

Ecological site R025XY610UT

Subalpine Loam (Subalpine 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.

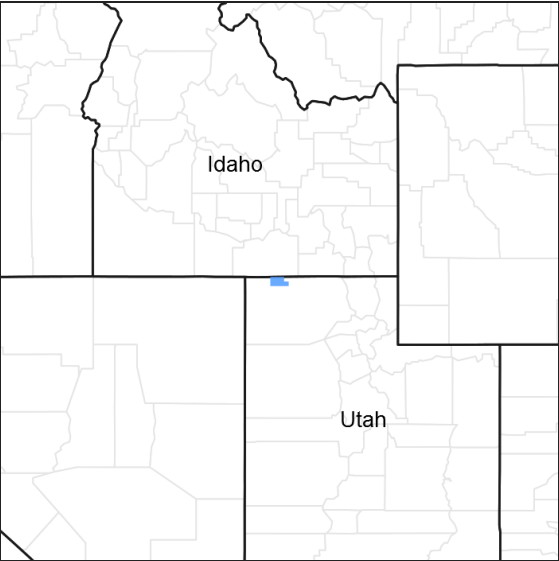


Figure 1. Mapped extent

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

R025XY412UT	Mountain Gravelly Loam (Mountain Big Sagebrush) This site, R025XY412UT, is also a similar site with differentiae. R025XY510UT High Mountain Loam (Subalpine Fir) is also an associated site.
R025XY615UT	Subalpine Windswept Ridge R025XY510UT High Mountain Loam (Subalpine Fir) is also an associated site.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site is found on gentle to steep mountain slopes. It occurs at elevations between 6,200 to 9,500 feet. Flooding or ponding does not occur on this site.

Table 2. Representative physiographic features

Landforms	(1) Mountain (2) Mountain slope
Flooding frequency	None
Ponding frequency	None
Elevation	1,890–2,896 m
Slope	5–30%

Climatic features

The climate is cool and humid with cold, snowy winters. This site tends toward a summer precipitation zone.

Mean Annual Air Temperature: 38-40

Mean Annual Soil Temperature: 40-42

Table 3. Representative climatic features

Frost-free period (average)	0 days
Freeze-free period (average)	35 days
Precipitation total (average)	686 mm

Influencing water features

Soil features

The soils on this site were formed in alluvium derived from quartzite and mica schist. These soils formed on mountain slopes, are well-drained, and have gravels on the surface. The surface soil texture is gravelly loam and the subsoils are gravelly and have coarse fragments in the root zone that average 35% by volume. The soil profile reaches lithic bedrock between 20 and 40 inches below the soil surface. Available water holding capacity ranges from 3.2 to 3.8 inches of water in the upper 40 inches of soil. The soil temperature regime is frigid.

Soils associated with this site:

Box Elder Co. UT601 – Bickmore (7)

Table 4. Representative soil features

Surface texture	(1) Gravelly loam
Drainage class	Well drained
Permeability class	Moderate
Soil depth	51–102 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	25%
Available water capacity (0-101.6cm)	8.13–9.65 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)	6.6–7.8

Subsurface fragment volume <=3" (Depth not specified)	35%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

As this site deteriorates due to grazing pressure the perennial grasses decrease while big sagebrush and crazyweed increase. When the potential natural plant community is burned, big sagebrush, Idaho fescue, and other perennial grasses and forbs decrease while Kentucky bluegrass and crazyweed 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 plant community is composed of approximately 50 percent perennial grasses, 35 percent forbs, and 15 percent shrubs by air-dry weight.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	897	1037	1401
Forb	628	726	981
Shrub/Vine	269	312	420
Total	1794	2075	2802

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	5-10%
Grass/grasslike foliar cover	15-30%
Forb foliar cover	5-20%
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	—	—	—	15-25%
>0.3 <= 0.6	—	—	25-35%	—
>0.6 <= 1.4	—	5-15%	—	—
>1.4 <= 4	—	—	—	—
>4 <= 12	—	—	—	—
>12 <= 24	—	—	—	—
>24 <= 37	—	—	—	—
>37	—	—	—	—

**Figure 4. Plant community growth curve (percent production by month).
UT6101, PNC. Excellent Condition.**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	20	35	30	10	5	0	0	0

