USDA Natural Resources
Conservation Service

Ecological site R028AY232UT
Semidesert Shallow Hardpan (Utah Juniper)

Accessed: 05/10/2025

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.

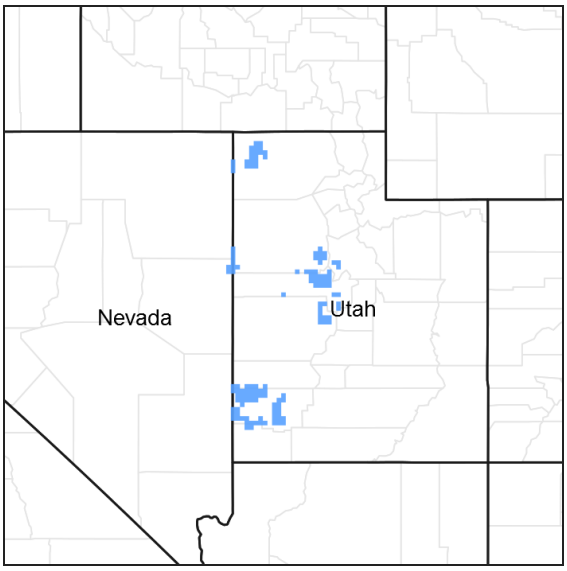

Figure 1. Mapped extent

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): 028A–Ancient Lake Bonneville

MLRA 28A occurs in Utah (82%), Nevada (16%), and Idaho (2%). It encompasses approximately 36,775 square miles (95,246 square kilometers). A large area west and southwest of Great Salt Lake is a salty playa. This area is the farthest eastern extent of the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus. It is an area of nearly level basins between widely separated mountain ranges trending north to south. The basins are bordered by long, gently sloping alluvial fans. The mountains are uplifted fault blocks with steep side slopes. Most of the valleys are closed basins containing sinks or playa lakes. Elevation ranges from 3,950 to 6,560 feet (1,204 to 2000 meters) in the basins and from 6,560 to 11,150 feet (1996 to 3398 meters) in the mountains. Much of the MLRA has alluvial valley fill and playa lakebed deposits at the surface from pluvial Lake Bonneville, which dominated this MLRA 13,000 years ago. A level line of remnant lake terraces on some mountain slopes indicates the former extent of this glacial lake. The Great Salt Lake is what remains of the pluvial lake.

Mountains in the interior of this MLRA consist of tilted blocks of marine sediments from Cambrian to Mississippian age with scattered outcrops of Tertiary continental sediments and volcanic rocks. The average annual precipitation is 5 to 12 inches (13 to 30 cm) in the valleys and ranges up to 49 inches (124 cm) in the mountains. Most of the rainfall in the southern LRU occurs as high-intensity, convective thunderstorms during the growing season (April through September). The driest period is from midsummer to early autumn in the northern LRU. Precipitation in winter typically occurs as snow. The average annual temperature is 39 to 53 °F (4 to 12 °C). The freeze-free period averages 165 days and ranges from 110 to 215 days, decreasing in length with increasing elevation. The dominant

soil orders in this MLRA are Aridisols, Entisols, and Mollisols. Soils are dominantly in the mesic or frigid soil temperature regime, aridic or xeric soil moisture regime, and mixed mineralogy. They generally are well drained, loamy or loamy-skeletal, and very deep.

Land Resource Unit (LRU): Basin and Range North

The Basin and Range North LRU exhibits dry summer with stronger xeric patterns than the Basin and Range South LRU. Ranges in the north LRU are about 50 percent Paleozoic sedimentary/metasedimentary (limestone/quartzite dominant) and about 10 percent Tertiary volcanics. The basin floors are between 4,200 and 5,100 feet (1280 to 1554 meters) in elevation. Pinyon and juniper sites have a greater percentage of Utah juniper (*Juniperus osteosperma*) in the plant community than pinyon pine (Pinus edulis or monophylla). The Basin and Range North have few semidesert ecological sites with Utah juniper. Cool season grasses, such as bluebunch wheatgrass (*Pseudoroegneria spicata*), are dominant in the plant community, while warm season grasses are largely absent or a small component of the plant community.

