USDA Natural Resources
Conservation Service

Ecological site R025XY418UT
Mountain Windswept Ridge (Low Sagebrush)

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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.

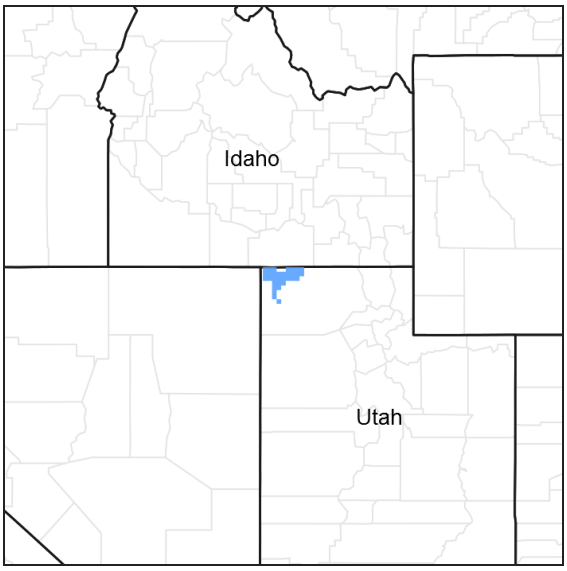

Figure 1. Mapped extent

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

R025XY316UT	**Upland Shallow Loam (Black Sagebrush)** This site is also a similar site with differentiae.
R025XY412UT	**Mountain Gravelly Loam (Mountain Big Sagebrush)**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia arbuscula*
Herbaceous	Not specified

Physiographic features

This site can be found on mountain slopes, hillslopes, and ridges on moderately steep to steep slopes. It can occur at elevations between 6,400 to 8,600 feet, but has occurred up to 10,000 feet on the Nielsen soil component.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope (2) Hill (3) Ridge
Flooding frequency	None
Ponding frequency	None
Elevation	1,951–2,621 m
Slope	20–60%

Climatic features

The climate is cold and snowy in the winter and warm and dry in the summer. Approximately 40 percent of the precipitation comes as rain from June through September. On the average July and August are the driest months and December through March are the wettest months. In average years grasses begin growth around June 1 and end growth around September 30.

Mean Annual Air Temperature: 39-44
Mean Annual Soil Temperature: 41-47

Table 3. Representative climatic features

Frost-free period (average)	0 days
Freeze-free period (average)	85 days
Precipitation total (average)	559 mm

Influencing water features

Soil features

The soils on this site were formed in colluvium derived from mixed metamorphic and sedimentary rocks, including quartzite, schist and gneiss. The soil is well drained with moderate permeability in the upper 10 inches of soil. The soil is also deep with bedrock greater than 20 inches beneath the soil surface. A lithic bedrock layer is found between 40 to 60 inches from the soil surface, while in the Nielson soil component a bedrock layer is found between 10 and 20 inches from the soil surface. The soil texture at the surface is very gravelly loam and surface gravels at between 30 and 38% by cover and subsurface gravels are between 32 and 46% by volume. Surface and subsurface rocks over 3 inches in diameter are under 15% by cover and volume. Available water capacity is between 1.2 and 4.8 in the upper 40 inches of soil. The soil temperature regime is frigid.

Soils associated with this site:
Box Elder Co. UT601 – Broad Canyon (59), Hoodle (81), Nielsen (24, 54)

Table 4. Representative soil features

Surface texture	(1) Very gravelly loam
Drainage class	Well drained
Permeability class	Moderate
Soil depth	102–152 cm
Surface fragment cover <=3"	30–38%
Surface fragment cover >3"	2–11%
Available water capacity (0-101.6cm)	3.05–12.19 cm
Calcium carbonate equivalent (0-101.6cm)	1–3%

Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	6.6–7.8
Subsurface fragment volume <=3" (Depth not specified)	32–46%
Subsurface fragment volume >3" (Depth not specified)	4–11%

