

Ecological site R025XY322UT Upland Juniper Savanna (Utah Juniper)

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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): 025X–Owyhee High Plateau

See note from meeting on D25 NV S&TM on 02/20/2013. This site fits well with the response group 11 JUOS/ARTRW/PSSP-ACTH

Associated sites

R025XY310UT	Upland Loam (Basin Big Sagebrush)
R025XY314UT	Upland Loam (Wyoming Big Sagebrush)
R025XY316UT	Upland Shallow Loam (Black Sagebrush) R025XY316UT is also a similar site with differentiae.

Table 1. Dominant plant species

Tree	(1) <i>Juniperus osteosperma</i>
Shrub	(1) <i>Artemisia tridentata ssp. wyomingensis</i>
Herbaceous	Not specified

Physiographic features

This site can be found on hillslopes on slopes ranging from 8 to 15%. It can occur at elevations between 5,300 to 6,000 feet. Flooding and ponding do not occur on this site.

Table 2. Representative physiographic features

Landforms	(1) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	1,615–1,829 m
Slope	8–15%

Climatic features

The climate is cold and snowy in the winter and warm and dry in the summer. Average annual precipitation is 12 to 17 inches. Approximately 40 percent occurs as rain from May to September. On the average July, August, and September are the driest months and March, April, and May are the wettest months. In average years, grasses begin growth around May 1 and end growth around September 30.

Table 3. Representative climatic features

Frost-free period (average)	0 days
Freeze-free period (average)	120 days
Precipitation total (average)	432 mm

Influencing water features

Water erosion hazard is slight to moderate.

Soil features

The soils on this site were formed in alluvium and colluvium derived from sandstone and limestone. The soil is well drained with moderately rapid permeability in the upper 10 inches of soil. The soil has a duripan layer between 20 and 40 inches beneath the soil surface. The soil texture at the surface is gravelly sandy loam and surface gravels are 25% by cover and subsurface gravels are 16% by volume. Surface and subsurface rocks over 3 inches in diameter are not found in the soil profile. Available water capacity is between 1.7 and 2.2 in the upper 40 inches of soil. The soil pH is between 7.4 and 8.4. The soil temperature regime is frigid.

Soils associated with this site:

Box Elder Co. UT601- Dahar (23)

Table 4. Representative soil features

Surface texture	(1) Gravelly sandy loam
Drainage class	Well drained
Permeability class	Moderately rapid
Soil depth	51–102 cm
Surface fragment cover <=3"	25%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	4.32–5.59 cm

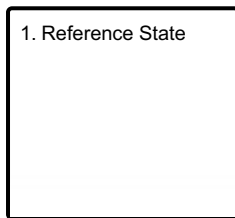
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	16%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

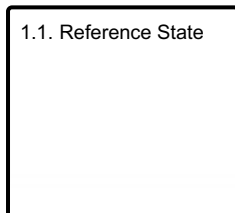
As this site deteriorates due to grazing pressure bluebunch wheatgrass, bitterbrush, and Indian ricegrass decrease while Utah juniper, big sagebrush, and low rabbitbrush increase. When the potential natural plant community is burned Utah juniper, big sagebrush, bitterbrush, and eriogonum decrease while low rabbitbrush, lupine, and annuals increase.

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 1 Reference State

Community 1.1 Reference State

The general view of this site is an open stand of Utah juniper with an understory of Wyoming big sagebrush and grass. The composition by air-dry weight is approximately 40 percent perennial grasses, 20 percent forbs, and 30 percent shrubs, and 10 percent trees.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	45	179	336
Shrub/Vine	34	135	252
Forb	22	90	168
Tree	11	45	84
Total	112	449	840

Table 6. Ground cover

Tree foliar cover	10-25%
Shrub/vine/liana foliar cover	10-20%
Grass/grasslike foliar cover	10-25%
Forb foliar cover	5-10%
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	–	–	–	5-15%
>0.3 <= 0.6	–	–	20-30%	–
>0.6 <= 1.4	–	15-25%	–	–
>1.4 <= 4	20-30%	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Figure 4. Plant community growth curve (percent production by month).
UT3221, PNC. Excellent Contition.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	15	40	20	10	5	5	0	0	0