Classification relationships

MRLA: 28A Great Salt Lake Area> LRU: A, Basin and Range North> Ecological Zone: Semidesert> Ecological Site: Semidesert Shallow Hardpan (Utah Juniper)

EPA Ecoregions: North American Deserts> Cold Deserts> Central Basin and Range> Woodland- and Shrub-Covered Low Mountains

Ecological site concept

This site occurs on alluvial fans and fan remnants. The soils are shallow over silica and carbonate hardpans. The dominant vegetation is Utah juniper and Indian ricegrass.

Associated sites

R028AY226UT	**Semidesert Sandy Loam (Wyoming Big Sagebrush)** Adjacent to R028AA232UT in lower lying areas.
R028AY230UT	**Semidesert Shallow Hardpan (Black Sagebrush)** This site occurs adjacent to R028AA232UT and on the same landform. This site should be dominated by black sagebrush with a small component of Utah juniper.

Table 1. Dominant plant species

Tree	(1) *Juniperus osteosperma*
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on alluvial fans and fan remnants between 4600 and 5800 feet. Slopes are typically between 4 and 15 percent. There is no flooding or ponding on this site.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Fan remnant
Flooding frequency	None
Ponding frequency	None
Elevation	4,600–5,800 ft
Slope	4–15%

Climatic features

The climate is semi-arid and characterized by cold snowy winters and warm dry summers. The average annual precipitation is 8 to 12 inches. Approximately 70 percent comes as rain from March through October. On the average, June through September are the driest months and March through May are the wettest months.

Mean Annual Air Temperature: 45-53
Mean Annual Soil Temperature: 48-55

Climate summary tables are derived from PRISM climate model.

Table 3. Representative climatic features

Frost-free period (average)	0 days
Freeze-free period (average)	0 days
Precipitation total (average)	12 in

Influencing water features

Soil features

The characteristic soils in this site are 10 to 20 inches deep over silica and carbonate hardpans that are generally fragmental.

They formed in alluvium and colluvium derived mainly from mixed parent materials. The surface horizon is medium or moderately coarse textures, and are generally calcareous throughout. Up to 28 percent of the soil surface is covered by rock fragments. The volume of rock fragments in the soil profile is up to 28 percent. Permeability is moderate or moderately rapid. The available water capacity is 1 to 2 inches.

Table 4. Representative soil features

Parent material	(1) Alluvium–limestone
Surface texture	(1) Gravelly fine sandy loam (2) Loam
Drainage class	Well drained
Permeability class	Moderately rapid
Soil depth	10–20 in
Surface fragment cover <=3"	21–28%
Surface fragment cover >3"	0–7%
Available water capacity (0-40in)	1–2 in
Calcium carbonate equivalent (0-40in)	1–15%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	7.9–9
Subsurface fragment volume <=3" (Depth not specified)	26–28%

Subsurface fragment volume >3" (Depth not specified)	7–10%

Ecological dynamics

As ecological condition deteriorates due to overgrazing, Indian ricegrass (*Achnatherum hymenoides*), needleandthread (*Hesperostipa comata*), and bluebunch wheatgrass (*Pseudoroegneria spicata*) decrease, while low rabbitbrush (*Chrysothamnus viscidiflorus*), black sagebrush (*Artemisia nova*), snakeweed (*Gutierrezia sarothrae*), and juniper (*Juniperus osteosperma*) increase.

When the potential natural plant community is burned, juniper, Indian ricegrass, needleandthread, and bluebunch wheatgrass decrease while low rabbitbrush, and Sandberg bluegrass (*Poa secunda*) increase

Annual grasses and annual forbs are most likely to invade this site.

Analyzing previously collected data and new field data will be needed to further develop vegetation dynamics within this site.

