July through October are the wettest months. The mean annual air temperature is 8.4 degrees celsius and the soil temperatures are in the mesic regime. The average freeze-free period is 110 to 125 days. In average years, plants begin growth around March 15 and end growth around October 15.

Table 3. Representative climatic features

Frost-free period (characteristic range)	
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	127-203 mm
Frost-free period (average)	
Freeze-free period (average)	125 days
Precipitation total (average)	

Influencing water features

Due to its landscape position, this site is not influenced by streams or wetlands.

Soil features

The soils of this site formed mostly in eolian deposits over alluvium derived from sedimentary rock and quartzite. Surface soils are loamy fine sands, gravelly fine sandy loam, and fine sandy loam in texture. Rock fragments may be present on the soil surface and throughout the profile, but make up less than 35 percent of the soil volume. These soils are deep to very deep, well-drained, and have a moderately to moderately rapid permeability. pH is slightly to strongly alkaline.. Available water-holding capacity ranges from 3 to 6 inches of water in the upper 60 inches of soil. The soil moisture regime is typic aridic and the soil temperature regime is mesic. Precipitation ranges from 5-8 inches annually.

Table 4. Representative soil features

Parent material	(1) Eolian deposits–metamorphic and sedimentary rock (2) Alluvium–metamorphic and sedimentary rock
Surface texture	(1) Loamy fine sand (2) Gravelly fine sandy loam (3) Fine sandy loam
Family particle size	(1) Coarse-loamy
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Depth to restrictive layer	152 cm
Soil depth	152 cm
Surface fragment cover <=3"	0–25%

Surface fragment cover >3"	0–10%
Available water capacity (Depth not specified)	7.62–15.24 cm
Calcium carbonate equivalent (Depth not specified)	1–20%
Electrical conductivity (Depth not specified)	0–4 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0–10
Soil reaction (1:1 water) (Depth not specified)	7.4–9
Subsurface fragment volume <=3" (Depth not specified)	0–28%
Subsurface fragment volume >3" (Depth not specified)	0–12%

Ecological dynamics

State 1: Reference State
This reference state was determined by the study of rangeland relic areas, areas protected from excessive disturbance, as well as areas influenced by activities such as grazing and recreation. Literature reviews, trends in plant community dynamics, and historical accounts are also considered.

This reference state represents the plant communities and ecological dynamics of the desert sandy loam, Indian ricegrass site. This state includes the biotic communities that can become established on this ecological site if all successional sequences are completed under the natural disturbance regime. This state is dominated by perennial warm and cool season grasses, where four-wing saltbush and shadscale species make up the dominant shrub canopy. In this state, both warm and cool season grass species are present, including Indian ricegrass and James galleta. Forb composition is variable.

Primary disturbance mechanisms include occasional fire caused by lightning strikes and Native American ignition sources, climate fluctuations, insect herbivory, and native herbivore grazing. Timing of these natural disturbances dictates the what ecological dynamics occur. The reference state is self-sustaining and resistant to change due to its high resistance to natural disturbances and it's high resilience following natural disturbances. When natural disturbances occur, the rate of recovery is relatively rapid due to niches being filled with highly adapted native vegetation.

Reference State: Community phases influenced by infrequent fire, native herbivore grazing, insect herbivory, and weather.

Indicators: A well-developed perennial cool and warm season grass understory with fourwing saltbush and shadsclae forming the dominant visual aspect.

Feedbacks: Extended drought and/or improper grazing that result in a reduction of native perennial plant vigor which may cause invasive species to become established in the understory, increased bare spaces, erosion, and soil loss. Infrequent but regular fires and/or properly managed grazing that maintain the perennial bunch grass understory and the establishment of shrubs.

At-risk Community Phase: All communities in this state are at risk when native plants are stressed and/or nutrients become available for invasive plants to establish; plant community 1.3 is most at risk due to its limited understory.

Trigger: Introduction and establishment of non-native invasive plants such as cheatgrass and Russian thistle.

