

Ecological site R025XY414UT

Mountain Mahogany Thicket (Curl-leaf Mountain Mahogany)

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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.

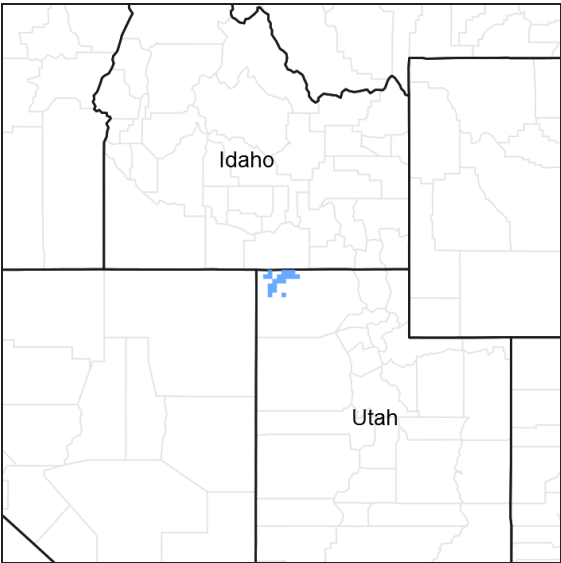


Figure 1. Mapped extent

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)
R025XY412UT	Mountain Gravelly Loam (Mountain Big Sagebrush) This site is also a similar site with defferentiae including soil and vegetation.
R025XY416UT	Mountain Shallow Loam (Low Sagebrush)

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Cercocarpus ledifolius</i>
Herbaceous	Not specified

Physiographic features

This site can be found on ridges on mountain slopes with slopes between 30 and 60%. It can occur at elevations between 6,300 to 8,300 feet. Flooding and ponding do not occur on this site.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope (2) Ridge
Flooding frequency	None
Ponding frequency	None
Elevation	1,920–2,530 m
Slope	30–60%

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. Because of the unique geographical setting of this site usually situated on ridge tops, craggy mountainous areas etc., effective precipitation is fairly limited due to the exposure of the site to wind and solar radiation. The high percentage of rock outcrop and extreme shallowness of the soils account for a high evapotranspiration rate during the summer months.

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)	80 days
Precipitation total (average)	559 mm

Influencing water features

Water erosion hazard is slight to moderate.

Soil features

The soils on this site were formed in colluvium and residuum derived from quartzite. The soil is well drained with moderately rapid permeability in the upper 10 inches of soil. The soil is also shallow with bedrock less than 20 inches beneath the soil surface. A lithic bedrock layer is found between 10 and 20 inches below the soil surface. These soils have high amounts of rock fragments and may have little to no pedogenic development. The soil texture at the surface is very gravelly sandy loam and surface gravels are 34% by cover and subsurface gravels are 39% by volume. Surface and subsurface rocks over 3 inches in diameter are less than 15% by cover or volume. Available water capacity is between 0.4 and 0.7 in the upper 40 inches of soil. Where subsoil does occur, it is normally neutral to slightly acid in reaction. The soil pH is between 6.6 and 7.3. The soil temperature regime is frigid.

Soils associated with this site:

Box Elder Co. UT601 – Eyre (6)

Table 4. Representative soil features

Surface texture	(1) Very gravelly sandy loam
Drainage class	Well drained
Permeability class	Moderately rapid
Soil depth	25–51 cm
Surface fragment cover ≤3"	34%
Surface fragment cover >3"	0%

Available water capacity (0-101.6cm)	1.02–1.78 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)	6.6–7.3
Subsurface fragment volume <=3" (Depth not specified)	39%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

As this site deteriorates due to grazing pressure bluebunch wheatgrass, Idaho fescue, and balsamroot decrease while, low rabbitbrush, curleaf mountainmahogany, and mountain big sagebrush increase. When the potential natural plant community is burned, curleaf mountainmahogany, and mountain big sagebrush decrease while low rabbitbrush, and tobaccobrush 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 curleaf mountainmahogany. The composition by air-dry weight is approximately 15 percent perennial grasses, 10 percent forbs, and 75 percent shrubs.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	588	967	1345
Grass/Grasslike	118	194	269
Forb	78	129	179
Total	784	1290	1793

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	20-75%
Grass/grasslike foliar cover	5-10%
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	—	—	5-15%	—
>0.6 <= 1.4	—	—	—	—
>1.4 <= 4	—	70-80%	—	—
>4 <= 12	—	—	—	—
>12 <= 24	—	—	—	—
>24 <= 37	—	—	—	—
>37	—	—	—	—