State and transition model

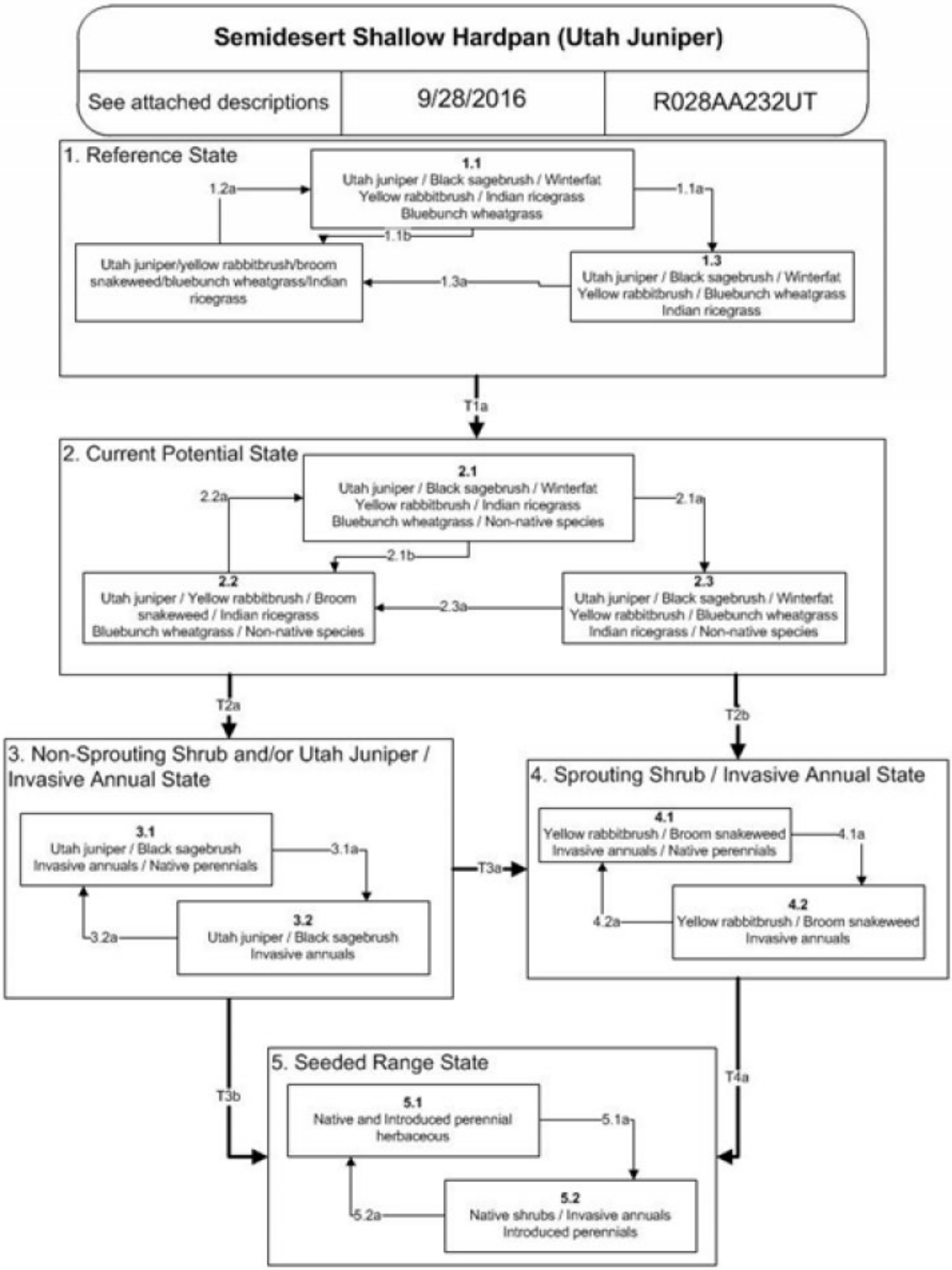

Figure 6. STM R028AA232UT

State 1
Reference State

This state has three community phases influenced by disturbance, such as fire or drought. Utah juniper is the dominant tree in all community phases, while the understory changes the most with disturbance. Fire will generally remove much of the shrub layer, increasing re-sprouting shrubs like rabbitbrush (community phase 1.2). Long term drought can reduce herbaceous understory (community phase 1.3).

Community 1.1
Utah juniper/black sagebrush/winterfat/rabbitbrush/Indian ricegrass/bluebunch wheatgrass

This is the plant community described in the Ecological Site Description. This community is composed of scattered mature Utah juniper as the dominant woodland species with a few singleleaf or doubleleaf pinyon occurring on moister locations. The understory shrub layer is dominated by black sagebrush and winterfat. Yellow rabbitbrush and Nevada ephedra are commonly present. Principal grasses include Indian ricegrass and bluebunch wheatgrass with lesser amounts of needleandthread present. Scattered forbs typically include longleaf phlox and Harry balsamroot. Percent composition by air-dry weight is 45% grass, 5% forbs, 40% shrubs and 10% trees. Natural fire frequency is estimated to be 60 to 80 years.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	125	200	325
Shrub/Vine	100	160	260
Tree	25	40	65
Forb	13	20	33
Total	**263**	**420**	**683**