Community Phase 1.1: Desert Grassland/Shrubland.
This plant community phase is characterized by a fourwing saltbush and shadcale overstory with a perennial cool and warm season grass understory. The dominant cool season grass is Indian ricegrass and the dominant warm

season grass is James galleta. Other perennial grasses, shrubs, and forbs may or may not be present and cover is variable.

Community Phase Pathway 1.1a
This pathway occurs when events, such as fire or shrub insect herbivory, favor the establishment of perennial native grasses and a reduction in the shrub canopy.

Community Phase Pathway 1.1b
This pathway occurs when events favor the establishment of native shrubs and a reduction in the perennial grass understory. Events may include time without disturbances, or improper grazing. This is the natural successional pathway from community 1.1 to 1.3

Community Phase 1.2: Desert Grassland
This plant community phase is characterized by well developed perennial warm and cool season grassland with occasional scattered fourwing saltbush and shadscale, depending on disturbance history. Dominant grasses include Indian ricegrass, needle-and-thread, James galleta, and sand dropseed. Other perennial grasses, shrubs, and forbs my or may not be present and cover is variable. This plant community typically is a result of a fire in either plant community 1.2 or 1.3 and thus shrubs may or may not be present depending on when the fire occurred.

Community Phase Pathway 1.2a
This pathway occurs when events favor the establishment of native shrubs with minimal loss of the perennial grass understory. Events may include time without disturbances or mild drought.

Community Phase 1.3: Desert Shrubland
This plant community phase is characterized by a well developed shrub overstory with a minimally developed native perennial grass understory. Dominant shrub species include fourwing saltbush and shadscale. Dominant perennial cool and warm season grasses include Indian ricegrass and James galleta. Other perennial grasses, shrubs, and forbs may or may not be present and cover is variable. Due to increased bare ground and decreased perennial grass understory this plant community is most at risk for erosion, soil loss, and invasion by introduced species such as cheatgrass, annual mustard, and/or Russian thistle, as well as invasive native species including broom snakeweed.

Community Phase Pathway 1.3a
This pathway occurs when events, such as a cool fire or insect herbivory, favor a minimal decrease in the shrub canopy and the increased establishment of native perennial grasses

Community Phase Pathway 1.3b
This pathway occurs when events, such as a hot fire, favors the establishment of native perennial grasses with a major reduction or removal of the shrub canopy.

Transition T1a
This transition is from the native perennial grass understory in the reference state to a state that contains invasive plants such as cheatgrass, Russian thistle, and annual mustards. Events that may trigger this event include fire, improper domestic livestock grazing, and extended drought that stress the native plants and allow nutrients to become available for more tolerant invasive species. Non-native, invasive species such as cheatgrass, however, have been known to invade into intact perennial plant communities where little to no disturbances have occurred. So while this transition may occur from any state in the reference state it typically will occur from community 1.3. Once invasive species have established in the understory a threshold has been crossed.

State 2: Current Potential State
This state is similar to the reference state except there are now non-native invasive plants established in the understory. This state is dominated by perennial warm and cool season grasses, where fourwing saltbush, shadscale and various mormontea species make up the shrub canopy. Dominant grass species include Indian ricegrass and James galleta. Forb composition is variable. Primary disturbance mechanisms include fire, human induced fire suppression, weather fluctuations, domestic livestock grazing, insect herbivory, and native herbivore grazing. Timing and severity of these disturbances dictate the ecological dynamics that occur. Disturbances can lead to shifts in species composition that affect the nutrient cycling, soil-water relationships, hydrology, and soil stability. This state has lower resistance to disturbances and resilience after disturbance than the reference state

due to the occurrence of invasive species and increased bare ground.

Current Potential State: Community phases influenced by fire, native herbivore grazing, domestic livestock grazing, insect herbivory cycles, lack of disturbances, and weather.
Indicators: A well developed perennial cool and warm season grass understory with fourwing saltbush and shadscale forming the dominant visual aspect. Invasive plants are present.

