

Ecological site R025XY324UT Upland Shallow Loam (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.

Associated sites

R025XY314UT	Upland Loam (Wyoming Big Sagebrush)
R025XY316UT	Upland Shallow Loam (Black Sagebrush)

Similar sites

R025XY322UT	Upland Juniper Savanna (Utah Juniper) This site is a similar site with differentiae.
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Table 1. Dominant plant species

Tree	(1) <i>Juniperus osteosperma</i>
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site can be found on hills and hillslopes on moderate to steep slopes. It can occur at elevations between 5,300 to 7,000 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	1,615–2,134 m
Slope	15–60%

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 through 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.

Mean Annual Air Temperature: 41-45

Mean Annual Soil Temperature: 43-47

Table 3. Representative climatic features

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

Influencing water features

Water erosion hazard is high.

Soil features

The soils on this site were formed in colluvium derived from sandstone, conglomerate, rhyolite and other extrusive igneous rocks. The soil is well drained with moderate to rapid permeability in the upper 10 inches of soil. The soil is also shallow with bedrock less than 20 inches beneath the soil surface. Lithic bedrock is found between 10 and 20 inches below the soil surface. The soil texture at the surface is very stony loam, gravelly sandy loam, or gravelly loam. Surface gravels are range from 14 to 38% by cover and subsurface gravels range from 19 to 53% by volume. Surface and subsurface rocks over 3 inches in diameter are between 0 to 37% and 0 to 31% by cover and volume, respectively. Available water capacity is between 0.8 and 1.2 in the upper 40 inches of soil. The soil pH is between 6.6 and 8.4. The soil temperature regime is frigid.

Soils associated with this site:

Box Elder Co. UT601 – Codquin (23, 97), Rexmont (68)

Table 4. Representative soil features

Surface texture	(1) Very stony loam (2) Gravelly sandy loam (3) Gravelly loam
Drainage class	Well drained
Permeability class	Moderate to rapid
Soil depth	25–51 cm
Surface fragment cover <=3"	14–25%
Surface fragment cover >3"	0–16%

Available water capacity (0-101.6cm)	2.03–3.05 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	19–53%
Subsurface fragment volume >3" (Depth not specified)	0–31%

Ecological dynamics

As this site deteriorates due to grazing pressure bluebunch wheatgrass, bitterbrush, and Indian rice grass decrease while juniper, Wyoming big sagebrush and rabbitbrush increase. When the potential natural plant community is burned, bitterbrush, Wyoming big sagebrush, and juniper decrease while rabbitbrush, and stemless mock goldenweed increase.

State and transition model

Ecosystem states

1. Reference State

State 1 submodel, plant communities

1.1. Reference State

State 1 Reference State

Community 1.1 Reference State

The general view of this site is Utah juniper. The composition by air-dry weight is approximately 40 percent perennial grasses, 10 percent forbs, and 40 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	22	90	179
Shrub/Vine	22	90	179
Tree	6	22	45
Forb	6	22	45
Total	56	224	448

Table 6. Ground cover

Tree foliar cover	15-40%
Shrub/vine/liana foliar cover	10-25%
Grass/grasslike foliar cover	10-25%
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 (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	–	–
>0.15 <= 0.3	–	–	–	0-10%
>0.3 <= 0.6	–	–	20-30%	–
>0.6 <= 1.4	–	20-30%	–	–
>1.4 <= 4	35-45%	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Figure 4. Plant community growth curve (percent production by month).
UT3241, PNC. Excellent Condition.

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			15–28	
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	15–28	–
Shrub/Vine					
0	Primary Shrubs			71–112	
	Saskatoon serviceberry	AMAL2	<i>Amelanchier alnifolia</i>	28–43	–
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	28–43	–
3	Secondary Shrubs			15–28	
	black sagebrush	ARNO4	<i>Artemisia nova</i>	9–15	–
	yellow rabbitbrush	CHV18	<i>Chrysothamnus viscidiflorus</i>	9–15	–
Grass/Grasslike					
0	Primary Grasses			93–127	
	tufted milkvetch	ASSP6	<i>Astragalus spatulatus</i>	71–84	–
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	71–84	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	15–28	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	9–15	–
1	Secondary Grasses			9–15	
	basin wildrye	LECI4	<i>Leymus cinereus</i>	3–9	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	3–9	–
Forb					
2	Forbs			15–28	
	arrowleaf balsamroot	BASA3	<i>Balsamorhiza sagittata</i>	3–9	–
	Douglas' dustymaiden	CHDO	<i>Chaenactis douglasii</i>	3–9	–
	cushion buckwheat	EROV	<i>Eriogonum ovalifolium</i>	3–9	–
	blue flax	LIPE2	<i>Linum perenne</i>	3–9	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	3–9	–

Animal community

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

Wildlife using this site include blacktail jackrabbit, cottontail, coyote, sage grouse, golden eagle (winter and spring), mule deer, and elk.