Table 6. Ground cover

Tree foliar cover	5-10%
Shrub/vine/liana foliar cover	10-25%
Grass/grasslike foliar cover	15-30%
Forb foliar cover	2-5%
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 (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	–	–	–
>0.5 <= 1	–	–	–	–
>1 <= 2	–	20-30%	25-35%	0-10%
>2 <= 4.5	–	–	–	–
>4.5 <= 13	5-15%	–	–	–
>13 <= 40	–	–	–	–
>40 <= 80	–	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

Figure 8. Plant community growth curve (percent production by month). UT2321, PNC. Excellent Condition.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	15	40	30	5	5	0	0	0	0

Community 1.2
Utah juniper/yellow rabbitbrush/broom snakeweed/bluebunch wheatgrass/Indian ricegrass

Mature Utah juniper sustains some fire damage, seedlings and saplings are killed. Black sagebrush and winterfat decrease significantly, although winterfat may resprout if conditions permit. Shadscale, Nevada ephedra and other non-sprouting shrubs decrease. Yellow rabbitbrush and broom snakeweed increase and excess fine fuel accumulation is removed. Indian ricegrass and bluebunch wheatgrass recover following the fire. Cool season bunchgrasses flourish. Fire tolerant shrubs may persist as dominants in the community for 30 years or longer.

Community 1.3
Utah juniper/black sagebrush/winterfat/yellow rabbitbrush/bluebunch wheatgrass/Indian ricegrass

Utah juniper overstory increases in density and dominates community. Black sagebrush and winterfat begin to increase in percent composition. Yellow rabbitbrush and Nevada ephedra may increase also. Indian ricegrass, bluebunch wheatgrass and other cool season bunchgrasses begin to lose vigor and increase in old vegetative matter. Shrubs and herbaceous plants show some decadence due to increased shading and juniper allopathy. Percent composition by air-dry weight is 30% grass, 5% forbs, 50% shrubs and 15% trees. Fire frequency increases to > 100 years.

Pathway 1.1b
Community 1.1 to 1.2

Disturbance: Recent fire occurrence (1 – 30 years). Site is properly grazed.

Pathway 1.1a
Community 1.1 to 1.3

Sustained period of time without a major disturbance such as fire; adequate competition; or prolonged drought. Fire frequency extends well beyond the 60 to 80 year average for the site.

Pathway 1.2a
Community 1.2 to 1.1

Sustained period of time without a major disturbance such as fire; adequate competition; or prolonged drought. Fire frequency extends well beyond the 60 to 80 year average for the site.

Pathway 1.3a
Community 1.3 to 1.2

Disturbance: Recent fire occurrence (1 – 30 years). Site is properly grazed.

State 2
Current Potential State

This state is the current analog of the reference state and includes non-native species. This state is less resilient and resistance to disturbance because of the presence of non-native species. There are three community phases in this state that are influenced by drought and fire and grazing.

Community 2.1
Utah juniper/black sagebrush/winterfat/yellow rabbitbrush/Indian ricegrass/non-natives

This community includes all the plants described in the Reference Community in State 1, Community A with the addition of non-native species now naturalized in that community. This is the plant community that would establish itself if all successional sequences were allowed to develop without interference. This community can include native, acclimatized, naturalized and invasive non-native species. This state is irreversibly changed from State 1, Community A, because exotic species will now remain a permanent part of this community.

Community 2.2
Utah juniper/yellow rabbitbrush/broom snakeweed/Indian ricegrass/non-natives

Mature Utah juniper sustains considerable fire damage, seedlings and saplings are killed. Black sagebrush and winterfat decrease significantly, winterfat resprouts but is hedged and in poor vigor. Shadscale and Nevada ephedra typically decrease also. Yellow rabbitbrush and broom snakeweed dominate the shrub layer. Fire tolerant shrubs persist in the community for 30 plus years. Indian ricegrass, bluebunch wheatgrass and other palatable native bunchgrasses are significantly reduced. Purple threeawn, Sand dropseed and invasive annuals including cheatgrass, annual mustards, redstem storksbill, etc. dominate the understory. Fire frequency 5 – 30 years and the community often re-burns every few years.