Feedbacks: Extended drought and/or improper grazing that result in a reduction of native perennial plant vigor which may cause invasive species to dominate the understory, increased bare spaces, erosion, and soil loss. Infrequent but regular fires and/or properly managed grazing that maintain the perennial bunch grass understory and the establishment of shrubs.

At-risk Community Phase: All communities are at risk when cheatgrass is present in the understory due to increased fine fuels, which may decrease the natural fire return interval that could eventually lead the site into an annual grass state (State 4). All community phases are also subject to possible transition into the disturbed state (state 3) due to increased bare ground, and increased opportunities for soil erosion especially when site is exposed to improper livestock grazing.

Trigger: Increase and/or establishment of broom snakeweed, and surface disturbances which increase soil erosion and loss; and/or increased establishment of invasive annuals such as cheatgrass and annual mustards which decrease the fire return interval.

Restoration Pathway: None

Community Phase 2.1: Desert Grassland/Shrubland
This plant community is characterized by a native perennial bunch grass understory with minimal occurrence of non-native invasive species. Fourwing saltbush and shadscale forms the dominant shrub overstory. Commonly observed invasive plants include broom snakeweed, Russian thistle, cheatgrass, and annual mustards. Dominant perennial cool and warm season grasses include Indian ricegrass and James galleta. Other grasses, shrubs, and forbs my or may not be present and cover is variable.

Community Phase Pathway 2.1a
This pathway occurs when events favor the establishment of grasses with a complete removal of the shrub component. Events may include fire that allows for the re-establishment of the perennial grasses or grazing livestock in such a way that removes the shrub canopy.

Community Phase Pathway 2.1b
This pathway occurs when events favor the establishment of shrubs with a reduction in the grass understory. Events may include fire suppression, time, or grazing livestock in such a way that reduces the grass understory and allows for increased establishment of the shrub component.

Community Phase 2.2: Desert Grassland
This plant community phase is characterized by well developed perennial warm and cool season grassland with occasional scattered fourwing saltbush and shadscale, depending on when the disturbance history. There is minimal occurrence of non-native invasive species. Grass species present include Indian ricegrass, James galleta, and cheatgrass. Commonly seen invasive forbs and shrubs include Russian thistle, broom snakeweed and annual mustards. Other grasses, shrubs, and forbs my or may not be present and cover is variable. This plant community typically is a result of a cool fire in either plant community 2.1 or 2.3 and thus shrubs may or may not be present depending on when the fire occurred.

Community Phase Pathway 2.2a
This pathway occurs when events favor the establishment of shrubs with minimal loss of the grass understory. Events may include time without disturbances, mild drought, or grazing livestock in such a way that allows for the increase of shrubs and decrease of grass species.

Community Phase 2.3: Desert Shrubland

This plant community phase is characterized by a well developed shrub overstory with a minimally developed native

perennial grass understory. Non-native invasive plants are present. Shrub species include fourwing saltbush, shadscale, broom snakeweed, and various mormontea species, Grasses include Indian ricegrass, cheatgrass, and James galleta. Commonly occurring invasive forbs include annual mustards and Russian thistle. Other grasses, shrubs, and forbs my or may not be present and cover is variable.

Community Phase Pathway 2.3a
This pathway occurs when events favor the establishment of native perennial grasses with a removal of the shrub canopy. Events typically include a cool fire that will significantly reduce or remove the shrubs, but still allow for establishment of native perennial grasses.

Community Phase Pathway 2.3b
This pathway occurs when events, such as insect herbivory, favor a decrease in shrub canopy. A variety of insects including Orthoptera, Lepidoptera, and Hemiptera feed on fourwing saltbush.

Transition T2a
This transition from the Current Potential State (State 2) to the Disturbed State (State 3). This transition occurs when events favor broom snakeweed to dominate the site. Bare ground increases and perennial/annual grass production decreases. Events typically include improperly managed domestic livestock grazing for extended periods of time. This transition may occur from any community in the current potential state. Once broom snakeweed and bare ground dominate, and drive the ecological dynamics of a site, a threshold has been crossed.