**Figure 5. Plant community growth curve (percent production by month).
UT6102, PNC. Bluegrass, Wheatgrass, Big Sagebrush.**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	10	40	45	5	0	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 (%)
Shrub/Vine					
0	Primary Shrubs			213–319	
	big sagebrush	ARTRS2	<i>Artemisia tridentata ssp. spiciformis</i>	213–319	–
3	Secondary Shrubs			64–106	
	yellow rabbitbrush	CHVIL4	<i>Chrysothamnus viscidiflorus ssp. lanceolatus</i>	21–64	–
	mountain snowberry	SYOR2	<i>Symphoricarpos oreophilus</i>	21–64	–
Grass/Grasslike					
0	Primary Grasses			532–852	
	Idaho fescue	FEID	<i>Festuca idahoensis</i>	319–426	–
	spike fescue	LEKI2	<i>Leucopoa kingii</i>	106–213	–
	muttongrass	POFE	<i>Poa fendleriana</i>	106–213	–
1	Secondary Grasses			213–319	
	Geyer's sedge	CAGE2	<i>Carex geyeri</i>	21–64	–
	spreading wheatgrass	ELSC4	<i>Elymus scribneri</i>	21–64	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	21–64	–
	alpine timothy	PHAL2	<i>Phleum alpinum</i>	21–64	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	21–64	–
	spike trisetum	TRSP2	<i>Trisetum spicatum</i>	21–64	–
Forb					
0	Primary Forbs			256–426	
	common yarrow	ACMI2	<i>Achillea millefolium</i>	64–106	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	64–106	–
	cutleaf daisy	ERCO4	<i>Erigeron compositus</i>	64–106	–
	white locoweed	OXSE	<i>Oxytropis sericea</i>	64–106	–
2	Secondary Forbs			213–319	
	littleleaf pussytoes	ANMI3	<i>Antennaria microphylla</i>	21–64	–
	cushion buckwheat	EROV	<i>Eriogonum ovalifolium</i>	21–64	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	21–64	–
	narrowleaf plantain	PLLA	<i>Plantago lanceolata</i>	21–64	–
	slender cinquefoil	POGR9	<i>Potentilla gracilis</i>	21–64	–
	common dandelion	TAOF	<i>Taraxacum officinale</i>	21–64	–

Animal community

This site supports green feed until frost and is valuable to maintain animal gains throughout the summer. Cattle, sheep and horses find excellent grazing use on this site during the summer and fall until snow covers the plants. Snow occurs in late October and November.

This site supports elk, mule deer, snowshoe hare, small rodents, songbirds, cougars, bear, golden eagles, bald eagles, and coyotes for at least part of the season.

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

Soils in this site are in C hydrologic group. When in climax condition, this site has hydrologic curves ranging from 81 to 78. Refer to SCS National Engineering Handbook, Section 4, to determine runoff quantities from these curves. When range condition has declined from the potential, field investigations are needed in order to determine hydrologic curve numbers. Use from UT-Range-2 for this purpose.

Recreational uses

This site has high values for aesthetics and natural beauty. It is good for elk and deer hunting and has high potential for skiing and snowmobiling.

Wood products

None

Other information

Threatened and endangered species include plants and animals.

Type locality

Location 1: Box Elder County, UT	
General legal description	Top of Raft River Mountains, South of Yost, Utah, Box Elder County

Contributors

G. Brock Benson

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	03/30/2007
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.

2. **Presence of water flow patterns:** Water flow patterns will be very short (3-6'), narrow (<1'), and meandering; interrupted by plants and exposed rocks. Slight to no evidence of erosion or deposition associated with flow patterns. Where slopes exceed 5%, water flow patterns may be of medium length (5 –10 feet).
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3. **Number and height of erosional pedestals or terracettes:** Plants may have small pedestals where they are adjacent to water flow patterns, but without exposed roots. Terracettes should be few and stable. Terracettes should be small 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.
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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 15-25% 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.
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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. 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.
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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 water flow paths with deposition occurring at points of obstruction. Where litter movement does occur, litter accumulates at plant bases. 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 to 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):** A1--1 to 3 inches; dark brown (10YR 3/3) gravelly silt loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; loose, very friable, nonsticky, slightly plastic; many fine and common medium roots; 20 percent gravel; noncalcareous; slightly acid (pH 6.5); abrupt wavy boundary. (2 to 7 inches thick)
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Bunchgrasses and shrubs are equally important for increasing infiltration and

reducing runoff. Plant litter and canopy cover from all functional groups intercept rainfall and prevent splash erosion. Bunchgrasses contribute organic matter directly to soil through root decay, and organic matter helps stabilize soil aggregates and maintain soil porosity. Shrubs hold snow and slow wind evaporation. Bunchgrass bases intercept litter and soil in water flow paths, reducing runoff. Biological soil crusts (where present) are resistant to raindrop impact and splash erosion. Spatial distribution of vascular plants and well-developed biological soil crusts (where present) provides detention storage and surface roughness that slows runoff allowing time for infiltration. Interspaces between plants and any well-developed biological soil crusts (where present) may serve as water flow patterns during episodic runoff events, with natural erosion expected in severe storms.

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: Perennial cool-season bunchgrasses (Idaho fescue, spike fescue, muttongrass) > non-sprouting shrubs (big sagebrush)

Sub-dominant: Sub-dominant: Perennial forbs (common yarrow, white sagebrush, cutleaf daisy, white locoweed)

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

Additional: Disturbance regime includes fire, drought, and insects. Assumed fire cycle of 30-80 years.

Dominance is based on average annual production, air dry weight: Perennial bunchgrasses > native perennial and annual forbs > non-sprouting shrubs > 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. Smooth brome, etc.)

Following a recent disturbance such as drought or insects that remove 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):** 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. There may be partial mortality of individual bunchgrasses and shrubs during less severe drought and toward the end of the fire cycle. 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. Litter will be concentrated under plant canopies and sparser between plant canopies, with an average cover of 15-35% and an average depth of 0.5-1 inches. Litter cover may increase 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): 1800-1900 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: leafy spurge, thistles
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17. **Perennial plant reproductive capability:** All perennial plants should have the ability to reproduce in all years, with limited reproduction in extreme drought years.
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