Figure 4. Plant community growth curve (percent production by month).
UT4141, 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			820–942	
	curl-leaf mountain mahogany	CELE3	<i>Cercocarpus ledifolius</i>	740–807	–
	mountain snowberry	SYOR2	<i>Symphoricarpos oreophilus</i>	40–67	–
	mountain big sagebrush	ARTRV	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	40–67	–
3	Secondary Shrubs			13–40	
	Saskatoon serviceberry	AMAL2	<i>Amelanchier alnifolia</i>	13–40	–
	black sagebrush	ARNO4	<i>Artemisia nova</i>	13–40	–
	snowbrush ceanothus	CEVE	<i>Ceanothus velutinus</i>	13–40	–
	yellow rabbitbrush	CHVIL4	<i>Chrysothamnus viscidiflorus</i> ssp. <i>lanceolatus</i>	13–40	–
	mormon tea	EPVI	<i>Ephedra viridis</i>	13–40	–
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	13–40	–
	creeping barberry	MARE11	<i>Mahonia repens</i>	13–40	–
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	13–40	–
	sticky currant	RIVI3	<i>Ribes viscosissimum</i>	13–40	–
	Nuttall's horsebrush	TENU2	<i>Tetradymia nuttallii</i>	13–40	–
Grass/Grasslike					
0	Primary Grasses			121–202	
	Idaho fescue	FEID	<i>Festuca idahoensis</i>	40–67	–
	basin wildrye	LECI4	<i>Leymus cinereus</i>	40–67	–
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	40–67	–
1	Secondary Grasses			67–135	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	13–40	–
	Thurber's needlegrass	ACTH7	<i>Achnatherum thurberianum</i>	13–40	–
	California brome	BRCA5	<i>Bromus carinatus</i>	13–40	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	13–40	–
	rock melicgrass	MEST	<i>Melica stricta</i>	13–40	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	13–40	–
Forb					
2	Forbs			135–202	
	common yarrow	ACMI2	<i>Achillea millefolium</i>	13–40	–
	freckled milkvetch	ASLE8	<i>Astragalus lentiginosus</i>	13–40	–
	Hooker's balsamroot	BAHO	<i>Balsamorhiza hookeri</i>	13–40	–
	arrowleaf balsamroot	BASA3	<i>Balsamorhiza sagittata</i>	13–40	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	13–40	–
	cushion buckwheat	EROV	<i>Eriogonum ovalifolium</i>	13–40	–
	oneflower helianthella	HEUN	<i>Helianthella uniflora</i>	13–40	–
	western stoneseed	LIRU4	<i>Lithospermum ruderales</i>	13–40	–
	low beardtongue	PEHU	<i>Penstemon humilis</i>	13–40	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	13–40	–

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.

Hydrological functions

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

Recreational uses

Hunting and Hiking

Wood products

Curlleaf mountainmahogany furnishes some fence posts and stays. Firewood for fireplaces and campfires can be harvested, but the wood is difficult to cut with an axe after it is dry. Knick-knacks and other novelties as lamp stands, etc. can be made from this wood.

Other information

Threatened and endangered species include plants and animals.

Type locality

Location 1: Box Elder County, UT	
Township/Range/Section	T11N R17W S24
General legal description	NW ¼ SE ¼ Section 24, Township 11N, 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.

Author(s)/participant(s)	Brock Benson (NRCS), Shane A. Green (NRCS), Robert D. Stager (BLM), Mike Gates (BLM), Tyler Staggs (BLM), Alan Bass (BLM).
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:** Some rills present. 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):** 15-30% 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.

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 8 inches; brown (10YR 4/3) sandy loam, dark brown (10YR 3/3) moist; weak very fine granular structure; soft, very friable; 10 percent angular sandstone pebbles and flagstones; many roots; medium acid; clear wavy boundary. (5 to 15 inches thick)

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Bunchgrasses, rhizomatous grasses, and shrubs provide nearly continuous canopy cover, which effectively intercepts rainfall and protects soil from erosion. Extensive root systems provide ample organic matter to the soil, resulting in very high water-holding capacity. Infiltration rates vary with soil type. Runoff is expected to be minimal.
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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: Sprouting shrubs (curl-leaf mountain mahogany, mountain snowberry) > Perennial cool-season bunchgrasses (Idaho fescue, bluebunch wheatgrass)
- Sub-dominant: Sub-dominant: Non-sprouting shrubs (mountain big sagebrush) = Tall perennial bunchgrass (basin wildrye)
- Other: Other: Perennial forbs > other perennial grasses > other shrubs
- Additional: Disturbance regime includes fire, drought, and insects. Assumed fire cycle of 50-80 years.
Dominance is based on average annual production, air dry weight: Sprouting shrubs > Perennial bunchgrasses > non-sprouting shrubs > native perennial and annual forbs.
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, intermediate wheatgrass, Siberian Wheatgrass etc.)
Following a recent disturbance such as drought or fire that remove the woody vegetation, forbs and perennial grasses (herbaceous species) may dominate the community. 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. 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 15-30% 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):** 1100-1200 lbs/acre.
- Even the most stable communities exhibit a range of production values. Production will vary between communities and across the MRLA. 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, Russian thistle, Utah juniper
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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.
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