Transition T2b
This transition from the Current Potential State (State 2) to the Annual Grass State (State 4). This transition occurs when events allow cheatgrass to dominate the site. Bare ground typically will decrease as cheatgrass increases. A hot, catastrophic fire occurring in any community in the current potential state can cause this transition to occur. This often causes an increase in the fire return interval. Once cheatgrass dominates and drives the ecological dynamics of a site, a threshold has been crossed.

State 3: Disturbed State
This state is characterized by a dominance of broom snakeweed, Russian thistle, and various mormontea species, with minimal occurrence of the perennial warm and cool season grasses associated with this site. Fourwing saltbush and/or shadscale may or may not be present. The primary disturbance mechanism is improperly managed domestic livestock grazing that maintains the broom snakeweed and bare ground. The shift in species composition, as well as the increased bare ground, affects the nutrient cycling, soil-water relationships, hydrology, and soil stability of this site. This state has lower resistance to disturbances and resilience after a disturbance than the previous two states.

Disturbed State: Community phase maintained by improperly managed domestic livestock grazing.

Indicators: A plant community dominated by broom snakeweed and Russian thistle, where bare ground is very common.

Feedbacks: Improper domestic livestock grazing that allows for the continued establishment and maintenance of broom snakeweed and bare ground. Time without disturbances that may aid in the re-establishment of native perennial grasses and shrubs.

At-risk Community Phase: All community phases are at risk when cheatgrass is present in the plant community and there are sufficient fine fuels to carry a fire.

Trigger: Increased cheatgrass and a resulting decrease in the sites fire return interval.
Restoration Pathway: Time with proper livestock grazing or other disturbance that allows native perennial vegetation to reclaim the site. This may take many years to accomplish.

Community Phase 3.1: Disturbed Grassland/Shrubland
This plant community phase is characterized by a dominance of broom snakeweed and Russian thistle. The perennial warm and cool season grasses may or may not be present. Fourwing saltbush, shadscale, and mormontea species also may be present. Cheatgrass is typically present and other invasive forbs are variable. This plant community is most at risk when cheatgrass is present and fine fuel loads are sufficient to carry a fire, causing

this community to be at risk of transitioning to an annual grass state (state 4).

Transition T3a
This transition is from the Disturbed State (State 3) to the Annual Grass state (State 4). This transition occurs when cheatgrass production is sufficient in the disturbed state for fire to be able to carry through the ecological site. Once cheatgrass drives the ecological dynamics of the site, a threshold has been crossed.

Restoration Pathway R3a
This restoration from the Disturbed State (State 3) to the Current Potential State (State 2). This restoration pathway occurs as native perennial shrubs and grasses are able to reclaim a site over time when improper livestock grazing and other disturbances are removed. For this to occur there must still be a seed source for native grasses and shrubs near or on the site. This restoration pathway may take many decades to complete and may not even be possible with the current knowledge.

State 4: Annual Grass State
This states ecological processes are driven by the dominance of cheatgrass production. Other invasive, and some native plant species may also be present. Cheatgrass dramatically affects the soil/plant/water relationships of a site. Research has shown that it has substantial effects on soil water content and temperature, as well as impacts on the frequency and intensity of disturbance. After a cheatgrass invasion, a sites fundamental nutrient cycling processes, root pores, mycorrhizal associations, microbial species, and soil organic material are changed (Chapin et al. 1997; Belnap and Phillips, 2001). These alterations may eventually create ecologically impoverished sites that are very difficult to restore to functionally. The competitiveness of cheatgrass and its ability to quickly establish after a disturbance make this state extremely resistance to change and resilient after a disturbance.

Annual Grass State: Community phases maintained, in a self-sustaining manner, by frequent fire.

Indicators: A site where ecological processes are driven by cheatgrass.