Community 2.3
Utah juniper/black sagebrush/winterfat/yellow rabbitbrush/bluebunch wheatgrass/non-natives

Mature Utah juniper dominates the overstory, immature juniper dominate the understory. Black sagebrush begins to decrease in percent composition. Yellow rabbitbrush and Nevada ephedra decrease also. Winterfat is heavily hedged and is in low vigor. Indian ricegrass, bluebunch wheatgrass and other palatable native bunchgrasses are significantly reduced. Purple threeawn and sand dropseed increase; invasive annuals including cheatgrass, annual mustards, redstem storksbill, etc. are common in the understory. Shrubs and herbaceous plants show decadence due to grazing pressure, shading and juniper allopathy. Percent composition by air-dry weight is 15% grass, 5% forbs, 35% shrubs and 45% trees.

Pathway 2.1b
Community 2.1 to 2.2

Disturbance: Recent fire occurrence (1 – 30 years). Site is properly grazed.

Pathway 2.1a
Community 2.1 to 2.3

Sustained period of time without a major disturbance such as fire; adequate competition; or prolonged drought. Fire frequency extends well beyond the 60 to 80 year average for the site.

Pathway 2.2a

Community 2.2 to 2.1

Normal fire frequency of 60 – 80 years returns on the site.

Pathway 2.3a
Community 2.3 to 2.2

Disturbance: Recent fire occurrence (1 – 30 years). Site is properly grazed.

State 3
Shrub/Tree State

This state occurs when native herbaceous vegetation is either removed or replaced largely by non-native invasive annual species. This state also occurs when fire is removed from the system. There are two community phases within this state.

Community 3.1
Utah juniper/black sagebrush/invasive annuals/native perennials

Mature Utah juniper dominates the overstory, immature juniper dominate the understory. Black sagebrush and other shrubs are reduced in the shrub layer. Winterfat is dead or dying. Remaining perennial herbaceous vegetation is mostly found only in protected locations under shrubs. Invasive, non-native grasses and weeds including cheatgrass, annual mustards, redstem storksbill, etc. dominate the understory. Fire frequency is 100 – 200 years. Catastrophic fire is required to remove the closed stand of Utah juniper.

Community 3.2
Utah juniper/black sagebrush/invasive annuals

Figure 9. Community Phase 3.2, photo 2

Figure 10. Community Phase 3.2, photo 1

Mature Utah juniper dominates the overstory, immature juniper dominate the understory. Black sagebrush and other shrubs are much reduced in the community. Winterfat is mostly dead. Remaining perennial herbaceous vegetation is rare or missing and is found only in protected locations under shrubs. Invasive, non-native grasses and weeds including cheatgrass, annual mustards, redstem storksbill, etc. dominate the understory. Fire frequency is 100 – 300 years. Catastrophic fire is required to remove the closed stand of Utah juniper. Photo captions: Photo 1: State 3, Community Phase 3.2- Utah Juniper; Black sagebrush; annual weeds. Photo taken by Keith Wadman 9/18/2006, T11S, R6W, S25, NW1/4. Photo 2: State 3, Community Phase 3.2 – Dominated by Utah juniper with few plants in the understory. Utah juniper 46%. Jericho soil component, NAD 27 12 382927E 4402403N. Photo Taken 10/8/2002 Utah GAP project, site UT100802MD01.

Pathway 3.1a
Community 3.1 to 3.2

Disturbance: Long-term improper grazing (including season long, overstocking, wrong season, etc.) and/or drought remove annual and perennial fine fuels from the site lessening the potential for fire to occur. Fire frequency is >100 years.

Pathway 3.2a
Community 3.2 to 3.1

Grazing management improves and site degradation slows or reverses. Native perennial vegetation begins to recover. Fire frequency remains well beyond normal for the community. Fire frequency is > 100 years.

State 4
Sprouting Shrubs/Invasive Annual State

This state occurs when the native herbaceous understory is removed and replaced with non-native invasive species generally through long term grazing and fire. Sprouting shrubs dominated the shrub layer and annual invasive species dominate the herbaceous layer. There are two community phases described in this state.

Community 4.1
Yellow rabbitbrush/broom snakeweed/invasive annuals/native perennials

Yellow rabbitbrush dominates the overstory community. Smooth horsebrush can also be plentiful if conditions are right. Fire tolerant shrubs persist as dominants in this community with fire periods reoccurring at intervals of 10 to 30 years. Broom snakeweed may be a dominant episodic species when conditions are favorable. Palatable native bunchgrasses are significantly reduced; purple threeawn and sand dropseed increase; invasive annuals including cheatgrass, annual mustards, redstem storksbill, etc. dominate the understory.