Hydrological functions

The soil series is in hydrologic group D. The runoff curve numbers are 80 through 89 depending on the condition of the watershed.

Recreational uses

Hunting, Hiking and Camping

Wood products

Fire Wood and Posts

Other information

Archaeological Values: A few surface finds of projectile points.

Threatened and endangered species include plants and animals.

Type locality

Location 1: Box Elder County, UT	
Township/Range/Section	T12N R17W S31
General legal description	SW ¼, SE ¼, Section 31, Township 12N, Range 17W
Location 2: Box Elder County, UT	
Township/Range/Section	T12N R18W S10
General legal description	SW ¼, SE ¼, Section 10, Township 12N, Range 18W

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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Date	05/15/2011
Approved by	Shane A. Green
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

- Number and extent of rills:** Few. Rills should be 1 to 2 inch deep, up to 5 inches wide, and may extend down the entire slope.

- Presence of water flow patterns:** Water flow patterns are frequent and occur throughout the site. Some exposed roots may be found around perennial plant bases. There is some evidence of current erosion. Flows may extend down the entire slope. There may some evidence of deposition where slope ends.

- Number and height of erosional pedestals or terracettes:** Pedestals form at the base of 20-40% perennial

vegetation. Terracettes are not common. Debris dams of small to medium sized litter (up to 2 inches in diameter) may form in water flow patterns and rills. These debris dams may accumulate smaller litter (leaves, grass and forb stems).

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 20-60% bare ground. Soil surface is typically covered by approximately 35% coarse fragments. Bare ground spaces may be connected and are mostly associated with waterflow patterns, rills and gullies.

5. **Number of gullies and erosion associated with gullies:** Gullies may be present. Length often extends the length of the slope cutting down to exposed tuffaceous sandstone parent material (sandstone which contains volcanic ash). The gullies are usually wide and shallow and armored with exposed parent material and some vegetation. Gullies may remove soil from the base of trees exposing roots.

6. **Extent of wind scoured, blowouts and/or depositional areas:** None.

7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter is moved with even moderate precipitation events and spring runoff, accumulating down slope behind plants and rock features in the site and onto adjacent sites. Woody stems may be washed from site. Gullies may remove accumulated litter from under trees.

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 the plant canopies using the soil stability kit test, and a rating of 2 to 4 in the interspaces. The average should be a 3. Surface texture is gravelly sandy loam. Vegetation cover, litter and/or surface rock reduce erosion.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** (Codquin) Soil surface horizon is 4 inches deep. Structure is single grain. Color is white (2.5YR8/2). An ochric epipedon (light or bleached color) is 4 inches and comprises the A horizon, especially under the tree canopies. 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:** This site has low vegetative cover with up to 60 percent bare ground. While limited juniper and understory shrubs, grasses and forbs are present and provide some erosion protection, the steepness and bareness of the slope are expected to allow some natural erosion to occur even in minor storms.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. Tuffaceous sandstone is typically found at 17 inches and is not considered a compaction layer.

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: Trees (Utah juniper) > Non-sprouting shrubs (Wyoming big sagebrush, bitterbrush) > Perennial bunchgrasses (bluebunch wheatgrass, Indian ricegrass).

Sub-dominant: Sprouting shrubs (Saskatoon serviceberry, green rabbitbrush) > Perennial forbs (arrowleaf balsamroot).

Other: Perennial and annual forbs can be expected to vary widely in their expression in the plant community based upon departures from average growing conditions.

Additional: Disturbance regime includes parasites, insects, drought, and very infrequent fire (100 or more 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, Pubescent wheatgrass, Siberian Wheatgrass etc.) Following a recent disturbance such as fire, drought, or insects that removes the woody vegetation, forbs and perennial grasses (herbaceous species) may dominate the community. If a disturbance has not occurred for an extended period of time, woody species may continue to increase crowding out the perennial herbaceous understory species. In either case, 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):** The plant community is made up of young, mid, and old aged juniper trees (seedling to 400+ years old) perennial grasses and shrubs. Standing dead trees may be present on the site and approximately 5-20 % of the trees can show evidence of decadence. All age classes of perennial grasses should be present under average to above average growing conditions with age class expression likely subdued during below average years or on sites with a high (usually greater than 65%) similarity index (late seral to historic climax). In drought and/or insect/fungus infestations, juniper mortality may increase with the first sign being a yellowish to reddish leaf color.

14. **Average percent litter cover (%) and depth (in):** Litter may only occur under perennial vegetation. Most litter will be herbaceous and depths of 0 to 1/4 inch would be considered normal. Perennial vegetation should be well distributed on the site.

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 150 - 250#/acre on an average year, but could range from 50 to 400#/acre during periods of prolonged drought or above average precipitation.

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Cheatgrass, non-native, invasive forbs such as alyssum.

17. **Perennial plant reproductive capability:** All perennial plants should have the ability to reproduce in most years, except in extreme drought years. Some seedling recruitment of major species should be present during average and above average growing years.