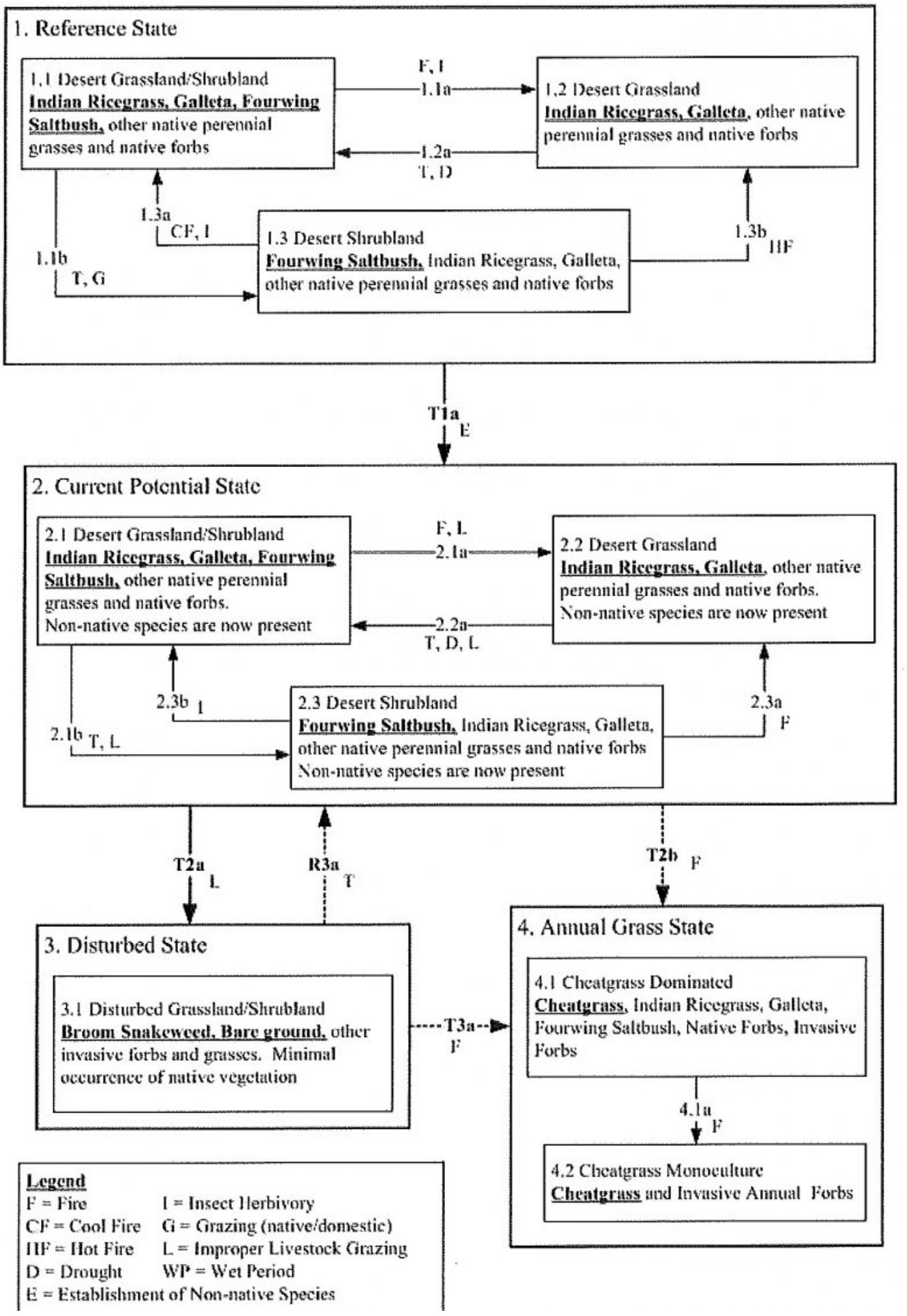
Feedbacks: A self sustaining disturbance regime of frequent fire.

Community Phase 4.1: Cheatgrass Dominated
This plant community is characterized by dominance of cheatgrass, other native species are present but no longer drive the ecological dynamics of the site. Bare ground is minimal (5-15% cover) due to the increase in litter and cheatgrass' dense establishment. Fire can carry through this community.