Ecological dynamics

As this site deteriorates due to grazing pressure bluebunch wheatgrass, and Idaho fescue decrease while low sagebrush and low rabbitbrush increase. When the potential natural plant community is burned, low sagebrush and Idaho fescue decrease while low rabbitbrush and annuals 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 low sagebrush and grass. The composition by air-dry weight is approximately 50 percent perennial grasses, 20 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	56	127	196
Shrub/Vine	34	76	118
Forb	22	50	78
Total	**112**	**253**	**392**

Table 6. Ground cover

Tree foliar cover	0%

Shrub/vine/liana foliar cover	10-20%
Grass/grasslike foliar cover	15-30%
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	–	15-25%	25-35%	–
>0.6 <= 1.4	–	–	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Figure 4. Plant community growth curve (percent production by month). UT4181, PNC. Excellent Condition.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	20	50	5	10	5	5	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 (%)
Shrub/Vine					
0	**Primary Shrubs**			65–84	
	little sagebrush	ARAR8	*Artemisia arbuscula*	56–71	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	56–71	–
3	**Secondary Shrubs**			9–15	
	prairie sagewort	ARFR4	*Artemisia frigida*	3–9	–
	black sagebrush	ARNO4	*Artemisia nova*	3–9	–
	mountain big sagebrush	ARTRV	*Artemisia tridentata ssp. vaseyana*	3–9	–
	slender buckwheat	ERMI4	*Eriogonum microthecum*	3–9	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	3–9	–
	mountain ball cactus	PESI	*Pediocactus simpsonii*	3–9	–
Grass/Grasslike					
0	**Primary Grasses**			99–140	
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	56–71	–
	Idaho fescue	FEID	*Festuca idahoensis*	28–43	–
1	**Secondary Grasses**			9–15	
	squirreltail	ELEL5	*Elymus elymoides*	3–9	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	3–9	–
	Sandberg bluegrass	POSE	*Poa secunda*	3–9	–
Forb					
0	**Primary Forbs**			17–28	
	spiny phlox	PHHO	*Phlox hoodii*	9–15	–
2	**Secondary Forbs**			3–9	
	Fendler's sandwort	ARFE3	*Arenaria fendleri*	3–9	–
	Torrey's milkvetch	ASCA9	*Astragalus calycosus*	3–9	–
	northwestern Indian paintbrush	CAAN7	*Castilleja angustifolia*	3–9	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	3–9	–
	fewseed draba	DROL	*Draba oligosperma*	3–9	–
	shaggy fleabane	ERPU2	*Erigeron pumilus*	3–9	–
	old man's whiskers	GETR	*Geum triflorum*	3–9	–
	low beardtongue	PEHU	*Penstemon humilis*	3–9	–
	spearleaf stonecrop	SELA	*Sedum lanceolatum*	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, coyote, sage grouse, mule deer, and elk.

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 hydrologic group fro the soils is B and D. The hydrologic curve numbers are 61 and 80 when the vegetation is in good condition.

Recreational uses

Hunting and Hiking

Wood products

None

Other information

Threatened and endangered species are plants and animals.

Type locality

Location 1: Box Elder County, UT	
Township/Range/Section	T14N R17W S5
General legal description	SW ¼ SW ¼ Section 5, Township 14N, Range 17W
Location 2: Box Elder County, UT	
Township/Range/Section	T13N R17W S26
General legal description	SW ¼ NE ¼ Section 26, Township 13N, Range 17W

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	03/30/2007
Approved by	Shane Green
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Many rills present. This site is subject to rilling even in reference condition due to slope, erodible soils, and percent bare ground. 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 other sites that produce large amounts of runoff (i.e. steeper sites, slickrock, rock outcrop).

2. **Presence of water flow patterns:** Water flow patterns are common. Some are long (15-20'). They are generally very widely spaced (about 20-30' apart). Flow patterns occur in low places associated with microtopography commonly occurring on this site.

