

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.

Landforms	(1) Mountain (2) Mountain slope
Flooding frequency	None
Ponding frequency	None
Elevation	6,200–9,500 ft
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)	27 in

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	20–40 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	25%
Available water capacity (0-40in)	3.2–3.8 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	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



State 1 submodel, plant communities



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 (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	800	925	1250
Forb	560	648	875
Shrub/Vine	240	278	375
Total	1600	1851	2500

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 (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	-	-	-	-
>0.5 <= 1	-	-	-	15-25%
>1 <= 2	-	-	25-35%	-
>2 <= 4.5	-	5-15%	-	-
>4.5 <= 13	-	-	-	-
>13 <= 40	-	-	-	-
>40 <= 80	-	-	-	-
>80 <= 120	-	-	-	-
>120	_	_	_	_

Figure 3. 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 4. Plant community growth curve (percent production by month). UT6102, PNC. Bluegrass, Wheatgrass, Big Sagebrush.

Jan	Feb	Mar	Apr	Мау	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 (Lb/Acre)	Foliar Cover (%)		
Shrub/Vine							
0	Primary Shrubs			190–285			
	big sagebrush	ARTRS2	Artemisia tridentata ssp. spiciformis	190–285	-		
3	Secondary Shrubs			57–95			
	yellow rabbitbrush	CHVIL4	Chrysothamnus viscidiflorus ssp. Ianceolatus	19–57	-		
	mountain snowberry	SYOR2	Symphoricarpos oreophilus	19–57	-		
Grass	/Grasslike						
0	Primary Grasses			475–760			
	Idaho fescue	FEID	Festuca idahoensis	285–380	-		
	spike fescue	LEKI2	Leucopoa kingii	95–190	-		
	muttongrass	POFE	Poa fendleriana	95–190	-		
1	Secondary Grasses			190–285			
	Geyer's sedge	CAGE2	Carex geyeri	19–57	-		
	spreading wheatgrass	ELSC4	Elymus scribneri	19–57	_		
	western wheatgrass	PASM	Pascopyrum smithii	19–57	-		
	alpine timothy	PHAL2	Phleum alpinum	19–57	-		
	Sandberg bluegrass	POSE	Poa secunda	19–57	-		
	spike trisetum	TRSP2	Trisetum spicatum	19–57	-		
Forb							
0	Primary Forbs			228–380			
	common yarrow	ACMI2	Achillea millefolium	57–95	-		
	white sagebrush	ARLU	Artemisia ludoviciana	57–95	-		
	cutleaf daisy	ERCO4	Erigeron compositus	57–95	-		
	white locoweed	OXSE	Oxytropis sericea	57–95	-		
2	Secondary Forbs		-	190–285			
	littleleaf pussytoes	ANMI3	Antennaria microphylla	19–57	-		
	cushion buckwheat	EROV	Eriogonum ovalifolium	19–57	-		
	spiny phlox	PHHO	Phlox hoodii	19–57	-		
	narrowleaf plantain	PLLA	Plantago lanceolata	19–57			
	slender cinquefoil	POGR9	Potentilla gracilis	19–57	-		
	common dandelion	TAOF	Taraxacum officinale	19–57	_		

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

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

Indicators

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.

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

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).
- 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%.
- 15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annualproduction): 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
- 17. **Perennial plant reproductive capability:** All perennial plants should have the ability to reproduce in all years, with limited reproduction in extreme drought years.