Community Phase Pathway 4.1a
This pathway is characterized by frequently occurring fires (every 5-10 years) that allows for establishment of a cheatgrass monoculture.

Community Phase 4.2: Cheatgrass Monoculture
This community is characterized by a complete monoculture of cheatgrass, where other grasses and shrubs do not occur. Invasive annual forbs may or may not be present, depending on current climatic conditions. This plant community is self-enhancing through frequent fire (every 5-10 years). Bare ground (5-15%) is minimal and biological crusts (1-5%) are characterized by light cyanobacteria in the interspaces.

State and transition model


1. Reference State
1.1 Desert Grassland/Shrubland
Indian Ricegrass, Galleta, Fourwing Saltbush, other native perennial grasses and native forbs
F, I
1.1a
1.2a
T, D
1.2 Desert Grassland
Indian Ricegrass, Galleta, other native perennial grasses and native forbs
1.3a
CF, I
1.1b
T, G
1.3 Desert Shrubland
Fourwing Saltbush, Indian Ricegrass, Galleta, other native perennial grasses and native forbs
1.3b
HF
T1a
E
2. Current Potential State
2.1 Desert Grassland/Shrubland
Indian Ricegrass, Galleta, Fourwing Saltbush, other native perennial grasses and native forbs.
Non-native species are now present
F, I
2.1a
2.2a
T, D, L
2.2 Desert Grassland
Indian Ricegrass, Galleta, other native perennial grasses and native forbs.
Non-native species are now present
2.3b
I
2.1b
T, L
2.3 Desert Shrubland
Fourwing Saltbush, Indian Ricegrass, Galleta, other native perennial grasses and native forbs
Non-native species are now present
2.3a
F
T2a
L
R3a
T
T2b
F
3. Disturbed State
3.1 Disturbed Grassland/Shrubland
Broom Snakeweed, Bare ground, other invasive forbs and grasses. Minimal occurrence of native vegetation
T3a
F
4. Annual Grass State
4.1 Cheatgrass Dominated
Cheatgrass, Indian Ricegrass, Galleta, Fourwing Saltbush, Native Forbs, Invasive Forbs
4.1a
F
4.2 Cheatgrass Monoculture
Cheatgrass and Invasive Annual Forbs
Legend
F = Fire
CF = Cool Fire
HF = Hot Fire
D = Drought
E = Establishment of Non-native Species
I = Insect Herbivory
G = Grazing (native/domestic)
L = Improper Livestock Grazing
WP = Wet Period