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, they are the result of litter and soil accumulating at plant bases, forming the appearance of a pedestal.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 30-50% bare ground (soil with no protection from raindrop impact). Very few if any bare spaces of greater than 1 square foot. In general, bare ground increases as production decreases. As species composition of shrubs relative to grasses increases, bare ground is likely to increase. Poorly developed biological soil crust that is susceptible to erosion from raindrop impact should be recorded as bare ground.

5. **Number of gullies and erosion associated with gullies:** Nonte to very few. Gullies should show only minor signs of active erosion and should be mostly stabilized with perennial vegetation and rock fragments. Gullies may show slightly more indication of erosion as slope steepens, or as the site occurs adjacent to steep areas with concentrated flow patterns.

6. **Extent of wind scoured, blowouts and/or depositional areas:** Very minor evidence of active wind-generated soil movement. Wind scoured (blowouts) and depositional areas are rarely present. If present they have muted features and are mostly stabilized with vegetation and/or biological crust.

7. **Amount of litter movement (describe size and distance expected to travel):** Most litter resides in place but on steep slopes (>30%), at least half of the litter is likely to be transported downhill by wind or water short. Litter rarely moves more than 1-2' to next obstruction. Leaves, stems, and small twigs will accumulate at plant bases, against rocks, in soil depressions, or against larger woody litter. Woody litter is not likely to move.

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 4 to 5 under plant canopies and a rating of 3 to 4 in the interspaces with an average rating of 4 using the soil stability kit test.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** A1--0 to 4 inches; very dark brown (10 YR 2/2) gravelly loam, dark grayish brown (10 YR 4/2) dry; weak medium subangular blocky structure; slightly hard, friable, slightly sticky; many fine and medium, and common coarse roots; slightly acid (pH 6.2); clear wavy boundary. (2 to 6 inches thick)

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial**

distribution on infiltration and runoff: Shrubs and well-developed biological soil crusts provide most of the interception of rainfall that prevents erosion. Biological soil crusts are resistant to raindrop impact and splash erosion. Biological soil crusts also provide surface roughness that slows runoff, allowing time for infiltration. Bunchgrasses, if present, may contribute to slowing runoff, but canopy cover from bunchgrasses is too low to provide much rainfall interception. Interspaces between shrubs and biological soil crusts may serve as water flow paths during episodic runoff events, with natural erosion expected in severe storms.

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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):** A compaction layer is not expected.

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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: Dominant: Non-sprouting shrubs (low sagebrush) > sprouting shrubs (yellow rabbitbrush) > perennial cool-season bunchgrasses (Idaho fescue, Sandberg bluegrass, bluebunch wheatgrass)

    Sub-dominant: Sub-dominant: Perennial forbs (spiny phlox, stemless mock goldenweed)

    Other: Other: Other shrubs=other perennial grasses=forbs

    Additional: Disturbance regime includes drought, insects, and very infrequent fire.
    Dominance by average annual production: perennial bunchgrasses > non-sprouting shrubs > native perennial and annual forbs > sprouting shrubs. 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, Siberian wheatgrass etc.)
    Following a recent disturbance such as drought, fire 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.

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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 mortality of bunchgrass and other shrubs may occur during very severe (long-term) droughts. Long-lived species dominate the site. Open spaces from disturbance are quickly filled by new plants through seedlings and asexual reproduction (tillering).

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14. **Average percent litter cover (%) and depth (in):** Litter cover includes litter under plants. Most litter will be fine (herbaceous) litter. Almost all litter is concentrated under plant canopies. Litter between plant canopies is very sparse. Average litter cover is 5-15% and average litter depth is 0.25-0.5 inches.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 200-250 lbs/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.

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, halogeton, kochia, Russian thistle, Utah juniper

17. **Perennial plant reproductive capability:** All perennial plants should have the ability to reproduce sexually or asexually, except in drought years. Density of plants indicates that plants reproduce at level sufficient to fill available resource. Within capability of site there are no restrictions on seed or vegetative reproductive capacity.