Community 4.2
Yellow rabbitbrush/broom snakeweed/invasive annuals

Yellow rabbitbrush dominates the overstory community. Smooth horsebrush can be plentiful if conditions are right. Fire tolerant shrubs persist as dominants in this community with fire periods reoccurring at intervals of 5 to 30 years. Broom snakeweed may be a dominant episodic species when conditions are favorable. Only remnant native grasses remain; invasive annuals including cheatgrass, annual mustards, redstem storksbill, etc. dominate the understory.

Pathway 4.1a
Community 4.1 to 4.2

Disturbance: Sustained, long-term improper grazing (including season long, overstocking, wrong season, etc.) and/or drought reduce perennial fine fuels from the site. Fire removes Black sagebrush and any Utah juniper or Wyoming big sagebrush occupying site. Yellow rabbitbrush and Broom snakeweed dominate.

Pathway 4.2a

Community 4.2 to 4.1

Site is properly grazed for an extended period of time. Native perennial vegetation is recovering. Fire frequency is 1 – 30 years.

State 5
Seeded State

This state occurs when a seeding takes place on the site. Typical species include both native and non-native bunchgrasses and forbs. Shrubs and trees are often reduced in this state. There are two community phases described in this state.

Community 5.1
Native and Introduced perennial herbacous

Utah juniper and various shrubs are reduced but may occupy a portion of the site because of inadequate kill or regeneration. This community may be allowed to regenerate naturally if sufficient desirable grasses are available, or be seeded to rangeland species that may be composed of introduced, native or combinations of these species. Invasive annual grasses and weedy forb species, primarily cheatgrass and various annual mustards, may be present in the seeding. Healthy range seedings are resistant to wildfire wildfire because the perennial bunchgrasses and forbs in the seeding can outcompete the invasive annual species, reducing fine fuels and fire.

Community 5.2
Native shrubs/Invasive annuals/introduced perennials

Utah juniper and various shrubs are reduced but may be reoccupying the site because of inadequate kill or regeneration. Native grasses or rangeland seeding fail to establish or are heavily overgrazed after establishment. This community is primarily composed of invasive annual grasses and weedy forb species, mostly cheatgrass and various annual mustards. Broom snakeweed may be an episodic dominant species when conditions are favorable.

Pathway 5.1a
Community 5.1 to 5.2

Disturbance: Natural herbaceous regeneration or range seeding is not well established; continued improper grazing (including season long, overstocking, wrong season, etc.); and/or drought reduces any perennial grasses established. Highly combustible fine fuels from invasive annuals increase the chances of fire burning through the seeding.

Pathway 5.2a
Community 5.2 to 5.1

Site receives excellent grazing management over a long period of time. Highly combustible fine fuels from invasive annuals continue to dominate the community resulting in increased chance for fire. Natural herbaceous regeneration or range seeding very slowly recovers.

Transition T1a
State 1 to 2

Introduction of non-native annual species.

Transition T2a
State 2 to 3

Disturbance: Long-term improper grazing (including season long, overstocking, wrong season, etc.) and/or prolonged drought; lengthening of fire period to > 100 years resulting in a dense tree/shrub overstory, reduction of native perennial vegetation.

Transition T2b
State 2 to 4

Long-term improper grazing (including season long, overstocking, wrong season, etc.) and/or prolonged drought; shortened fire frequency allows site to be dominated by sprouting shrubs, including Yellow rabbitbrush and Broom snakeweed; significant reduction of perennial bunchgrass species. Highly combustible fine fuels from invasive annuals dominate the community. Fire frequency is typically 10 – 30 years.

Transition T3a
State 3 to 4

Long-term improper grazing (including season long, overstocking, wrong season, etc.) and/or prolonged drought; shortened fire frequency allows site to be dominated by sprouting shrubs, including Yellow rabbitbrush and Broom snakeweed; significant reduction of perennial bunchgrass species. Highly combustible fine fuels from invasive annuals dominate the community. Fire frequency is typically 10 – 30 years.

Transition T3b
State 3 to 5

Mechanical chaining of Utah juniper where present and/or chemical treatment of undesirable shrubs with regeneration of native herbaceous species, or seeding of introduced, native or combination rangeland grass and forb species.

Transition T4a
State 4 to 5

Mechanical chaining of Utah juniper where present and/or chemical treatment of undesirable shrubs with regeneration of native herbaceous species, or seeding of introduced, native or combination rangeland grass and forb species.