State 1
Reference State

Community 1.1
Reference State

The dominant aspect of the plant community is Indian ricegrass and galleta. The composition by air-dry weight is approximately 55 percent perennial grasses, 15 percent forbs and 30 percent shrubs.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	200	322	416
Shrub/Vine	110	178	228
Forb	55	89	113
Total	**365**	**589**	**757**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	19-21%
Grass/grasslike foliar cover	34-36%
Forb foliar cover	9-11%
Non-vascular plants	0%
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	–	–	–	9-11%
>0.3 <= 0.6	–	–	34-36%	–
>0.6 <= 1.4	–	19-21%	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Shrub/Vine					
0	**Dominant Shrubs**			82–155	
	fourwing saltbush	ATCA2	*Atriplex canescens*	31–62	–
	shadscale saltbush	ATCO	*Atriplex confertifolia*	31–62	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	19–31	–
3	**Sub-Dominant Shrubs**			99–252	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	31–62	–
	sand sagebrush	ARFI2	*Artemisia filifolia*	7–19	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	7–19	–
	Torrey's jointfir	EPTO	*Ephedra torreyana*	7–19	–
	mormon tea	EPVI	*Ephedra viridis*	7–19	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	7–19	–
	rubber rabbitbrush	ERNAN5	*Ericameria nauseosa ssp. nauseosa var. nauseosa*	7–19	–
	sulphur-flower buckwheat	ERUM	*Eriogonum umbellatum*	7–19	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	7–19	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	7–19	–
	shortspine horsebrush	TESP2	*Tetradymia spinosa*	7–19	–
Grass/Grasslike					
0	**Dominant Grasses**			216–308	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	123–185	–
	James' galleta	PLJA	*Pleuraphis jamesii*	93–123	–
1	**Sub-Dominant Grasses**			110–257	
	Grass, annual	2GA	*Grass, annual*	31–62	–
	Grass, perennial	2GP	*Grass, perennial*	31–62	–
	purple threeawn	ARPU9	*Aristida purpurea*	7–19	–
	blue grama	BOGR2	*Bouteloua gracilis*	7–19	–
	squirreltail	ELEL5	*Elymus elymoides*	7–19	–
	needle and thread	HECO26	*Hesperostipa comata*	7–19	–
	sandhill muhly	MUPU2	*Muhlenbergia pungens*	7–19	–
	alkali sacaton	SPAI	*Sporobolus airoides*	7–19	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	7–19	–
Forb					
0	**Dominant Forbs**			45–105	
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	31–62	–
	yellow milkvetch	ASFL	*Astragalus flavus*	7–31	–
	Pacific aster	SYCHC	*Symphyotrichum chilense var. chilense*	7–12	–
2	**Sub-Dominant Forbs**			87–234	
	Forb, annual	2FA	*Forb, annual*	7–49	–
	Forb, perennial	2FP	*Forb, perennial*	7–49	–
	Hamilton's milkvetch	ASHA3	*Astragalus hamiltonii*	7–12	–

	Brenda's yellow cryptantha	CRFL5	*Cryptantha flava*	7–12	–
	Canyonlands prairie clover	DAFL	*Dalea flavescens*	7–12	–
	desert trumpet	ERIN4	*Eriogonum inflatum*	7–12	–
	basin fleabane	ERPU9	*Erigeron pulcherrimus*	7–12	–
	mountain pepperweed	LEMO2	*Lepidium montanum*	7–12	–
	hoary tansyaster	MACA2	*Machaeranthera canescens*	7–12	–
	pale evening primrose	OEPA	*Oenothera pallida*	7–12	–
	woolly plantain	PLPA2	*Plantago patagonica*	7–12	–
	thrift mock goldenweed	STARA	*Stenotus armerioides var. armerioides*	7–12	–
	stemless four-nerve daisy	TEACA2	*Tetraneuris acaulis var. acaulis*	7–12	–

Animal community

This site provides proper grazing for sheep and cattle in the fall, winter, and spring.
This site provides food and cover for wildlife.
Wildlife using this site include mice, kangaroo rat, snake, jackrabbit, coyote, hawk, and bobcat.

Hydrological functions

The soil is in hydrologic group b. The runoff curve numbers are 61 through 79 depending on the condition of the watershed.

Recreational uses

Recreation values are hiking and hunting.

Wood products

None

Other references

Modal Soil: Fruitland L Hummocky 4-25% — coarse-loamy, mixed, calcareous, mesic Typic Torriorthents

Contributors

J. Lee Broadbent

Approval

Kirt Walstad, 3/05/2022

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	05/31/2012
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None on slopes < 10%. Rare on slopes > 10%. A minor increase in rill development may be evident immediately following significant thunderstorm or snow melt events but, because of the sites coarse textured soils, they should begin to heal during the following growing season. The presence of rills may also be more apparent where run-on from adjacent upland sites or exposed bedrock concentrate flows. Any rill development present should be less than 1 inch deep, moderately short (< 5') and spaced 8 to 10 feet apart.

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2. **Presence of water flow patterns:** A very few stable overland flow patterns may be present and wind around plant bases. They should show no evidence of current erision or deposition. Flow patterns present are normally 10 to 15 feet long, follow natural contours, and are typically spaced at least 15 to 20 feet apart. A slight increase in flow activity may be observed immediately following significant weather events such as thunderstorms or spring run-off events.