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Tree					
0	Tree			13–17	
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	13–17	–
Shrub/Vine					
0	Primary Shrubs			117–202	
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	50–76	–
	mountain big sagebrush	ARTRV	<i>Artemisia tridentata ssp. vaseyana</i>	16–50	–
Grass/Grasslike					
0	Primary Grasses			91–151	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	50–76	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	26–50	–
	Columbia needlegrass	ACNE9	<i>Achnatherum nelsonii</i>	16–26	–
1	Secondary Grasses			26–50	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	6–16	–
	Idaho fescue	FEID	<i>Festuca idahoensis</i>	6–16	–
	basin wildrye	LECI4	<i>Leymus cinereus</i>	6–16	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	6–16	–
Forb					
2	Forbs			76–101	
	Torrey's milkvetch	ASCA9	<i>Astragalus calycosus</i>	6–16	–
	Hooker's balsamroot	BAHO	<i>Balsamorhiza hookeri</i>	6–16	–
	arrowleaf balsamroot	BASA3	<i>Balsamorhiza sagittata</i>	6–16	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	6–16	–
	shortstem buckwheat	ERBR5	<i>Eriogonum brevicaulis</i>	6–16	–
	stemless dwarf lupine	LUCA3	<i>Lupinus caespitosus</i>	6–16	–
	low beardtongue	PEHU	<i>Penstemon humilis</i>	6–16	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	6–16	–

Animal community

This site provides proper grazing for cattle and sheep during spring, summer, and fall.

Wildlife using this site include blacktail jackrabbit, coyote, sage grouse, and mule deer, and elk.

Hydrological functions

The soil is in hydrologic group C. The runoff curve number is 74 when the watershed is in good condition.

Recreational uses

Camping, Hunting, and Hiking

Wood products

Fire Wood and Fence Posts

Other products

None

Other information

Threatened and endangered species include plants and animals.

Type locality

Location 1: Box Elder County, UT	
Township/Range/Section	T15N R19W S34
General legal description	NW ¼ SW ¼ Section 34, Township 15N, Range 19W. Goose Creek Area

Contributors

GBB

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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Contact for lead author	shane.green@ut.usda.gov
Date	12/15/2011
Approved by	Shane A. Green
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

- 1. Number and extent of rills:** None to very rare. Any rills should be <2 inch deep, fairly short (8-10 feet) and somewhat widely spaced (6-8 feet). Rill occurrence may increase slightly on steeper slopes or on areas located below exposed bedrock or other water shedding areas where increased runoff may occur. A slight increase in rill development may also be observed following major thunderstorm or spring runoff events but should heal during the next growing season.

- 2. Presence of water flow patterns:** Minor evidence of water flow patterns may be found around perennial plant bases. They are expected to be somewhat short (6-8 feet), stable, sinuous and not connected. There may also be minor evidence of deposition. Evidence of water flow may increase somewhat with slope.

- 3. Number and height of erosional pedestals or terracettes:** Perennial vegetation shows no to very slight evidence of

erosional pedestalling (3 to 5% of individual plants). Plant roots are covered and litter remains in place around plant crowns. A very few terracettes may also be present but should be stable. A slight increase in both pedestal and terracette development may occur with increasing slope.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 10-15% bare ground. Soil surface is typically covered by 15 to 35% coarse fragments. Bare ground spaces should not be greater than 2 to 3 feet in diameter. Most bare ground is associated with waterflow patterns, rills and gullies.

5. **Number of gullies and erosion associated with gullies:** None. Some minor additional gully development may also be present in landscape settings where they transport runoff from areas of greater water flow such as exposed bedrock. These landscape level gullies should be limited to slopes exceeding 20% slope and adjacent to sites where this runoff accumulation occurs. Any gullies present should show little sign of accelerated erosion and should be mostly stabilized with perennial vegetation.