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Tree					
0	**Tree**			45–68	
	Utah juniper	JUOS	*Juniperus osteosperma*	45–68	–
Shrub/Vine					
0	**Primary Shrubs**			140–225	
	black sagebrush	ARNO4	*Artemisia nova*	90–135	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	23–45	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	14–23	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	14–23	–
3	**Secondary Shrubs**			5–9	
	pygmy sagebrush	ARPY2	*Artemisia pygmaea*	5–9	–
	Wyoming big sagebrush	ARTRW8	*Artemisia tridentata ssp. wyomingensis*	5–9	–
	shadscale saltbush	ATCO	*Atriplex confertifolia*	5–9	–
	slender buckwheat	ERMI4	*Eriogonum microthecum*	5–9	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	5–9	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	5–9	–

	bud sagebrush	PIDE4	*Picrothamnus desertorum*	5–9	–
	Mexican cliffrose	PUME	*Purshia mexicana*	5–9	–
Grass/Grasslike					
0	**Primary Grasses**			171–248	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	68–90	–
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	68–90	–
	needle and thread	HECO26	*Hesperostipa comata*	23–45	–
	squirreltail	ELEL5	*Elymus elymoides*	14–23	–
1	**Secondary Grasses**			14–23	
	purple threeawn	ARPU9	*Aristida purpurea*	5–14	–
	James' galleta	PLJA	*Pleuraphis jamesii*	0–14	–
	Sandberg bluegrass	POSE	*Poa secunda*	5–14	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	5–14	–
Forb					
2	**Forbs**			23–45	
	littleleaf pussytoes	ANMI3	*Antennaria microphylla*	23–45	–
	freckled milkvetch	ASLE8	*Astragalus lentiginosus*	23–45	–
	Hooker's balsamroot	BAHO	*Balsamorhiza hookeri*	23–45	–
	thickstem wild cabbage	CACR11	*Caulanthus crassicaulis*	23–45	–
	roundspike cryptantha	CRHU2	*Cryptantha humilis*	23–45	–
	cushion buckwheat	EROV	*Eriogonum ovalifolium*	23–45	–
	ballhead ipomopsis	IPCOC3	*Ipomopsis congesta ssp. congesta*	23–45	–
	Gray's biscuitroot	LOGR	*Lomatium grayi*	23–45	–
	longleaf phlox	PHLO2	*Phlox longifolia*	23–45	–
	gooseberryleaf globemallow	SPGR2	*Sphaeralcea grossulariifolia*	23–45	–
	Pacific aster	SYCHC	*Symphyotrichum chilense var. chilense*	23–45	–

Animal community

This site is suited for cattle and sheep grazing during spring, fall, and winter.

Wildlife using this site include rabbit, coyote, fox, badger, pronghorn antelope, mule deer, and dove.

This is a short list of the more common species found. Many other species are present as well and migratory birds are present at times.

Hydrological functions

The soils are in hydrologic groups C and D with runoff curves ranging from 74 to 86 and 80 to 89 respectively, depending on hydrologic condition.

Recreational uses

Resources that have special aesthetic and landscape values are wildflowers. Some recreation uses of this site are hiking, picnicking, and hunting.

Wood products

Potential wood products are fuel, and posts.

Other information

Threatened and endangered species include plants and animals.

Type locality

Location 1: Box Elder County, UT	
Township/Range/Section	T12N R15W S33
General legal description	SW ¼, SE ¼, Section 33, Township 12N, Range 15W. Fifteen Miles Southwest of Park valley

Contributors

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Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

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Date	02/09/2010
Approved by	Shane A. Green
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** No rills present. Very minor rill development may occur in sparsely vegetated areas. If rills are present, they should be widely spaced and not connected. Rill development may increase following large storm events, but should begin to heal during the following growing season. Frost heaving will accelerate recovery. Rill development may increase when run inflow enters site from adjacent sites that produce large amounts of runoff (i.e. steeper sites, slickrock, rock outcrop). Site is essentially level and rills do not form.

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2. **Presence of water flow patterns:** Water flow patterns will be short (2-5’), narrow (<1’), and meandering; interrupted by plants and exposed rocks. Slight to no evidence of erosion or deposition associated with flow patterns.

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3. **Number and height of erosional pedestals or terracettes:** Plants may have small pedestals (1-3”) where they are adjacent to water flow patterns, but without exposed roots. Terracettes should be few and stable. Terracettes should be

small (1-3”) and show little sign of active erosion. Some plants may appear to have a pedestal but rather than be formed by erosion, the only place litter accumulates and soil collects is at plant bases forming the appearance of a pedestal.