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3. **Number and height of erosional pedestals or terracettes:** None. There should be no evidence of pedestals or terracettes caused by accelerated water erosion. One to 2 inches of elevational mounding under four-wing saltbush and other shrub canopies, and within biological soil crusts, is normal for this site and is not caused by water erosion. There are no exposed roots around perennial grasses and shrubs.

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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 40% - 45%. Bare ground openings should not be greater than 2 to 3 feet in diameter and should normally not be connected.

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5. **Number of gullies and erosion associated with gullies:** None at site level. Scattered landscape level gully channels, however, are a normal component of desert environments. Where landscape gullies are present, they should be stable, partially vegetated on their sides and bottoms, with no evidence of head-cutting. Some slight increase in disturbance may be evident following significant weather events or when gullies convey considerable runoff from higher elevation rocky or naturally eroding areas.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** Some evidence of wind generated soil movement is normal. Moderate depositional mounding within perennial grass crowns, under four-wing saltbush and other shrub canopies, and within biological soil crusts is expected on this site. Wind caused blowouts, where present, are generally stable or are being stabilized with vegetation.

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7. **Amount of litter movement (describe size and distance expected to travel):** The majority of litter accumulates in

place at the base of plants canopies. Slight movement of the finest material (< 1/8 inch) may move 1 to 2 feet in the direction of prevailing winds or down slope if being transported by water. Some minor accumulation is observed behind obstructions.

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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):** This site should have a soil stability rating of 3 or 4 under plant canopies, and a 2 to 3 in the interspaces. Average should be a 3. Surface textures are typically sands, and fine sands containing few coarse fragments.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** (Shotnick Soil surface is typically 0 to 8 inches deep. Texture is a sandy loam and structure is weak coarse platy. The A-horizon color is pale brown (7.5YR 6/4). Soils have an Ochric epipedon that extends 8 inches into the soil profile. The A horizon is normally deeper and better developed under plant canopies. Use the specific information for the soil you are assessing found in the published soil survey to supplement this description.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Healthy stands of perennial grasses and shrubs, as well as the presence of biological crusts, provide for good infiltration, help break raindrop impact, and reduce runoff from storm events. Bare spaces are expected to be fairly small (< 3 feet) should be irregular in shape and usually not connected. Vegetative structure is adequate to capture snow and and allow snowmelt to occur in a controlled manner.

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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. Soils are deep and sandy throughout.

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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: Sprouting shrubs (four-wing saltbush, winterfat) > Perennial bunchgrasses (Indian ricegrass, needle-and-thread) >> Perennial forbs (yellow milkvetch, scarlet globemallow).

    Sub-dominant: Sprouting shrubs (Torrey jointfir, rubber rabbitbrush) > = Warm season grasses (James galleta, sand dropseed).

    Other: A wide variety of other grasses and both perennial and annual forbs can be expected to occur in the plant community.

    Additional: Moss and lichen communities will normally be found under plant canopies while the cyanobacteria may be found throughout the site. Functional/structural groups may appropriately contain non-native species if their ecological function is the same as the native species. Perennial and annual forbs can be expected to vary widely in their expression in the plant community based upon departures from average growing conditions.

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** All age classes of perennial grasses should be present during years with average to above-average precipitation, there should be very little recent mortality or decadence apparent in either the shrubs or grasses. During severe (multi-year) drought or insect infestations up to 20% of the winterfat may die. There may be partial mortality of individual bunchgrasses and other shrubs during severe drought.

14. **Average percent litter cover (%) and depth (in):** Litter cover ranges from 15 to 20%. Depth should be 1 leaf thickness in the interspaces and from 1/2 - 3/4 inches under perennial plant canopies.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Annual production in air-dry herbage should be approximately 500 to 550 pounds per acre on an average year. Production could vary from 300 to 700 pounds per acre during drought or above-average years.

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:** Russian thistle, annual bromes and halogeton are most likely to invade this site.

17. **Perennial plant reproductive capability:** All perennial plant species have the ability to reproduce in most years except drought years. There are no restrictions on either seed or vegetative reproduction. Some seedling recruitment of major species may be present during average or above average years.