6. **Extent of wind scoured, blowouts and/or depositional areas:** None. No evidence of wind generated soil movement is present. Wind caused blowouts and deposition are not present.

7. **Amount of litter movement (describe size and distance expected to travel):** Most litter resides in place with some redistribution caused by water movement. Minor litter removal may occur in flow channels with deposition occurring within 1 to 2 feet at points of obstruction. The majority of litter accumulates at the base of plants. Some grass leaves and small twigs (grass stems) may accumulate in soil depressions adjacent to plants. Woody stems are not likely to move. However, some litter movement is expected (up to 6 feet) with increases in slopes and/or increased runoff resulting from heavy thunderstorms.

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 4 or 5 under the plant canopies, and a rating of 3 to 4 in the interspaces. The average rating should be a 4. Soil surface texture is typically a gravelly sandy loam.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** (Dahar) Soil surface 0-3 inches. Texture is a gravelly sandy loam; color is grayish brown (10YR5/2); and structure is medium platy parting to very weak fine granular. Ochric epipedon ranges to 6 inches. Use the specific information for the soil you are assessing found in the published soil survey to supplement this description.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Perennial vegetation produces sufficient cover and spatial arrangement to intercept most raindrops and reduce raindrop splash erosion. Litter on soil surface and cryptogamic crusting, where present, also protects soil from splash erosion and encourages a higher rate of infiltration. Plant spatial distribution should slow runoff, allowing additional time for infiltration. Bare spaces are expected to be small and irregular in shape and are usually not connected. Vegetative structure is usually adequate to capture snow and ensure that snowmelt occurs in a controlled manner, allowing maximum time for infiltration, and reducing runoff and erosion in all but the most extreme storm events. When perennial grasses and shrubs decrease due to natural events including drought, insect damage, etc., which reduce ground cover and increasing bare ground, runoff is expected to increase and any associated

infiltration reduced.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. A cambic horizon occurs between 6 and 12 inches and a strongly cemented duripan is found between 20 and 40 inches. These soil features should not be mistaken for compaction.
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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: Non-sprouting shrubs (mountain big sagebrush, Wyoming big sagebrush, bitterbrush) > Perennial bunchgrasses (bluebunch wheatgrass, Indian ricegrass)

Sub-dominant: Rhizomatous grasses (western wheatgrass) > trees (Utah Juniper) > Sprouting shrubs (green rabbitbrush) > Perennial forbs (arrowleaf balsamroot).

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

Additional: Natural disturbance regimes include fire, drought, and insects. Assumed fire cycle of 30 to 40+ years.

Functional/structural groups may appropriately contain non-native species if their ecological function is the same as the native species in the reference state (e.g. Crested wheatgrass, Smooth brome, intermediate wheatgrass, Siberian Wheatgrass etc.)

Following a disturbance such as fire, drought, rodents or insects that remove woody vegetation, forbs and perennial grasses (herbaceous species) may dominate the community for a period of time. If a disturbance has not occurred for an extended period of time, woody species may continue to increase. These conditions would reflect a functional community phase within the reference state.

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 under average to above average growing conditions with age class expression likely subdued during periods of extended drought. Slight decadence in the principle shrubs could occur near the end of the fire cycle or during periods of extended drought, or insect infestations. In general, a mix of age classes should be expected with some dead and decadent plants present.
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14. **Average percent litter cover (%) and depth (in):** Litter cover will be heavier under plants. Most litter will be herbaceous and depths of 1/4 to 1/2 inch would be considered normal. Perennial vegetation should be well distributed on the site.
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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 350 - 450#/acre on an average year, but could range from 100 to 750#/acre during periods of prolonged drought or above average precipitation.
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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that**

become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is **NOT** expected in the reference state for the ecological site: Cheatgrass, Russian thistle, and non-native invasive annual forbs such as alyssum.

17. **Perennial plant reproductive capability:** All perennial plants should have the ability to reproduce in all years, except in extreme drought years. Green rabbitbrush sprouts vigorously following fire. There are no restrictions on either seed or vegetative reproduction. Some seedling recruitment of major species should be present during average and above average growing years.
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