Well-developed biological crusts may appear pedestalled, but are actually a characteristic of the crust formation. Some plants may appear to have a pedestal but rather than be formed by erosion, the only place litter accumulates and soil collects is at plant bases forming the appearance of a pedestal.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 20-40% bare ground (soil with no protection from raindrop impact). Herbaceous communities are most likely to have lower values. As species composition by shrubs increases, bare ground is likely to increase. Poorly developed biological soil crust that is susceptible to raindrop splash erosion should be recorded as bare ground. Very few if any bare spaces of greater than 1 square foot.

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5. **Number of gullies and erosion associated with gullies:** No gullies present.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** Very minor evidence of active wind generated soil movement is present in reference communities. Wind scoured (blowouts) and depositional areas are rarely present. Slight depositional mounding at plant bases. Slight deposition may occur in perennial bunchgrasses, under winterfat canopy, and within biological soil crusts. Wind scour or deposition areas are associated with fire activity. Very small areas (less than 4 square feet) may be present.

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7. **Amount of litter movement (describe size and distance expected to travel):** Most litter resides in place with some redistribution caused by water and wind movement. Very minor litter removal may occur in flow patterns and rills with deposition occurring at points of obstruction. The majority of litter accumulates at the base of plants. Some leaves, stems, and small twigs may accumulate in soil depressions adjacent to plants. Woody stems are not likely to move.

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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 an erosion rating of 5 or 6 under plant canopies and a rating of 4 to 5 in the interspaces with an average rating of 5 using the soil stability kit test.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** This description is based on the modal soil (Plegomir, Very Shallow, soil survey area: 611, Tooele). This site has 2 correlated soils, resulting in variation of each of these attributes. Unless working on a location with the modal soil, it is critical to supplement this description with the soil-specific information from the published soil survey.

   Soil surface horizon is typically 5 inches deep. Structure is typically fine and medium granular. Color is typically brown (10YR 5/3), dark brown (10YR 3/3) moist.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Vascular plants and any well-developed biological soil crusts (where present) will break raindrop impact and splash erosion. Spatial distribution of vascular plants and interspaces between well-developed biological soil crusts (where present) provide detention storage and surface roughness that slows runoff allowing time for infiltration. Crowns of trees and accumulating litter at base of trees appear to create a micro-topography

that may enhance development of water flow patterns below the drip line of the canopy. Significant increases in pinyon-juniper canopy reduces understory vegetation and increases 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):** None. Naturally occurring soil horizons may be harder than the surface because of an accumulation of calcium carbonate and should not be considered as compaction layers. A duripan (indurated layer of illuvial silica and lime) may be present at a depth of about 13".

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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: black sagebrush

    Sub-dominant: Indian ricegrass, bluebunch wheatgrass

    Other: other shrubs > other grasses > forbs

    Additional: In the northern portion of the MLRA cool-season perennial grasses (Indian ricegrass, needle and thread) dominate. In the southernmost portion of the MLRA warm-season perennial grasses (galleta, sand dropseed) dominate. The two groups share dominance in the middle portion of the MLRA.

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** During years with average to above average precipitation, there should be very little recent mortality or decadence apparent in either the shrubs or grasses. Some bunchgrass and shrub mortality may occur during severe droughts, particularly on the shallower and coarser soils associated with this site.

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14. **Average percent litter cover (%) and depth (in):** Litter cover includes litter under plants. Most litter will be fine litter. Depth should be 1-2 leaf thickness in the interspaces and up to 1/2" under canopies. Litter cover may increase to 15-25% following years with favorable growing conditions. Excess litter may accumulate in absence of disturbance. Vegetative production may be reduced if litter cover exceeds 40%.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 420#/acre.
    Even the most stable communities exhibit a range of production values. Production will vary between communities and across the MRLA. Refer to the community descriptions in the ESD. Production will differ across the MLRA due to the naturally occurring variability in weather, soils, and aspect. The biological processes on this site are complex; therefore, representative values are presented in a land management context.

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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:** Annual grasses and annual forbs

17. **Perennial plant reproductive capability:** Reproduction restricted by effective precipitation, rock cover, soil depth, and generally harsh growing conditions; all to be expected for site. Site provides harsh environment for seedling establishment.